# Embroidery Business from Home

## Business model and digitizing training course

by Martin Barnes


www.embroideryhomebusiness.com

# *EMBROIDERY BUSINESS FROM HOME*

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*by Martin Barnes*

## Volume 2: Digitizing Training

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# Chapter 5 – Basic digitizing

In this chapter I will teach you all the basic things you need to know in order to start digitizing. This is a complete analysis covering all basic things a digitizer needs to know as far as the digitizing process is concerned, plus secrets on how to calculate cost and selling price of embroideries. You will learn how digitizers and embroiderers charge their customers, and the secret they don't want you to know about how they price digitizing. It is important for you to know that possibly the majority of digitizers out there know much less than you will learn in this chapter alone. If you add the knowledge that you will get from Chapters 6 (Lettering), 8 (Advanced digitizing techniques) and the training videos of this course, then you will outrun most of your competition. The number of ignorant digitizers out there will amaze you when you enter the business. If you correctly apply marketing techniques and the knowledge you will get from the next 5 Chapters, then you will surely make a fortune out of embroidery. So, let's make you a top class embroidery digitizer now.

## *The three basic stitch types*

There are many stitch types in embroidery, but three of them are the basic ones: Running stitch, Satin stitch and Fill stitch. You will use one or more of these stitch types in more than 95% of your work, so you'd better get used to working with them. In order to help you understand the difference of those three stitch types, I will present the same design digitized using all three of them, and also provide zoomed view for better explanation.

## *Running stitch*

The running stitch is the basic stitch type in hand-sewing and embroidery, on which all other forms of sewing are based. The stitch is worked by passing the needle in and out of the fabric. Running stitches may be of varying length, but as a rule more thread is visible on the top of the embroidery than on the underside. It can be used to create complete embroidery designs, but usually it is just being

used as part of a design, for example as an outline, or on top of fill stitch in order to tone the shadows of the image.

In image 2 you can see a design entirely made of running stitch:

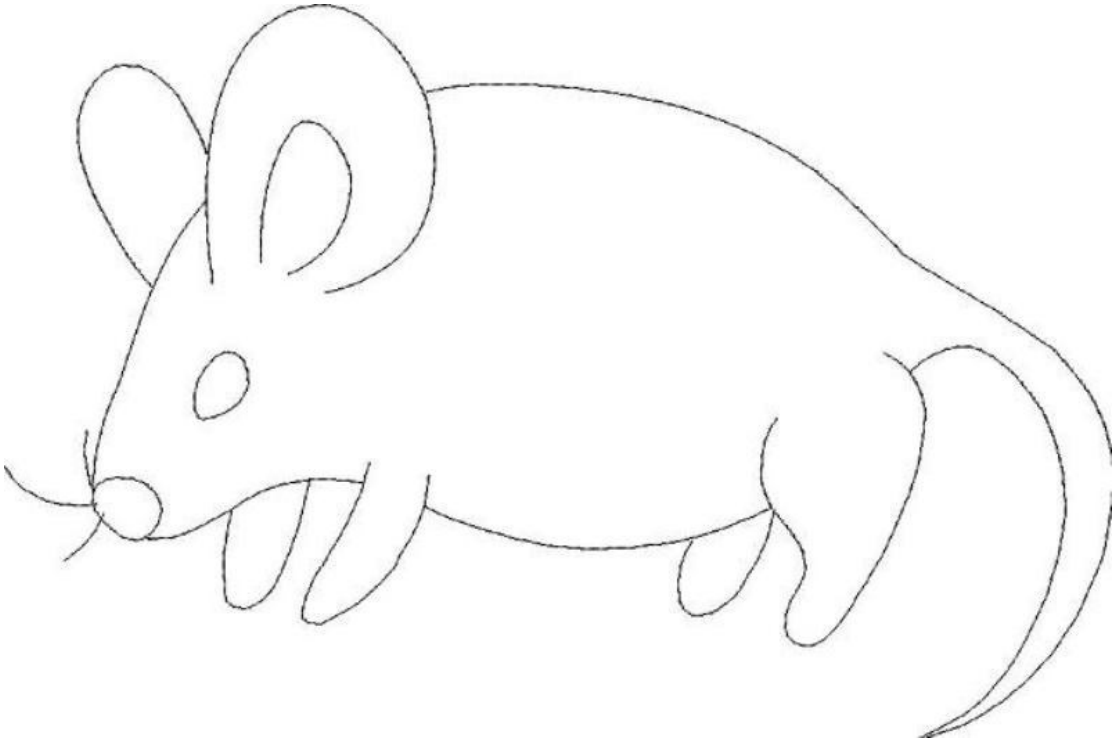


**Image 2 – Running stitch mouse**

What is basically being done when you digitize a design with running stitch, is that the needle brings down the thread and embroiders the outline of the design, the way you have digitized it in your embroidery software. It is the simplest, quickest and most inexpensive stitch type, since it uses the least amount of thread, the design is being embroidered in minimum amount of time, which means less electrical power and less working hours for embroidering, plus the digitizing is easier than other stitch types, which also means less working hours for digitizing. Let's see up close how the machine embroiders this design:

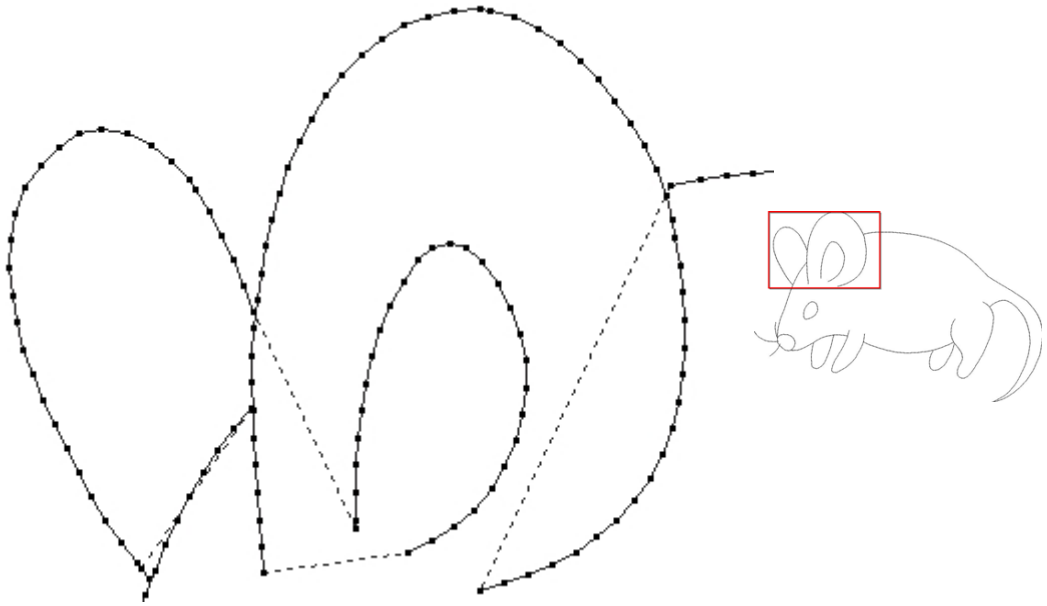


**Image 3 – Close view of running stitch embroidery**

What you actually see in image 3 is a close look of the mouse's ears, as the small image on the right indicates. The little dots are the stitching points, which means the machine will hit the fabric on these points, penetrate it, and then go out in order to do the same on the next point. This repeated movement results in running stitch type. The distance from one stitch to the next is called *"step length"* and can be adjusted using the embroidery software.

The dash lines in my design suggest *"jump stitches"*. A jump stitch occurs when there are areas of a design that are of the same color, but separated from each other. In that case the machine goes from one place to the other without penetrating the fabric and without cutting the thread, thus it jumps from the last stitch of the already embroidered block (a design is consisted of a number of blocks which the digitizer creates) to the first stitch of the next block, and that is why it is called jump stitch. We will see jump stitches more analytically in sub-chapter "connecting the stitch blocks" of Chapter 7 – Advanced digitizing techniques.

## *Satin stitch*

Satin stitch is an embroidery stitch type worked in parallel lines so closely and evenly as to resemble satin. What the machine does is hit a stitch point, then hit a point opposite from it, and then do the same thing in parallel lines and in small distance from the previous one. The distance between the opposite stitch points is adjustable and it is advised not to exceed 0.25 inches. The distance between the stitch points of the parallel lines is adjustable and can be set through the "density" that the digitizer gives to the design from the appropriate setting of his embroidery software. You can find out more about density in the appropriate sub-chapter "changing density" of this Chapter.

In Image 4 below, you can see the mouse image digitized in satin stitch type:

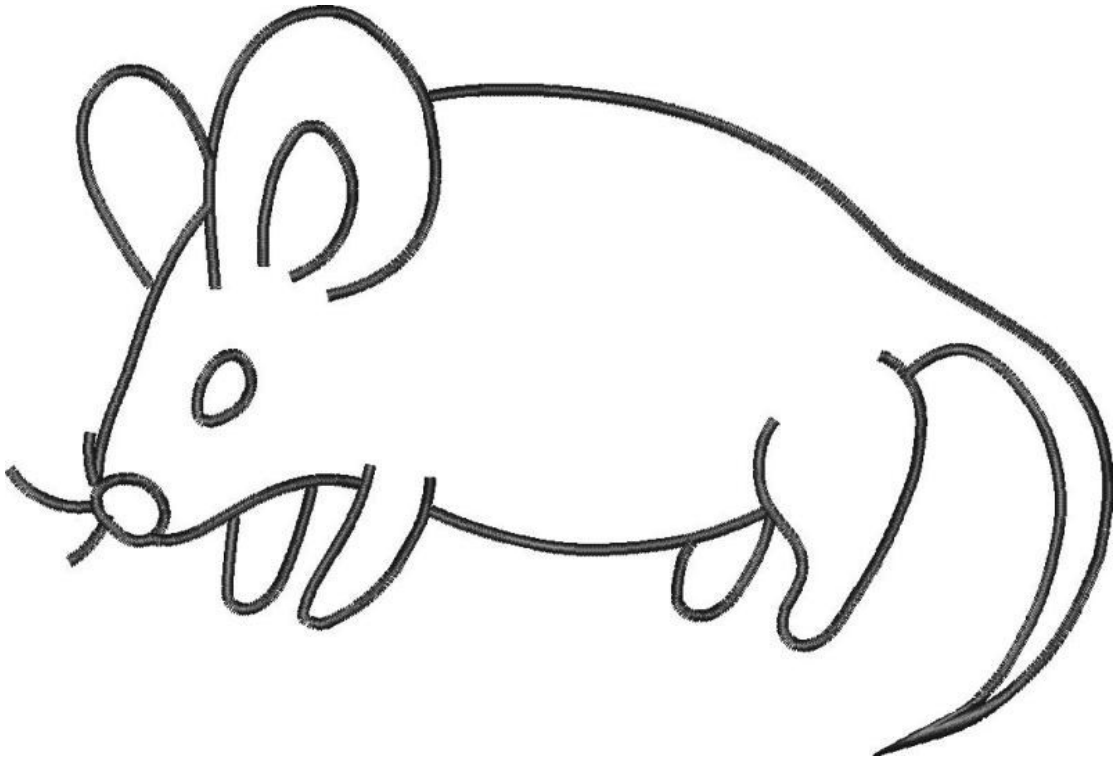


**Image 4 – Satin stitch mouse**

As you can see, the visual outcome of digitizing the same design with satin stitch instead of running stitch is that it looks similar, since the satin stitch also embroiders only the outline, but bolder since the satin stitch embroiders in two

opposite stitch points in each point of the outline, instead of one that the running stitch does. Let's see satin stitch in zoomed view in order to understand the difference:

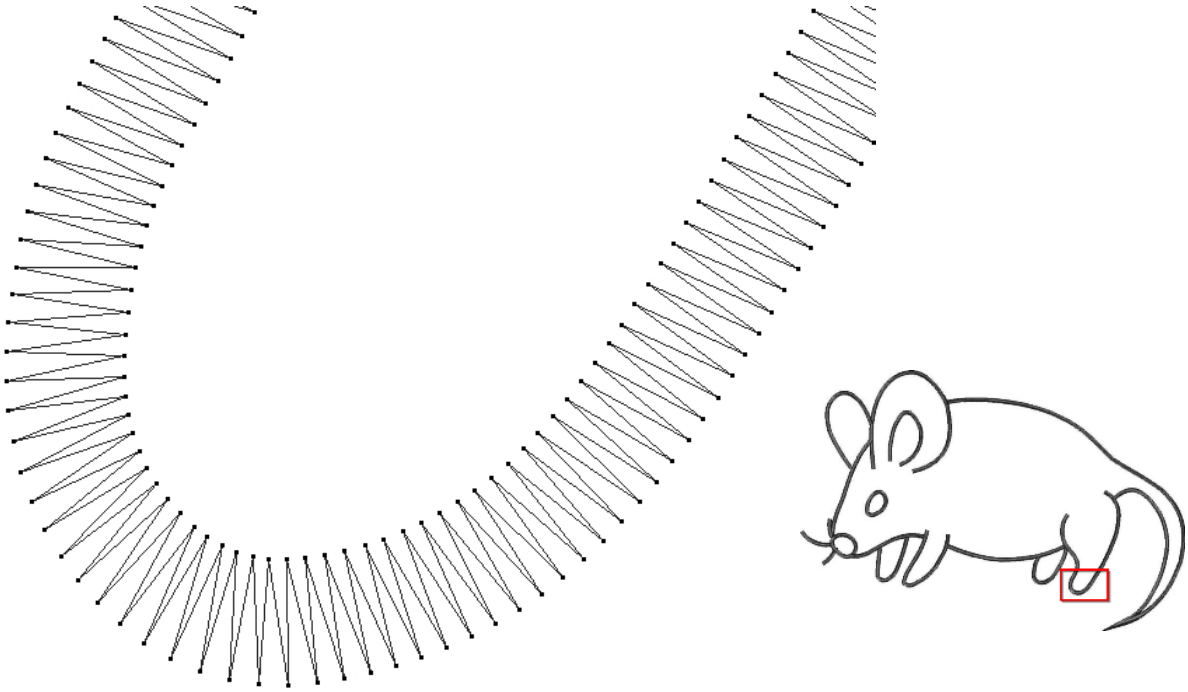


**Image 5 – Close view of satin stitch embroidery**

As you can see in the close view of the satin stitch embroidery (Image 5), there are two opposite stitches in each outline point, which are being repeated in parallel lines. I have chosen to zoom at a curve intentionally, in order for you to see how the satin stitch turns.

As you can see, the embroidery outcome using satin stitch is entirely different compared to the one using running stitch, and the "extra uses" of satin stitch are different as well. Satin stitch, apart from digitizing the whole design with, is being used for outlining or for holding appliqué (see chapter 7). It is also the most common stitch type used to embroider letters, as long as the satin does not exceed 0.25 inches in width. If it does, there is another satin stitch subtype called "long satin", which is used in satins that exceed 0.25 inches in width, and many good embroidery software will offer this setting to you:

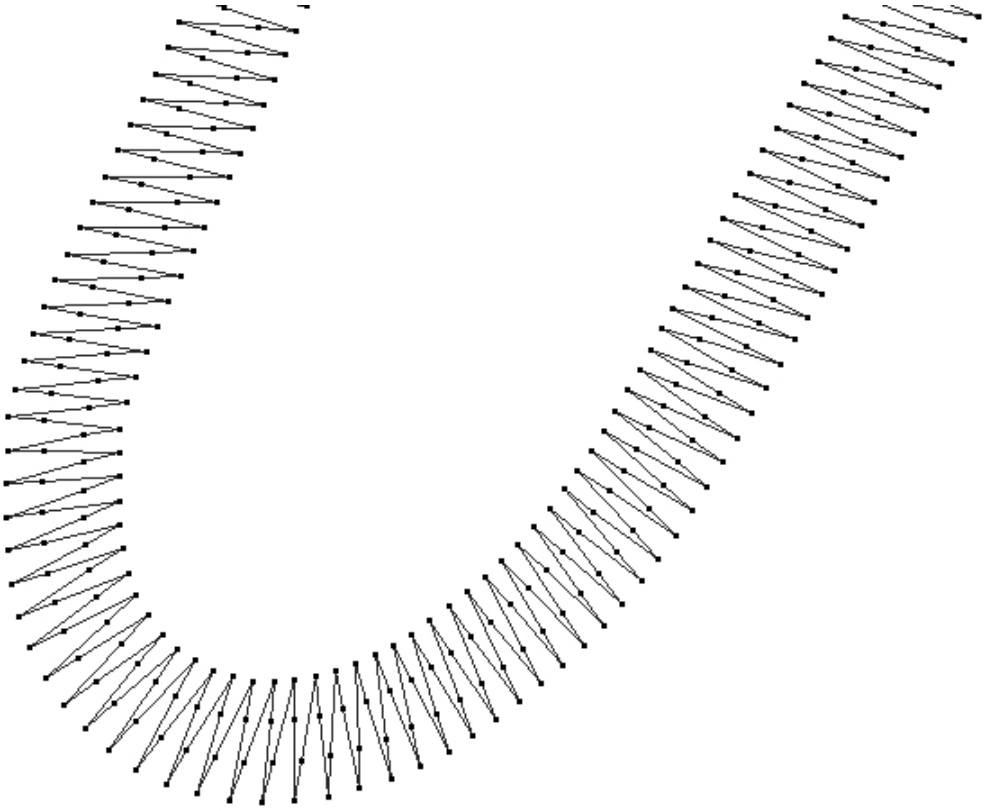


**Image 6 – Long satin**

What you basically do here, is put one or two intermediate stitch points in the satin in order to keep it stable if it exceeds 0.25 inches. If you don't do that and your satin is bigger than 0.25 inches, then it will definitely unravel pretty easily. The bigger the satin the quicker it will unravel. You must remember this, because this is a common mistake many embroiderers make, and, as we have discussed, quality is your strong point, so no satin with size bigger than 0.25 inches, or else you must use long satin. The alternative of using long satin if the size is bigger that 0.25 inches, is using a different stitch type called "fill stitch". Using fill stitch instead of satin stitch will have a different visual outcome in the finished embroidery, but it will be stable and strong.

## *Fill stitch*

Fill stitch is an embroidery stitch type that fills an entire area with stitches in several ways. The main difference with running and satin stitch types is that the

entire design area is filled with stitches. Also, fill stitch has many variations, and each embroidery software will offer a vast selection for you to experiment with. These functions are what makes modern embroidery digitizing more of an art than labor. Below you can see the mouse digitized using fill stitch and satin stitch for the outline:

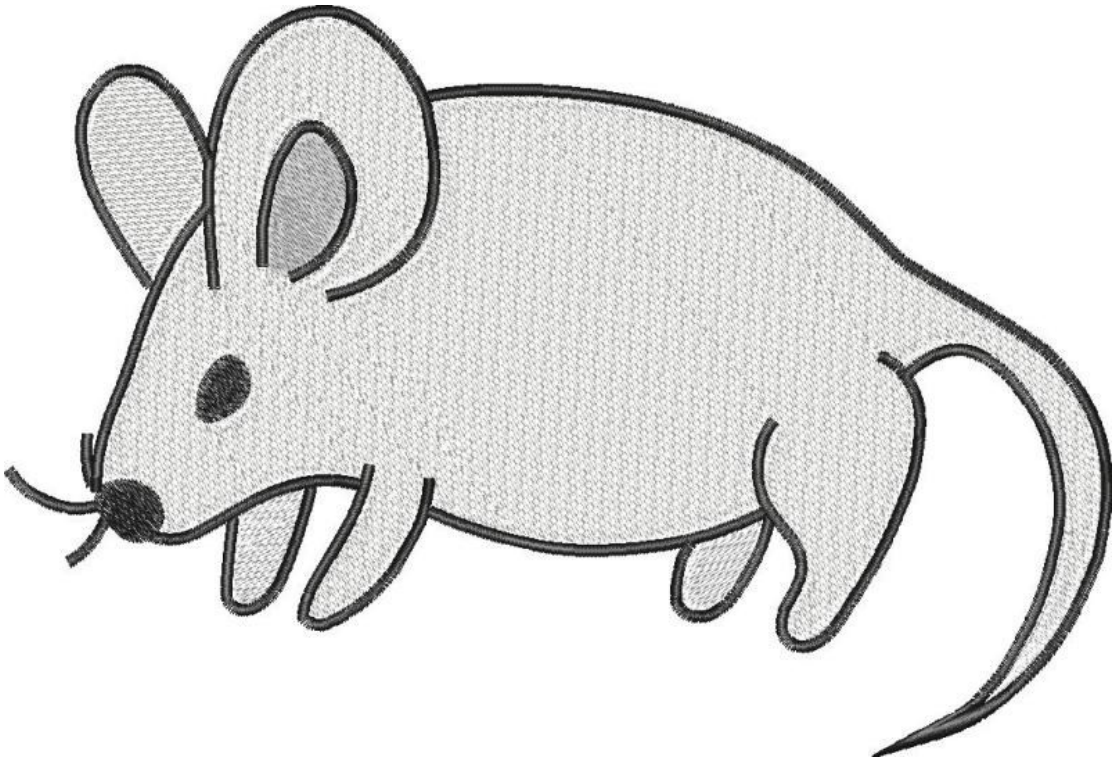


**Image 7 – Fill stitch mouse**

As you can see, the entire area of the design is covered with stitches. In this design I have used 3 colors, black for the satin outline, the nose and the eye, gray for the fill and darker gray for the inner part of the ear. This variation of the mouse is the most complete and beautiful, but the most expensive, since it will use much more thread, it will take much longer to embroider, which means higher electrical power cost and more working hours for embroidery, plus more working hours for digitizing. Most designs that you will create though will use fill stitch, since you do not target lower possible cost, but high quality products in a niche market.

In image 8 you can see a second variation of the light gray fill stitches covering the mouse:

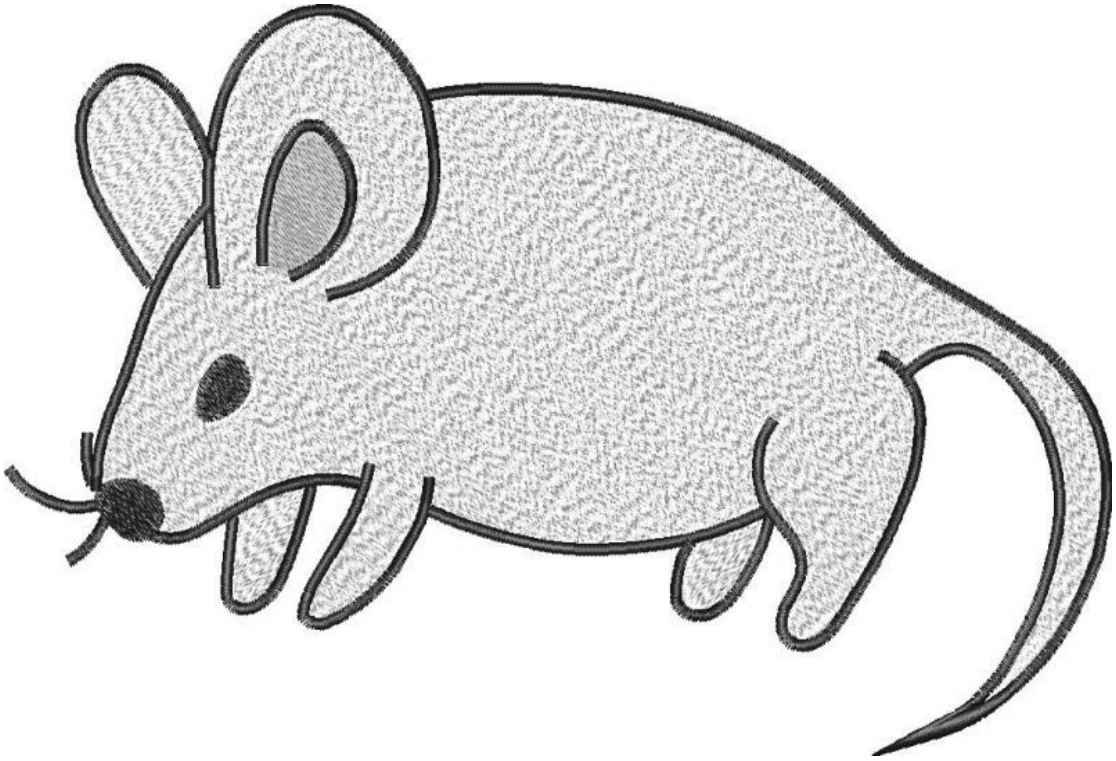


**Image 8 – Different type of fill stitch**

I personally like the second one better since the fur is more realistic. What I just did after digitizing it was just changing the stitch type variation. You must experiment with these functions as much as possible once you choose and buy your embroidery software.

Now, let's take a closer look on the fill stitch in order to understand how it works. In image 9, you can again see the leg of the mouse. You can see the satin outline as we did previously, but now the inner area of the leg is also filled with stitches. The pattern is that the machine hits the fabric and covers it in stitches by moving in X and Y axis, like a printer fills a paper with ink. The distance between the stitches is the step length, as we have already seen in the previous sub chapter, and you can change it from within your embroidery software. The closeness of stitches can be also set from within your software by changing the parameter "density".

Concerning the sequence of your embroidery (which part will be embroidered first, second and so on), you can set it from within your embroidery software. In this example, the fill stitches are being embroidered before the satin stitch blocks, in order for the satins to cover the fills, which results in much better and stable embroidery.

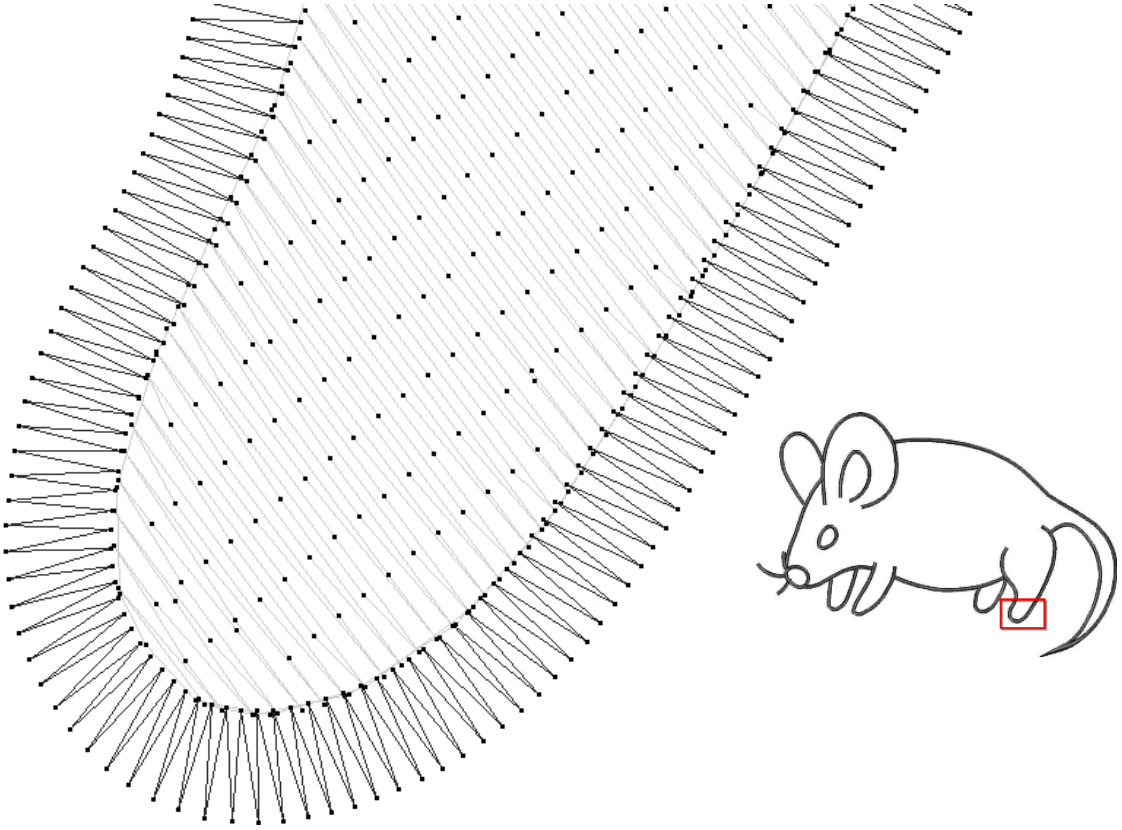


**Image 9 – Close view of fill stitch embroidery**

## *Using underlay*

Underlay acts like a skeleton in an embroidery design. These underlay stitches are laid down before the upper decorative stitches are being stitched, and are much lighter in coverage, which means they have much lower density. Just consider it like this: As the bones of your skeleton provide support for your body, so does underlay support an embroidery design; it is the foundation of a good

design and provides stability to maintain the design's integrity. Proper underlay is vital in order to have good embroidery results. The purposes of underlay are to stabilize the fabric, and to support and provide structure for the top stitching.

There are two types of underlay, "edgewalk underlay" and "fill underlay".

Edgewalk underlay is an outline running stitch of the design. There is a variation of this called "centerwalk underlay", which simply puts a line of running stitch up the center of the design instead of the outline.

Fill underlay is the heaviest underlay, and covers the entire design area with underlay stitches. It is used on designs digitized for textured fabric like corduroy or terry cloth, in order to keep the fabric stable for the upper decorative stitching. In image 10 you can see a fill underlay stitching:

**Image 10 – Fill underlay**

Underlay supports the top stitching by maintaining a crisp, well-defined edge between abutting areas of stitches. Underlay also prevents stitches from sinking into the fabric. Highly textured fabrics, like terry cloth towels can benefit from a light “net” of underlay to hold down the nap and provide a smooth, even surface for later stitches.

Digitizers also employ underlay creatively to add additional loft to some sections of embroidery to add interest, depth, and realism. They may also intentionally delete underlay to create blending and shading.

It is good to use even a light underlay in most designs, and fill underlay when needed, since it is a safety net for a good design. It helps embroider on difficult to embroider materials, and also prevents the stitching to go out of the stitching area due to fabric stretch or shrink during the embroidery process.



**Image 11 – Difference between area with underlay and area with underlay and upper stitching**

In Image 11 you can see the difference of the underlay with the upper stitching. On the left part of the image, the design is only covered with fill underlay stitching, while on the right it is covered with fill underlay stitching and upper stitching.

Underlay is not necessary in designs made with running stitch, since running stitch type doesn't cause fabric distortion like fill or satin stitch do. Moreover, underlay is not necessary when embroidering non-fabrics, like leather, un-backed vinyl, wood, metal, paper etc.

## *Changing Density*

Density is the distance between individual stitches in a satin stitch type or between rows of stitches in a fill stitch type. The closer the rows are to each other, the denser an area of stitches is. Density of a design is a very important setting that you will have to set in all the designs that you will create, and all embroidery software will offer you this ability.

The setting of density might be confusing because the bigger the number you set, the less dense the area will be, and the smaller the number you set, the denser the area will be. This is due to the measuring system, which measures space between stitches, so the smaller the number the more stitches in an area. A number of 4 to 4.5 is considered to be a normal one and is mostly used by digitizers. Image 11 will help you understand the difference. The upper design has a density setting of 8 and the lower of 2.

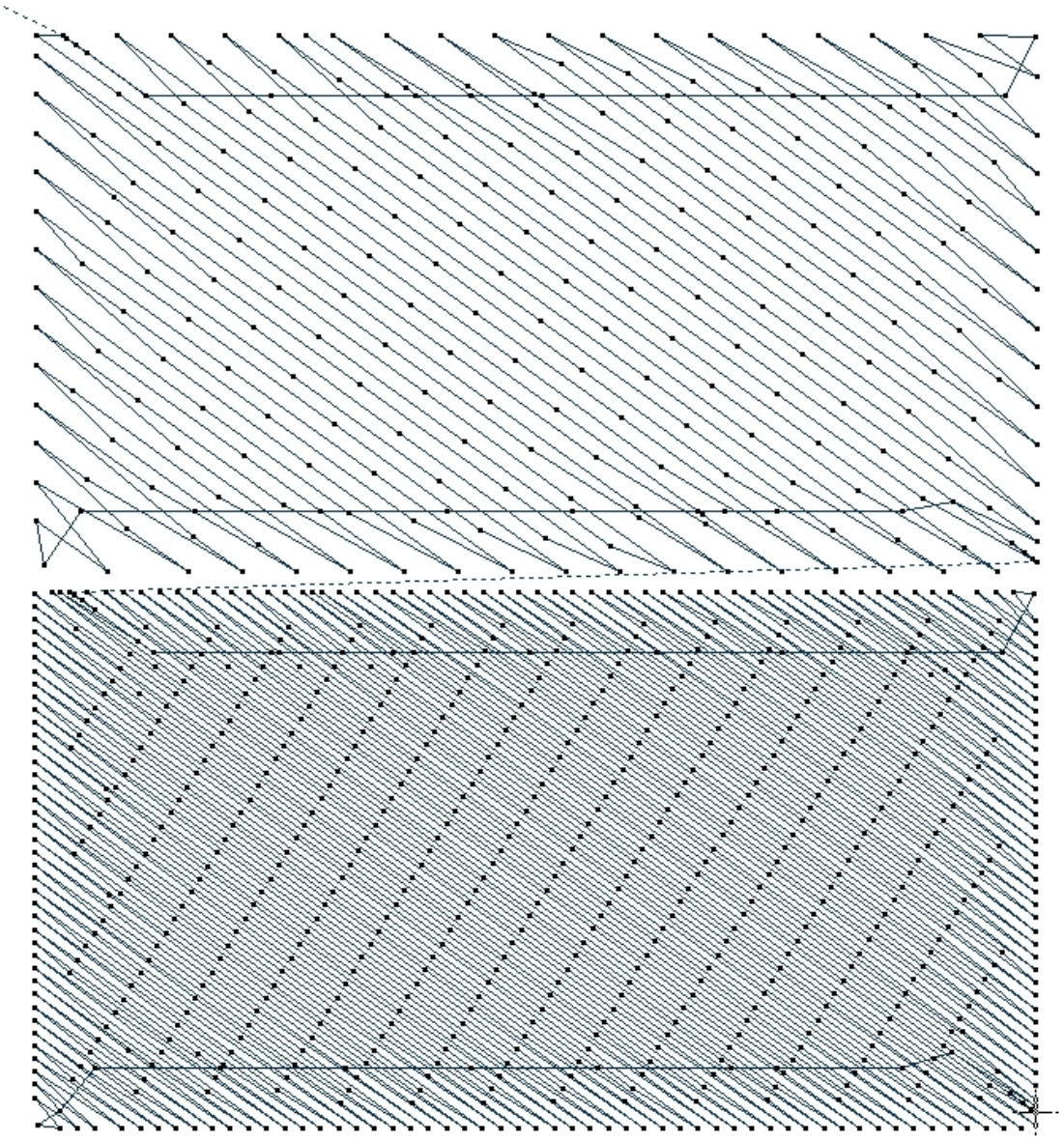


**Image 12 – Comparison of different density settings in the same design**

You can see how much denser the lower design looks and how many more stitches it has compared to the upper one. It has almost 3x times more stitches than the upper one.

Density is one of the most important settings, and you will use it all the time when you digitize. As you understand, the result in the embroidery from different density settings is quite visible, and you will have to practice a lot to master the correct setting for each design, or even for each part of a design, since many

parts of a design might have different density settings. For example, you might have two layers of upper stitching in a design. In this case, the lower layer must have smaller density setting, e.g. 4, and the upper layer bigger density setting, e.g. 7.5. The alternative would be to open a hole in the first layer in order to put the second layer in there and thus treat it like being first layer as well. In this case it will have density settings of 4 as well since it is considered first layer now. Underlay is actually something like a first layer with very low density, at a number of approximately 30, which in most embroidery software is adjustable.

Density setting is available only in fill and satin stitch types. Density has no purpose in running stitch, since there is no area covered with stitches. In running stitch you can use “stitch repeat”, which we will examine in Chapter 7.

Lighter density is mostly used for backgrounds and shadows. Heavier density is used when the digitizer wants to tone specific parts the design. Note though that high density can result in thread or needle breaks more often than usual, so use it with caution.

### *Color changes*

Color changes in a design actually result in needle changes in the embroidery machine. If you have a single-needle embroidery machine, then the color changes must be made manually in your embroidery machine. That means that if you have a multi – color design to embroider, you must put STOPS (see “changing the stitch code” in Chapter 7) before each color change. If you do that, the machine will stop, allowing you to insert a different color thread, and then push the appropriate machine button which will resume the embroidery with the new thread color.

If you have a multi-needle machine and want to embroider a multi-color design, then you can assign which needle number will embroider each color. You can do that during the digitizing process through your embroidery software, or from the embroidery machine’s menu. So, you can assign for example needle 1 for red thread, needle 2 for blue and needle 3 for white for a 3-color design. Then the machine will embroider each part of the design accordingly. Most people are

wondering: “How does the machine understand colors?” The answer is that the machine does not understand colors, but codes. What you actually order the machine to do is to embroider part 1 of the design with needle 1, part 2 with needle 2 and then part 3 with needle 3 and with that order. It’s simple enough for the machine. The color of thread you are going to insert in each needle is a different story. The machine just knows that part one is going to be embroidered with needle 1. It doesn’t know and it doesn’t care what thread you are going to put in needle 1. So, if you put yellow thread in needle 1, part 1 which was supposed to be red, will now be yellow! I think you get the point.

All multi-head machines today have a knife. Once part 1 with red color of the previous example is embroidered, the machine will cut the red thread automatically, and then it will bring down needle 2, and will start embroidering part 2 of the design, which has blue color. All you have to do is just watch the machine do the job for you!

Now, you must know that assigning needles in parts of the design through your embroidery software, does not necessarily work in all machine brands. Some machine brands can only read STOP codes, which means that you will actually have to make all the needle assigning settings again from the machine’s menu. It’s not as difficult as it sounds, but it’s extra work. So, before buying a specific brand keep that in mind. My advice is that this characteristic should not be the sole factor on which you will decide which machine to buy, but you can simply add it to the pros or cons of the brand you are thinking of buying.

### *Repeat and flip functions*

These are two very useful functions incorporated in most embroidery software today, even in many starter software. Both functions will save you lots of time during digitizing process.

The repeat function automatically repeats a design in as many copies horizontally and vertically as you want, and automatically puts the same distance between them. In image 13, you can see the mouse repeated one time horizontally and one time vertically in same distance between them:

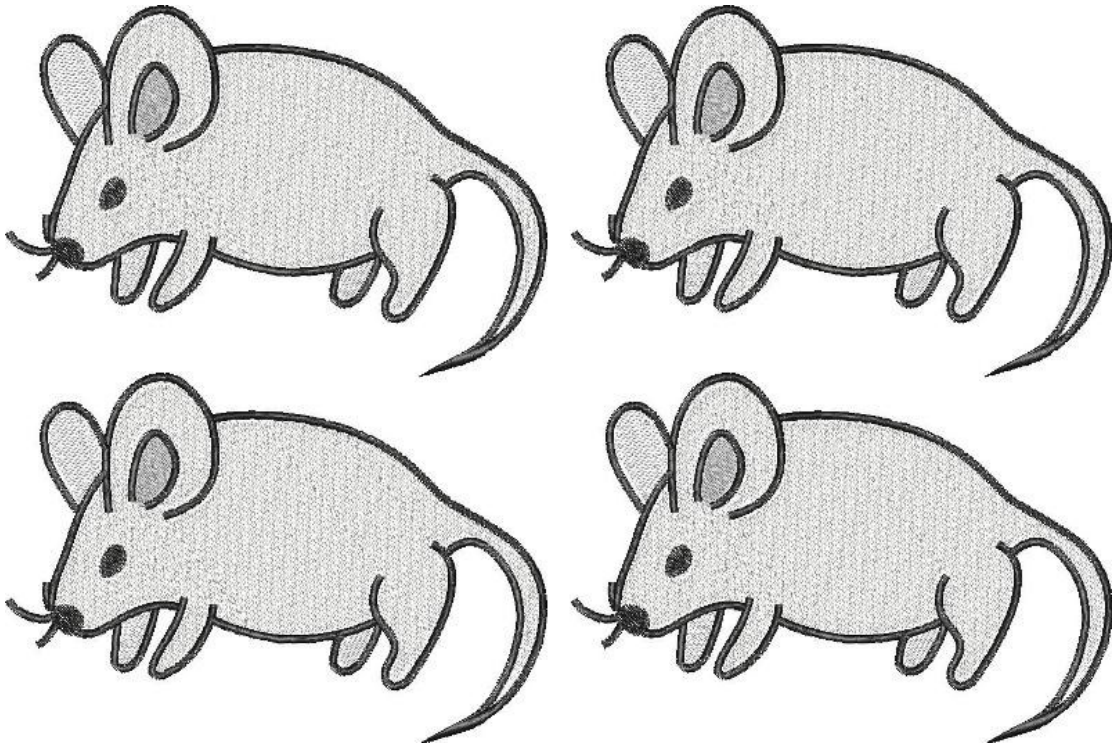


**Image 13 – Repeat function**

This function is very useful when you want to embroider multiple designs in the same canvas, which can afterwards be embroidered or glued onto a fabric or anything else you want. It is also very useful when digitizing patterns that repeat themselves, like a meander.

The second function is called flip function. What it actually does is flip a design horizontally or vertically. It actually creates a horizontal or vertical mirror of the selected design. If you combine this function with copy and paste or repeat functions, then you have some powerful tools which will help you a lot and will spare you a lot of digitizing time in your career. If you watch closely, there are many designs including logos, which are actually vertical or horizontal mirrors. Parts of the design or even the whole design might be comprised of 2 or more mirrors. Without these functions you would have to digitize each part separately. Using these functions, you only have to digitize one part, and then just mirror it and put it at the appropriate place on the canvas. This might spare you 50% or more of working time in a design, and it will not affect quality at all, as long as you

digitize the original block in high quality. So keep you eyes open, and spot all possible mirrors in designs that you will have to digitize.

In image 14, you can see an example of Horizontal and Vertical flip of the mouse.

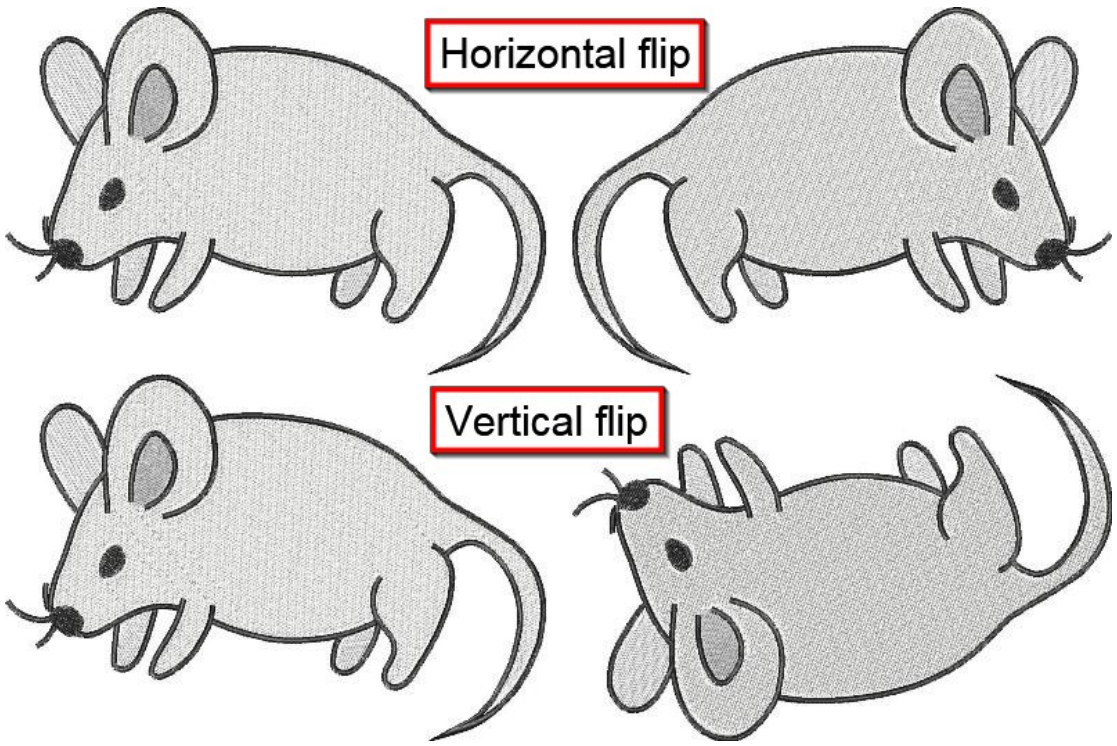



**Image 14 – Flip function**

## *Centering the design*

Each time you send a design to the machine, the needle is located on a specific point above the fabric before starting the embroidery. This point is called “starting point” or “origin”. So the starting point is the position of the pantograph when the Start button is first pressed.

The most commonly used position for this point is the center of the frame of your design. This is being calculated automatically from the embroidery software. Most embroidery software though, will give you the ability to set the origin at a different

point than the center. Those other points might be at the first stitch of your design, the last stitch of your design or any other customly selected point.

Setting the origin is most important, since you will know where the embroidery will start, and you can calculate if it fits the area you want it to fit in. Some even print a copy of the design including the origin on a paper and put it under the needle before starting the embroidery, in order to see where the design is going to be embroidered.

If you forget to set the origin, you don't know where the machine will start embroidering, and you might find yourself embroidering on a different area than the one desired, or even hitting the hoop if the machine does not warn you. The embroidery machines have a very useful function called "trace" which simulates the embroidery in order for you to see which area it will embroider. Be sure to use this, at least before you master the art of embroidering.

In image 15 you can see the mouse centered in the center of its frame. Your embroidery software will probably be able to produce a printing page including the design and its center point. The center point in this as you might have understood is at the center of the circle that the red arrow shows you. This is where the needle will be right before it starts the embroidery. The needle will go to the first stitch with a jump stitch. This means it will go to the first stitch without penetrating the fabric.

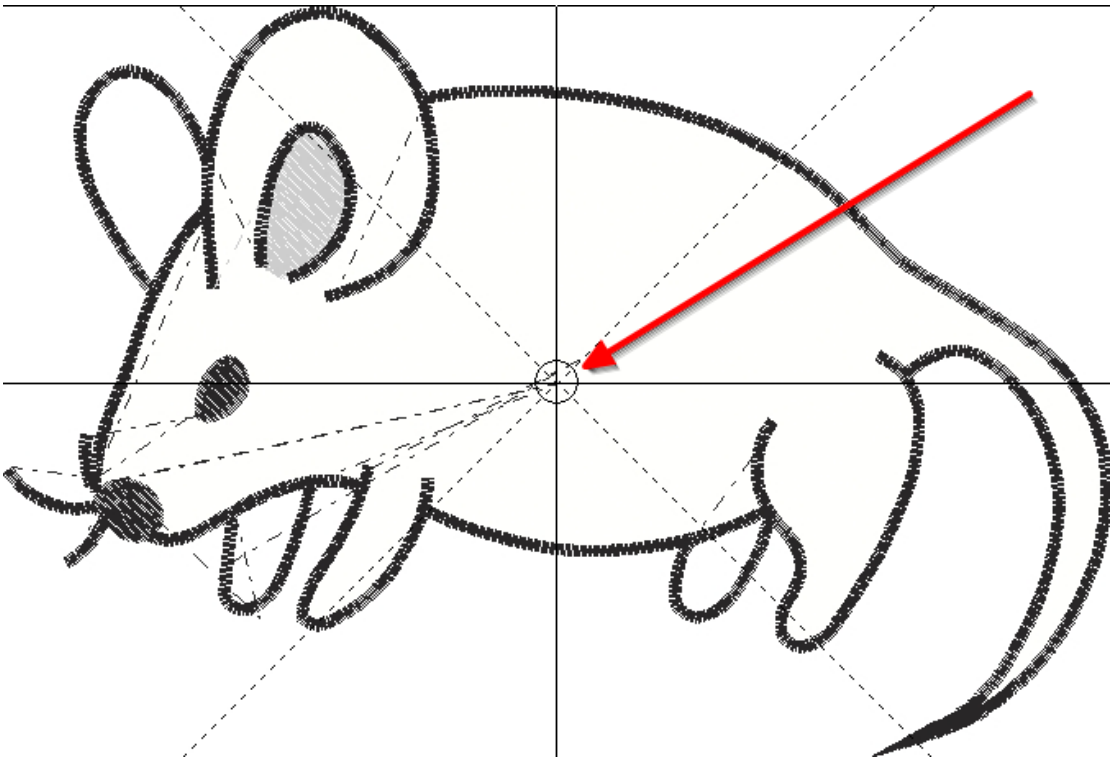


**Image 15 – Center of the design**

## *Magic wand and automatic digitizing*

Embroidery digitizing is a difficult and pretty delicate work. When you manually digitize a design, you have to manually delimit the lines for running stitch or satin stitch or the outlines for fill stitch of the design. For example, when I digitized the mouse's eye, I manually delimited the eye's outline and then the software filled it with stitches. This type of digitizing is the professional type, but is also very time consuming and difficult. Most embroidery software developers have developed and offer automatic tools to their customers in order to make their software more appealing. These automatic tools save a lot of time for the digitizer, but most likely will cost in quality, so I do not advise you to use them, since quality is what you sell. I am just presenting the option for you to have a complete knowledge of what's out there.

The first tool is called “magic wand” and you might also know about it from other CAD/CAM software. What it actually does is that you press inside a color area (e.g. the mouse’s eye) and it automatically selects the outline of this. By doing that, you do not have to manually delimit the outline of each part of the design, but you can just do this with one click. Magic wand can work well if you have already edited the image design using third party software like Adobe Illustrator® and thus you are working on a vector file. If you are working on simple jpegs, magic wand will not work well, and you will need to dedicate a lot of time in editing the faults. If you decide to edit the image in another software first and then digitize it in your embroidery software, you will still spend the same amount of time in two different software, so why not work on your embroidery software manually from the start for better results and 100% of control over your design?

The second tool called “Automatic digitizing” or “Automatic punching” or whatever other name embroidery software developers might have given it, goes even further, and can actually digitize the whole design automatically using variables to calculate which embroidery stitch type to use and how to separate different areas of a design. Again this premises a top quality image, so the same argument as above applies. Those tools might be used by home embroiderers for their own embroideries, but in no case from professionals. You would be surprised to know how many “professional” digitizers use those automatic tools in order to “digitize” and deliver “professional” work to their customers. I am not talking only about low quality internet digitizers; I am also talking about respectable digitizers working for big brands. Don’t be like them. Be a professional, deliver high quality work and treasure the customer. This is the path to the top.

## *Sending the design to the machine*

After you finish digitizing, you must send the design to your embroidery machine in order to embroider it. Today there are 3 different ways that you can do that:

1) Cable
2) USB flash disk
3) Wi-Fi

Older machines also used floppy disk, but now this is out of date. There are of course many second hand old machines being sold today, that use floppy disk as a means of transfer from the computer, but in some years those will be extinct.

Concerning cable connection type, older machines used parallel and then serial cables. Newest machines use a USB cable, and are usually being accompanied by software in order to communicate with the computer. The most common connection type nowadays though is a USB flash disk. Most machines have USB input on their body, or for multi-needle machines, USB input on their screen (most likely touch screen). What you actually need to do here, is save the design in the appropriate file type that your machine can read, inside the USB flash disk. For example, if you have a Tajima embroidery machine, you must save a copy of your design in ".dst" format inside your USB flash drive, and then connect the USB flash drive on your machine, which will recognize the file. Further handling after connecting the USB to your machine, should be sought in your embroidery machine's manual.

Wi-Fi is the new trend in embroidery machine connectivity. Many embroidery machine manufacturers have already incorporated it in their machines, and the rest will do so soon. Embroidery software developers also have started working in order to incorporate this technology into their software. It is wireless, catchy and can be advertized well and raise product's value, so my estimation is that it will be incorporated by all manufacturers. The obvious advantage is that it is wireless, but again sending the file to the machine was never that difficult. USB flash drive is very easy to use, even if someone has more than one machine. In any case what I am trying to say here is don't fall for the marketing tricks, if your new embroidery machine doesn't have Wi-Fi its not the end of the world. You can do the embroidery work with USB flash drive pretty well.

## *How to digitize – steps to follow*

Now that you have learned all the basics a good digitizer should know, let's summarize and go through the 12 steps you need to follow in order to digitize a flawless design and deliver a high quality product to the customer:

1) Look at the image and **imagine how you are going to digitize it**. You have to fully visualize how each part of the image will be digitized before starting to actually digitize it. Imagine which block you will digitize first, which second and so on, until the design is complete. Keep in mind that when you embroider it in the machine, the part of the design that will be embroidered first will be covered (at the edges) by the one which will be embroidered afterwards, so make sure you choose a good embroidery sequence. Moreover, when you start digitizing, make sure you overlap (a little) each block with the neighboring blocks, just to make sure that no empty space will be visible if the fabric stretches. This is a very important thing to do in all of your designs, especially the ones that will be embroidered on unstable fabrics.

2) After you create a pretty clear image in your mind about how to digitize, then **imagine what stitch types you will use in each part of the design**, and in what other way you could achieve best result. For example, you might think that making a block of the design denser and adding some running stitches above it, might look real nice. Or maybe a denser part might create a more realistic 3D embroidery, etc.

3) Once you start digitizing, everything must be crystal clear to your mind, and you must know exactly what to use and where. Remember that you are an artist, and you must take your time to compose your work. So, **start implementing what you have imagined** in the first 2 steps.

4) **Use underlay** if needed, and **set density and stitch type** for all blocks. For more advanced digitizers, you can also **set stitch angle** for fill stitch types and **starting and finishing points**, matters that are being explained in Chapter 7.

5) **Assign appropriate needle (color)** to each part of your design.

6) When you finish digitizing, **check your design thoroughly for mistakes**, and review the stitching sequence again. If anything is wrong, correct it. Most embroidery software will allow you to edit already digitized designs, and also to change stitching sequence.

7) Once you finish step 6, **center your design** to the desired point, usually the center of the frame.

8) **Print your design** if you like, especially if it helps you embroider it.

9) **Save the design** to the appropriate format your machine reads, **and send it to the machine**.

10) **Embroider a sample embroidery** if you don't feel confident, especially if you are still a beginner.

11) After embroidering it, **check the final product for any defects**. You should never deliver a product which is not flawless. The cost from a disappointed customer will be much more serious for your business than the cost of the product you need to embroider for a second or third time.

12) **Save and keep the digitized design** on an archive for possible future usage. It is good to have two or three different backups of your designs in different places, like hard drives, USBs and CDs or DVDs. I have seen many digitizers lose their life's work, thirty or more years of designs, because they only had it stored in their computer's hard drive which failed. Don't make the same mistake; it is much cheaper to invest now in an external hard drive, USB drive or optical disk than lose the work of a lifetime.

Make sure you follow all 12 above steps for each design you digitize. This translates to decades of experience for many people, not just me, packed in 12 simple steps. Let that be your bible, and benefit from this accumulated knowledge.

## *How to calculate cost and selling price*

Calculating embroidery cost and selling price is a difficult process for many, and even old embroiderers and digitizers often charge their work without calculating

exact costs, or having a basic reasoning on the price. You would be amazed if you knew how many professionals do that. Let me say that pricing an embroidery design as a digitizer and pricing finished embroideries are two entirely different things.

Let's start with the first one, which is how to charge for an embroidery design to a person that asks you to digitize for him. Most digitizers charge based on the size of the delivered design, or on the count of its stitches. Let me tell you their biggest secret; there is no meaning in this type of charge since neither size nor number of stitches depicts cost or difficulty. They just had to find a way to price their designs. Resizing the design is just one mouse click in an embroidery software, but the digitizers will charge a customer twice the price for a bigger design! Number of stitches is also non relevant, since the stitch count will be higher if you put underlay, bigger density, etc, so one can increase it just in order to be paid more. The true and logical way to price digitizing is by the complexity of the designs. So, if a design takes you one hour to create, you can charge for example $30, and if it takes you two hours $60, etc. Of course there are a lot of digitizers selling lots of designs, so they could not negotiate with each customer separately, that is why they have invented size and stitches as a way of charging, which is pretty clear and the customer cannot complain for. So, personally I do not blame digitizers for charging this way, I just want you to know the truth about it, since you are probably becoming a digitizer yourself, and no one else will share the secrets of their profession with you. So, there are 3 ways to charge for digitizing:

1) Based on the size of the delivered design
2) Based on the stitch count
3) Based on the difficulty of the design

Prices can vary within a wide range, but again they represent the quality of the work delivered, so don't try to compete with low prices, but to please customers with the quality of the designs and after sales service, in order for the customer to return to you for future work and promote your work to others. Remember that once a customer finds a good digitizer, he doesn't change him. Moreover, offer small changes after delivering the final design for free, since many times a

customer might need minor changes. For big changes that will take you a lot of time to make, you can charge as normal.

Let's move on and see how to calculate cost and selling price for embroidery products. Most embroiderers use the "cost plus" method to determine their selling price. That is, they calculate the cost for the produced product, and add the profit they want to gain from it. For example, one might determine a cost of $2.7 for a product and add a profit of $8/hour for his work. If it took him an hour to make it, he will charge the customer $10.7. But how can one calculate the actual cost?

Remember that by working from home, you have a very important advantage: you do not pay business rent plus you split all other bills (internet connection, telephone, electrical power) with your home expenses. This allows you to either sell at a lower price, or have better "markup". At this point let me explain to you the difference between markup and profit:

Profit is usually expressed as a percentage of the selling price. Let's assume we sell a product for $75 with a cost of $50.

**profit** = [(selling price) - (cost)]/(selling price)
= (75 - 50)/(75) = 25/75 = 0.33 = 33%
profit = 25% of sales

On the other hand, markup is usually figured as a percentage of the cost.
**markup** = [(selling price) - (cost)]/cost = 25/50 = 0.5 = 50%
markup 50% of sales for the same calculation

You can use either profit or markup, whatever suits you best. Now, I would advise you not to drop selling price, but have a much better markup and of course offer flawless products to your customers.

So, one would wonder how to determine costs. Well, your exact costs for a product that took you an hour to produce are the following:

[electrical power for your embroidery machine for one hour + fabric used + thread used + time to digitize the design + cost for the machine service + other costs like

taxes, internet connection, telephone, etc calculated for one hour and whatever else might be related to your work calculated for one hour]

I know this is quite difficult to do. An average cost estimation for the US would be that a machine working at 500 SPM (stitches per minute) is $1.20 for the embroidery plus all other costs related to this production. These kinds of calculations though are for factories that want to calculate their exact cost in order to sell at as low a price as possible, so they can compete with countries where labor is cheaper. The business model I am suggesting is far from that.

So, I would suggest you do a simple calculation of your own, just to know where your cost lies approximately. Your selling price should be sufficiently higher since you are targeting a niche market. In order to find your selling price, you will have to make an analysis of your niche market and see your competitors' selling prices. If you are selling to a new niche market, then you can sell at as high a price as you can, within reason of course, since you won't have competition for some time.

Let me give an example of the above:

Say I sell embroidered pāreu's and my competitors sell for $49.95 per piece plus shipping. I calculate my costs:

| Cost type - (Time to produce is 20 minutes) | Cost in USD for 1 hour | Final cost in USD for 20 minutes of production |
|---|---|---|
| Electrical power of the embroidery machine | $0.80 | $0.27 |
| Fabric and thread used | $7.80 | $7.80 |
| Time to digitize the design - 30 minutes | $5.00 | $5.00 |
| Cost for machine service (e.g. once every three months) | $1.30 | $0.43 |
| Taxes | $2.00 | $0.67 |

| | | |
|---|---|---|
| Other costs (internet connection, telephone etc) | $3.00 | $1.00 |
| **Total Cost** | **$19.90** | **$15.17** |

**Table 4 – Calculation of product cost**

In the first column you can see the type of cost, in the second the cost per hour and in the third the cost per 20 minutes, because we assume that this product takes 20 minutes to be produced. Please note that this example does not necessarily represent true costs and it's only for educational purposes. You can see that I have some fixed and some variable costs. Fixed costs are the same no matter how long I need the embroidery to be made. So, cost of fabric used and time to digitize the design (assuming I charge $10 for an hour of digitizing, thus $5 for 30 minutes of digitizing) are fixed costs and will be the same no matter how long it will take to embroider the pāreu. On the other hand, more electrical power is used when the machine embroiders for one hour and less for 20 minutes, so the cost is different. The same goes for calculating machine service, taxes and other costs, since I calculate these monthly and then divide by how many hours I work per month. So, if I have other costs of $480 per month and I work 8 hours a day, 5 days a week, 4 weeks a month, that is 8x5x4 = 160 hours per month. If I divide $480/160hours, then I get a cost of $3/hour for other costs. That is the way to allocate various monthly expenses to working hours, and thus incorporate into your product costs.

Now, as you may notice, the costs for 20 minutes are not as low as someone would expect compared to costs for an hour for the same product. That is because we have high fixed costs in this particular production, which are $12.8 out of $15.17 or 84.38% of the total cost. From our calculation, the total cost of this product is $15.17 and competitors sell for $49.95, so you are free to sell up to $49.95 or even higher if you can persuade the customer that you are offering better quality products.

If you sell for $49.95 then your markup will be:

[(49.95)-(15.17)]/49.95 = 69.63%

And your profit will be:

[(49.95)-(15.17)]/15.17 = 229.26%

That is one hell of a profit, and in niche markets you can easily earn that, if you are a professional and you have happy customers.

# Chapter 6 – Lettering and Editing

Lettering is a very important part of embroidery, and very popular for home – based embroidery. The reason is simple: Many enterprises need clothes embroidered with only their names, and many customers choose personalization by embroidering their name on various products like shirts, t-shirts, hats, etc. There are many embroiderers who do only lettering, and many who do only monogramming, which is a part of lettering. There are thousands of businesses that make a living out of lettering. Imagine what you can do by knowing not only how to do letter embroidery, but any other kind of embroidery as well. You need to understand that embroiderers who do lettering or monogramming embroideries, do not know how to digitize any other embroidery design apart from lettering. Also, you need to know that embroidery software have integrated pre – digitized fonts, so these embroiderers actually do not know how to digitize at all! They only know how to type letters, press “enter” in order to automatically create an embroidery design, and then transfer this to the machine. They have never learned what you have learned in Chapter 5 - Basic Digitizing, not to mention what you will learn in Chapter 7 - Advanced digitizing techniques.

Lettering is actually one of the easiest to learn parts of the embroidery digitizing. It is also quite easy to embroider, and has a big customer base. So pay attention, your niche market and your way to make a fortune out of embroidery business from your home might go through lettering embroidery.

## *Simple lettering*

Lettering is very easy to do nowadays. Embroidery software developers include pre – digitized fonts in their software, so all you have to do is open the appropriate window, type the letters you want to create as embroidery, for example “Embroidery business from home”, then press OK and voila:


**Image 16 – Simple Lettering**

Of course there are some settings that you can change in order to achieve the desired result. You also need to set the size of the embroidery and transfer it to the machine.

Embroidery software developers usually include more fonts in their high level software and less in their lower levels. So, you might find professional embroidery software with 100 or 150 fonts included, and lower level with only 20 or 30, and the ability to buy extra fonts if you like. Some may even offer custom font creation for you for a relatively high price.

Over the last few years, all major embroidery software developers have included an automatic function that will transform fonts you have inside your computer into embroidery. What this function actually does is open the "ttf" (true type font) image of the font, auto – digitize it and then make it available to you. This function usually produces lower quality embroidery, since it is automatic, but is very handy for starters, and allows them to expand their portfolio instantly, by being able to embroider any font their customer might desire. I would advise you to use this function at least at the start, but always check the created embroidery design for mistakes thoroughly and correct them. You will almost always find mistakes when using this function. What this function does automatically, professional digitizers have done manually for the fonts that the embroidery developers include in their software. So, as you can see, the comparison is: manually created font from professional digitizer versus automatically created font in one minute from computer. You get the point.

Lettering is most of the times created using satin stitch type. If the satin though is bigger than 0.25 inches as we said, you must use long satin or fill stitch type. Most of your work though will be done in satin and most customers will expect it

to be in satin since that is what they are used to. If you have never noticed that before, just check a shirt, or polo type t-shirt of yours right now and see the small embroidery on the upper right. It will be a small lettering in satin stitch type. This is how you need to do it. In image 17 you can see letter “E” from image 16 in close view. You can see it is satin stitch embroidery that creates the letter “E” with a central underlay in order to keep it strong.

You can offer your customers only the fonts that are available in your embroidery software, or you can offer to digitize any other font they might want. When they ask for a font that is not included in your embroidery software, you can always use the automatic transformation function, if this is available in your software, or digitize it yourself. When I say digitize it, I mean do it like it is any other design. Just open the “ttf” image of the font in your embroidery software and start digitizing the letters that the customer wants one by one. So if the customer wants the word “Embroidery software” in ArialX font, find the ttf file of ArialX font (if it is for free, or buy it if it isn’t) and then only digitize the letters “Embroidery software”. Alternatively, you can digitize all the letters in order to keep them for future orders. Most professional software will have a way of saving user digitized fonts in a manner that will allow them to use it the same way as they use the internal pre – digitized fonts of the software. That means, that you will be able to use them the same way you use the fonts that your software had inside, practically creating new fonts for your embroidery software manually. Just ask for this function when you choose embroidery software, if you think this might be useful to you.

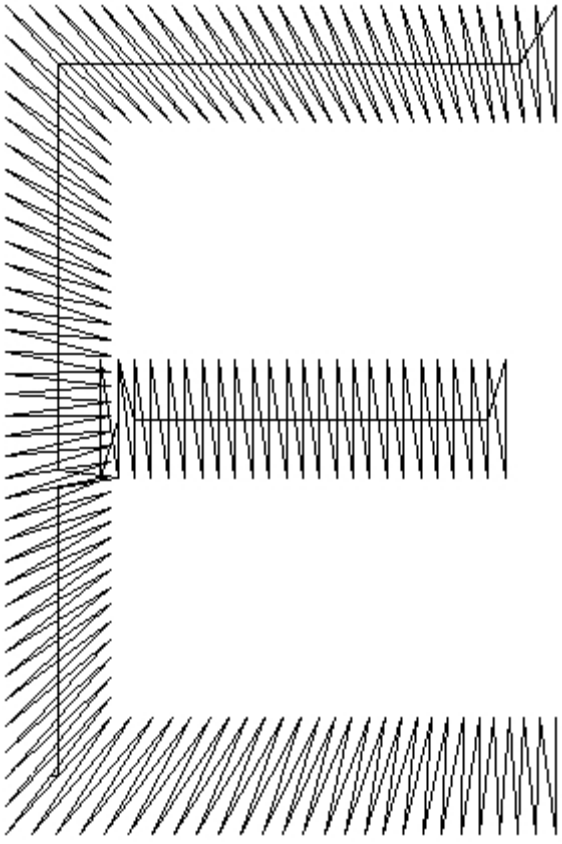


**Image 17 - Close view of a letter**

## *Choosing font*

Choosing a font is not easy when you are selling lettering embroidery. The first case is that the customer specifically asks for a font, which we have discussed in the previous sub chapter “simple lettering”. The second case is that you choose the font. When you choose a font you must take into account what size this font is made for. Not all fonts are appropriate for all embroidery sizes. Your embroidery software developer can probably advise you how to use their fonts, and in what size you can use each of their fonts.

Moreover, there are three types of fonts for embroidery, mainly following the types of fonts in general:

1. Script fonts
2. Block fonts
3. Monogram fonts

In Image 18 you can see an example of each of the above mentioned font types:

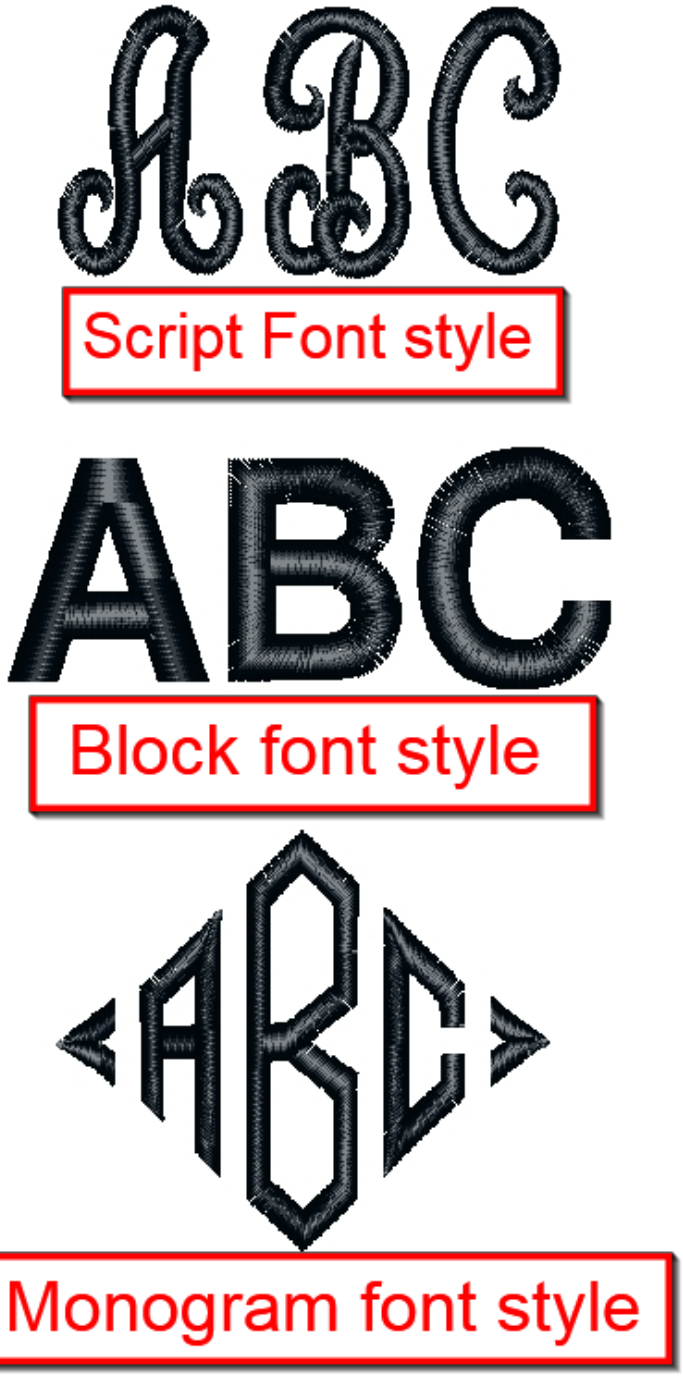



**Image 18 – Font styles**

Your embroidery software should have at least a few of each type if it is a pro level. The demand you will have from customers will be for all 3 font types, but most of them will probably be for monograms, then blocks and then scripts. There are professionals that actually live by only offering monogram embroidery as I already mentioned. This will only be a fraction of the services and products that you will be able to offer, so imagine the possibilities.

In general you need to remember that monogram fonts are being requested mainly from enterprises and they only have 3 letters. Blocks are the vast majority of fonts used for embroidery lettering. Scripts are used mostly for bigger sized embroideries due to their style, which is more difficult to be embroidered well in smaller size.

In image 18 you can only see the style difference. There are many different fonts in each font style, so you will surely find one suitable to please every customer. For example, block style fonts could be bolder or thinner, taller or shorter, etc, the variety is endless.

### *Changing Frames*

Except for finding the correct font for a customer, you must also find the correct frame that he likes. Not all customers want to have flat line embroidery lettering, and I guess many of them don't know there is a different type. So, don't forget to inform your customers about your different frame potentials and of course about the extra charge as well…

Your embroidery software will probably have a variety of frames, and the higher the level, the more frames it will have available. Offering variety is very important in this job, so again choosing professional embroidery software, if you can afford it, will be very helpful to you.

Now, customers usually go for slightly curved frames, wavelike (like the first in image 19), or for rounded ones (like the middle ones in image 19). Of course, if you offer them much more, maybe they will choose another one. Most embroiderers do not give much attention to this, which is a mistake, since it is an

extra characteristic you can sell. Offering multiple frames in different prices might be a source of extra income for you with no extra cost, plus the customer is impressed with your professionalism and your capabilities. So don't think twice, exploit what you can in order to offer top quality services. Offering different frames, and advertising that you do so, is one good and easy way to start with.

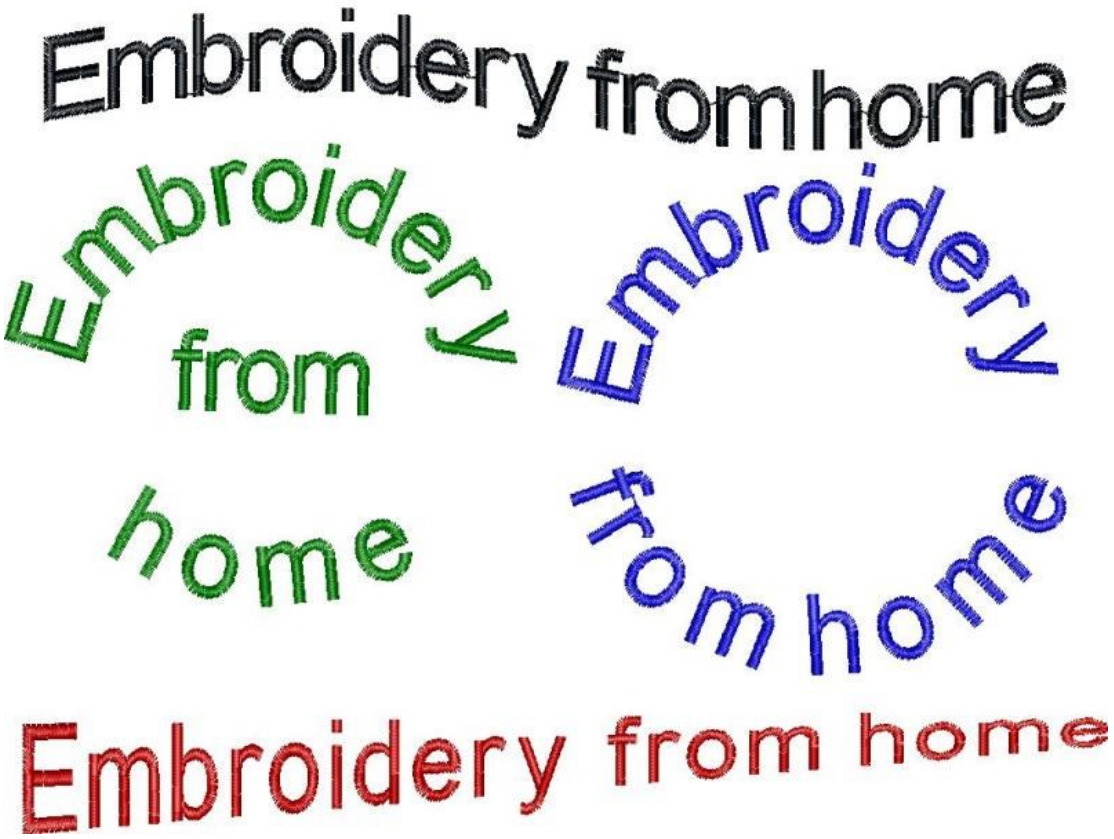



**Image 19 – Different Frames**

## *Monogramming*

Monogramming is just a part of lettering, but a very profitable one. Many businesses and also private individuals (for personalization) want a monogram to be embroidered, usually on towels, t – shirts, shirts, etc. If they bring their

monogram image to you and ask for an embroidery, then you will treat this as a normal image embroidery, thus digitize it as any other image. If they ask you to present them with different style of letter monograms to choose from, then you present what monogram fonts your embroidery software has. The higher your software's level, the more monogram fonts you will have available. Bigger embroidery developers also offer extra fonts for an extra charge, so if you see that monogramming is an important part of your business, then adding more monogram fonts to your software would be a good choice.

**Image 20 – Monogram font styles**

One of the most popular monogram styles is the one where the middle letter is bigger than the other two, as you can see in image 20. Most of the monograms that you will be asked to embroider are 3-letter monograms, since this is the norm after the 20th century, while 2-letter monograms where used along with 3-letter monograms in older times.

If a customer asks you to suggest a monogram for his initials, you can suggest one from those you have available. If he wants more, then the assistance of a graphic designer should be sought, except if you have the knowledge to act as a graphic designer as well, thus make an extra amount of money from this service.

## *Name drop*

Name drop is a very useful function when you have to personalize multiple embroideries. For example, a football team comes in and tells you that they want you to embroider their team logo on hats, in 30 copies. They want each copy to have a different name, one for each player, plus the team logo for all. So, you have to do 30 different embroidery designs with the same logo but a different name on each one of them, and be careful to make them in the same size, same distance of logo and name, plus to center them on the same canvas point as the rest. Sure it can be done manually, but there is a tool that will spare you A LOT of work. This tool is called “namedrop”. What namedrop is actually going to do, is allow you to do all that in one single design! You will digitize the logo, and then write the 30 names altogether and check namedrop function in your embroidery software. What the software is going to tell the machine is to embroider the design one time along with the first name, then stop in order to allow you to put the second hat, then you just press resume button on the machine, and the machine starts embroidering the design again but now it embroiders the second name, then it stops in order for you to put the third hat and so on. In image 21 you can see a namedrop embroidery. Let’s assume you want to embroider 3 hats. All three must have a red apple, but each one must have a different name in different color:

1. Hat 1: Red apple + Name Mary in yellow color
2. Hat 2: Red apple + Name Robert in green color
3. Hat 3: Red apple + Name Linda in red color

You can see how that is done in images 21 and 22.

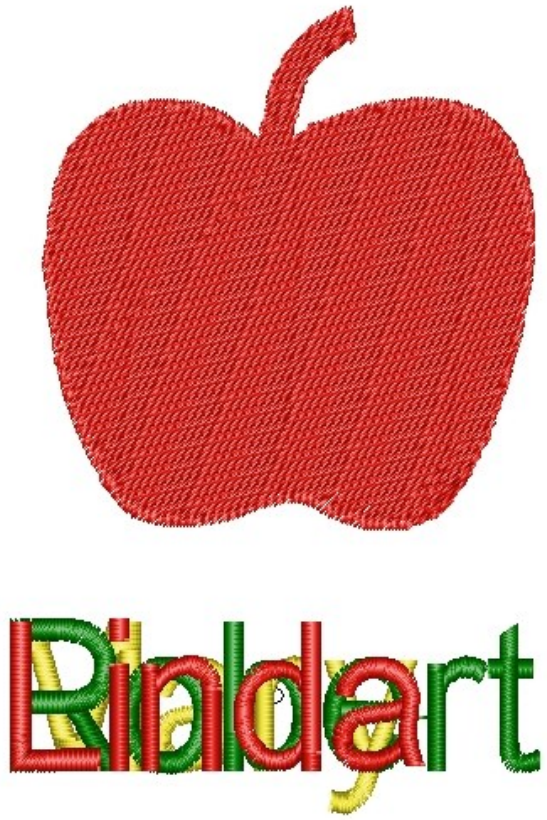


**Image 21 – Namedrop**

Image 21 looks weird because it actually puts all names on top of each other. It will not be embroidered this way though, since the software puts STOP codes between each embroidery, so each name will be embroidered in a new hat. Putting the design and names on top of each other is crucial, since this way they are perfectly centered with the previous and the next embroidery, provided of course that the embroiderer centers the fabric the same way into the hoop.

In image 22, you can see that more clearly. The machine starts embroidering the design, which in this case is an apple, and then the name “Mary”. Then it has a STOP code. That means, after the red apple and the name “Mary” have been embroidered onto the first hat, the machine will stop its operation, in order to allow you to remove the embroidered hat, and input an empty one. As soon as

you input the second hat, you press the appropriate button on your machine, and the machine resumes the embroidery. It embroiders a red apple again, but now it embroiders the name “Robert” in green color. Then it stops again in order for you to put the third hat. On the third hat it embroiders the red apple again, but now the name “Linda” in red color follows.

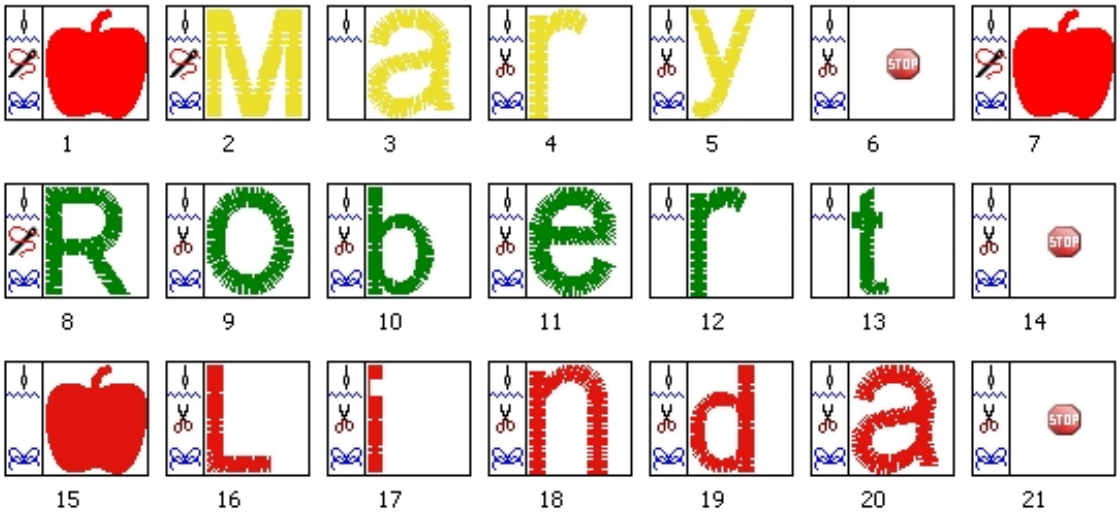



**Image 22 – Namedrop embroidery sequence**

This way you can embroider as many personalized designs as you want quickly and easily. The alternative of creating one design for each name would take you a lot more time to digitize, and much more time to load multiple designs to the machine, and start a new design each time. This way, you just load one design to the machine, and you embroider as many as you want, with the transition being easy and quick. Your productivity is much higher using namedrop function for that kind of jobs, which can be translated in cutting down costs.

So, once a customer comes asking for a personalized embroidery job like this, you must have in mind that you can do this quickly and easily, so offer them the appropriate price. The price shouldn’t be very high because you have to keep in mind that you will do this in 1 design and not 30 different designs. Your competitors may also use this function, so their price for that kind of jobs will surely take into account the easiness offered by namedrop function.

## *Editing*

Editing is a very important function of embroidery software. Whether you buy ready-to-be-stitched embroidery designs, or you create your own archive, at some point you will need to edit some designs. Most likely this will happen pretty often, since you will need to change size, personalize the same design with different names on it, change density or other settings, etc. So, editing is a function that you will often use in your embroidery software.

You must understand though that editing a file is different in different file types. In subchapter "Embroidery files" of Chapter 3, we have seen the different file types that exist and I have advised you to *"save all your files in both forms, most importantly as block files, in order to be available for future editing and in stitch file for embroidering it or delivering to the customer if you act only as digitizer."* What you need to understand is that you will have full control on a linear file for designs that you will make on your own, while you will have limited control on stitch files.

When you have a linear file, then you have 2 types of editing, block editing and stitch editing. With block editing, you can edit entire blocks of the design and change whatever settings you want on them. With stitch edit, you can change each and every stitch of your design, no matter how many thousand stitches it has, change their code, move them, see information about them, etc. So, as you understand, you have full control over your designs, and you can do wonders from your computer before even touching the embroidery machine.

In image 23, you can see a stitch edit taking place. I move a stitch from the mouse's eye to a different place. You can see the level of control you have on your designs. Each and every stitch is fully editable.

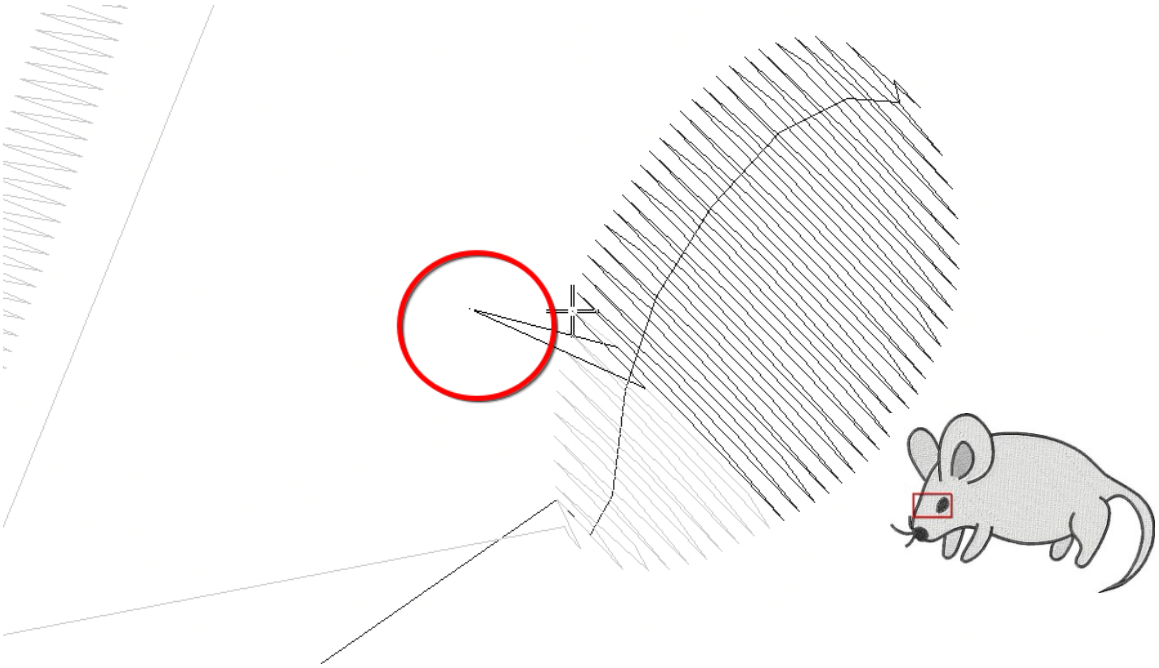


**Image 23 – Stitch editing the mouse's eye**

To conclude, lettering is a very important part of embroidery, and many embroiderers make a living only from lettering, as I have already stated. Offering lettering to your customers is not optional. Your customers will expect you to be able to offer them lettering embroidery. Offering all the other digitizing options that you have learned and will learn in this course, is what will separate you from your competition, and attract much more customers. Editing, on the other hand, is crucial for your business, since you will have to edit many designs in your embroidery career. Customers might ask for edits in a design, or you might need to edit already digitized designs for future orders, or even make alterations, if a customer requests you to. So editing is very important for all embroiderers.

You have already learnt all the basic embroidery techniques in Chapter 5, but what you are about to learn in Chapter 7 – Advanced digitizing techniques, is what is going to skyrocket your digitizing abilities and thus your offering products and services. So keep reading, keep learning and keep practicing.

# Chapter 7 – Advanced digitizing techniques

In previous chapters we have learned all the basic, and even some advanced techniques, necessary for the average digitizer. In this chapter, I will teach you more advanced digitizing techniques, which will make you a state of the art digitizer, and help you stand out from the low quality digitizers. With what you have already learned in previous chapters, and with a little practice with your new embroidery software, it is safe to say that you will be within the 10% of the top digitizers out there. When you finish this chapter and practice what you will learn here as well, you will be among the 2-3% of the best digitizers in the world. Don't be amazed, most of the digitizers and embroiderers on the internet are below average. Only few are true digitizers. Most of them just know how to open an image and automatically embroider it!

In this chapter I will teach you advanced digitizing techniques, like additional stitch types, changing stitch codes, color blending, digitizing for sequins and much more. These are techniques the average internet digitizer hasn't even dreamed of, so pay attention and practice a lot. Let's start with reviewing some additional stitch types from the one we have already seen.

## *Other stitch types*

In this sub chapter we will see three additional stitch types, apart from the ones we have already seen. These are, "cross stitch", "appliqué" and "variable angles".

### *Cross stitch*

Most likely you already know what cross stitch is. It is a popular form of embroidery, in which X – shaped stitches in a tiled, raster-like pattern are used to form a picture. It is a very old stitch type, made by hand for centuries, and in the modern era most embroidery software include it. Using embroidery software

makes it easier than ever to create cross stitch embroidery, since you have full control over it, it is easily changeable if you or the customer don't like it, and of course it can be produced in more than one copies.

In image 24 you can see the mouse with cross stitch fill.

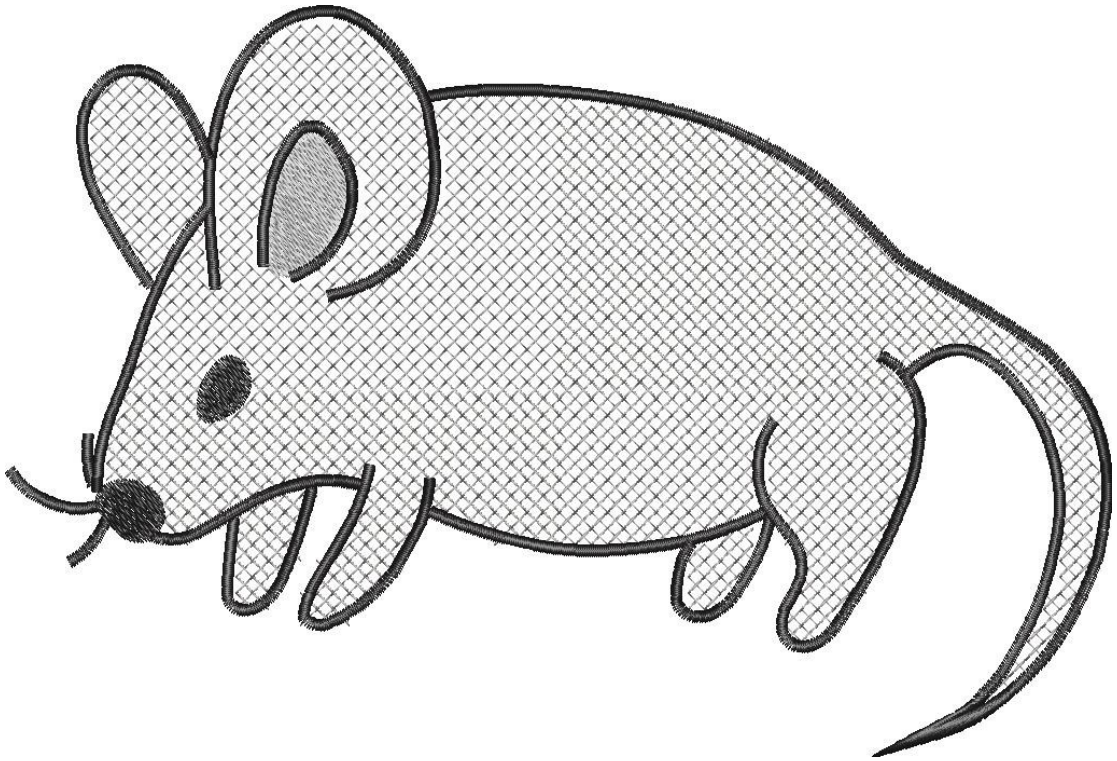


**Image 24 – Cross stitch mouse**

Cross stitch is a very simple embroidery stitch type. You do not have many settings to change or to choose from. The only settings you can play with are the cell size, and the number of passes of thread the system will do. Extra passes make the embroidery look denser and stronger, since 2 or 3 or more layers of thread are placed on it. So if you want to have thick looking embroidery, just choose more passes.

About the cell size, your embroidery software should have an appropriate setting. This setting is entirely up to what you or your customer wants. In image 25, you can see the mouse with bigger cell size than image 24. The difference is obvious, since it covers the entire fill of the mouse.

Cross stitch is a very beautiful decorative stitch, and you might offer it to customers as an alternative to other stitch types, or customers might ask you for it since it is a very old and popular stitch type. Apart from that though, a cross stitch embroidery has much lower cost, since it uses much less thread than fill stitch types do, and it takes much less time to embroider, since it has significantly less stitches than the fill stitch. Compared to embroidering the mouse only with running or satin stitch, cross-stitch is more expensive as you understand, since running and satin stitch have no fill for the mouse, but compared to fill stitch it is much more inexpensive.

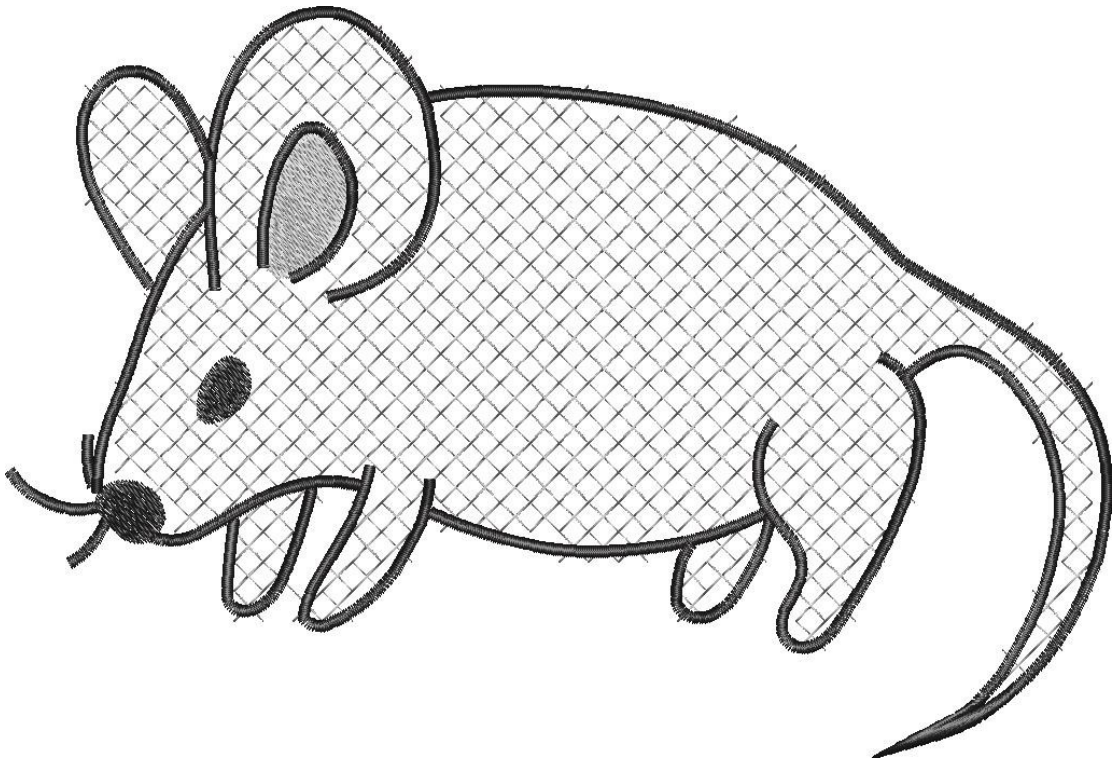


**Image 25 – Cross stitch with bigger cell size**

In order to give you an estimation on how inexpensive the cross stitch mouse can be compared to fill stitch, in size of 8.1 to 5.5 inches, the cross stitch mouse has 9,333 stitches, while the fill stitch mouse has 25,699 stitches. That is almost 3 times the stitches the cross stitch mouse has! The satin stitch mouse has 5,810 stitches, but it's empty in the inside. With cross stitch, you give the illusion of fullness, and it costs next to nothing! So, I would suggest using cross stitch

whenever you can. After I teach you the other 2 stitch types, appliqué and variable angles, I will present a very useful table that will compare all stitch types that we have learned, including cost comparison.

### *Appliqué*

Appliqué is an embroidery technique where a fabric piece is applied and embroidered on another fabric (the main product). This technique is very popular, and you have surely seen or have a lot of clothes with appliqué on them. This is also a low-cost technique, which produces high quality and nice-looking results, so be sure to have it in your mind when deciding what stitch type you are going to use for a design. Appliqué can be done manually, or with simple sewing machines, but when using embroidery software appliqué goes to a different level, since everything is possible. Make sure you do quality appliqué, and your customers will be amazed.

If you see an appliqué you might think it is difficult to create. Well it isn't, it just requires the appropriate knowledge and experience. Let's assume that we want to create the mouse with red appliqué fabric instead of fill stitch. In image 26 you can see this design made with appliqué.

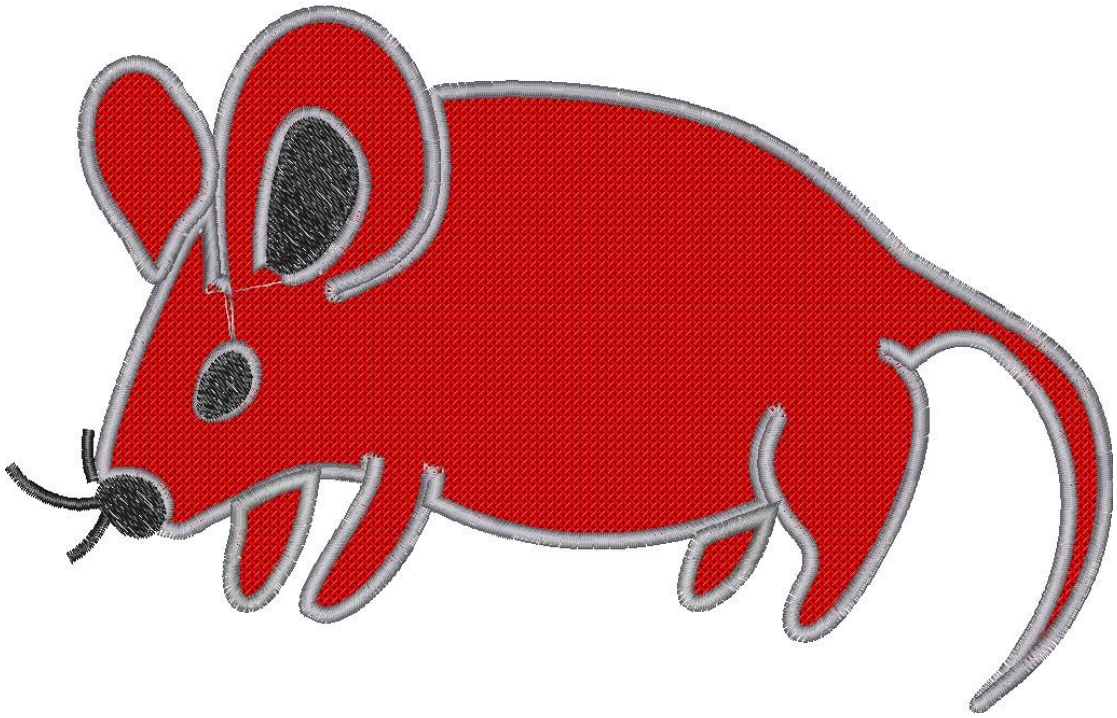


**Image 26 – Applique**

What you see here is not what you think! The red color is not stitches; the red color is the empty space where the appliqué goes and I just made it red for you to understand where the extra fabric (appliqué) goes to. In image 27 you can see only the stitches this appliqué design has. So the embroidery software produces a file like the one in image 27, but when you embroider it, you put the extra fabric on the cloth, which is stabilized by the stitches we have created, and you have an end result like the one in image 26! Easy, right? We are not done yet though, since there is more to learn on appliqué embroidery.

The gray satin you can see in image 26, are actually the stitches that are going to stabilize the red appliqué fabric, and they follow it all the way. The black satin and fill stitches are not stabilizing stitches but decorative stitches, because without them our mouse would not have eye, nose and whiskers! So, gray stitches are stabilizing the appliqué, black are decorative and red are not stitches, but the extra appliqué fabric.

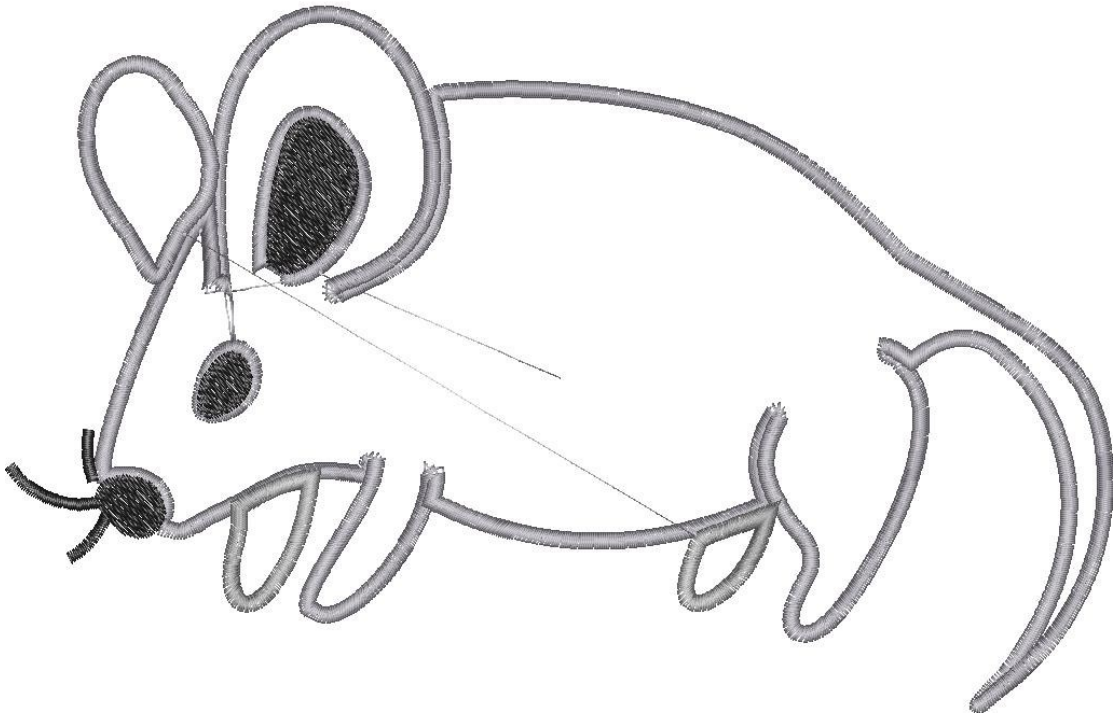


**Image 27 – What appliqué design really looks like**

You must be wondering now, how you will know where to put the appliqué in order to embroider it. For start you need to have the appliqué fabric ready and pre – cut before stabilizing it on the cloth. I have seen many appliqués that are being embroidered and then cut. This is not correct, since you risk cutting some stitches, and if you accidentally cut even one, the embroidery will soon start unraveling. Secondly, it doesn't look good, since the appliqué exceeds the satin. Remember, you want to offer top quality products, because you will sell at a high price. What you need to do is cut the appliqué at the appropriate shape you want, measure it, and then create a design with the same size. The satin stitches must cover the appliqué on one side and the cloth on the other, as you can see in image 28. This is the right way, and this is how you need to do it in order to produce high quality products.

When you center the design to your hoop, you will exactly know where the machine will stitch, so you will know where to put the appliqué fabric. I have two

secret techniques to share with you, in case you have problems with putting the appliqué fabric to the right place:

1. Center the design not on the automatic frame center, but on an easy to find point. For example, center the mouse on the end of its tail, which is very easy to spot. Then, when you go to the embroidery machine, the needle will be exactly on top of this center before the embroidery starts. You just need to put the tail's end exactly below that point and voila you have your first appliqué.
2. This is even easier. Most embroidery software will offer you the ability to do a first, even a second hold down line for the appliqué with running stitch. What this actually does, is that it runs the appliqué with a running stitch, zigzag stitch, etc, in order to hold it down firmly, and let the satin stitch stabilize it well. The trick you can use is to make the first hold down line with running stitch without putting the actual appliqué fabric. After this finishes, stop the embroidery, see where the running stitch runs and put your appliqué fabric exactly onto the running stitch. Then resume the embroidery with a second running stitch or zigzag holding down line, and then proceed with the actual satin stitch (in appliqué it's called "overlock stitch").

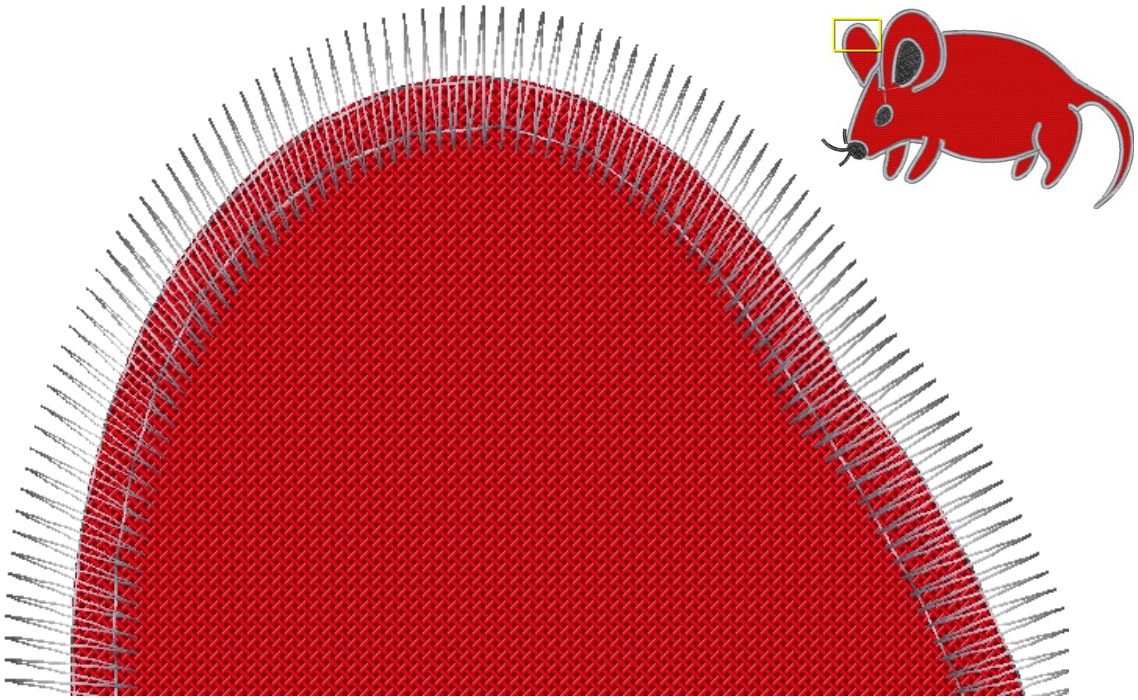


**Image 28 – Close view of appliqué embroidery**

I have already told you about most of the settings that you will have available for appliqué embroidery. That is, first and second hold down line with running stitch, zigzag or whatever else your embroidery software offers (I advise running stitch), and then the overlock stitching. In image 28 you can see a running stitch and satin stitches. The running stitch is the first hold down line, and the satin stitches are the overlock. I didn't set second hold line stitch for this design. Concerning the overlock stitching, you will probably also have some settings available. That should include density, passes, stitch type and more. Changing those doesn't really change the design, but again even a small change might look beautiful, so feel free to experiment with your embroidery software and your embroidery machine.

Some of your customers might specifically ask for appliqué embroidery. You can offer appliqué to others, since it has also lower cost than fill stitch, but high end result, much higher than design without any fill at all, like running stitch for example. Many will say that appliqué is much more beautiful than cross stitch, while it keeps the cost low. It's for you to decide, offer to your customers and see

what feedback you will have from them. My advice is that appliqué should be considered as high quality embroidery when it's is done well, when it achieves to differentiate from simple sewing machine appliqué, and when it amazes the customer.

***Variable angles***

"Variable angles" is another stitch type that you will find in some embroidery software, and can make the difference between a good design and an extraordinary design. What it actually does, as the name states, is give different stitch angles within the same design block. It can be very useful in designs that you create with fill stitch type, where you only have one stitch angle available. With this stitch type, you can have better results in many cases, but mostly in curves. Let's assume we have to digitize the blue arrow on the image on the left.

The normal way to digitize using step satin fill stitch (when satin stitch type is not available because we want the arrow to be bigger than 0.25 inches) is like the left part of image 29. This way though it only has 1 angle, so the curve of the arrow is not very visible on the embroidery. Using variable angles stitch type though, as you can see on the right part of image 29, gives a much better result, since the arrow curve is visible to the actual embroidery through changing the stitch angle wherever we want. In this design I have used 5 different stitch angles at the points where the red arrows are in image 29. The result on the embroidery will be very good, and I would advise you to use this technique when needed.

When you use satin stitch type, you can set the stitch angle of the embroidery, like we did in image 4 (Satin stitch mouse). But when you have to digitize with fill stitch (also called step satin), then you only have 1 angle available, and this is when you can use the variable angles technique.

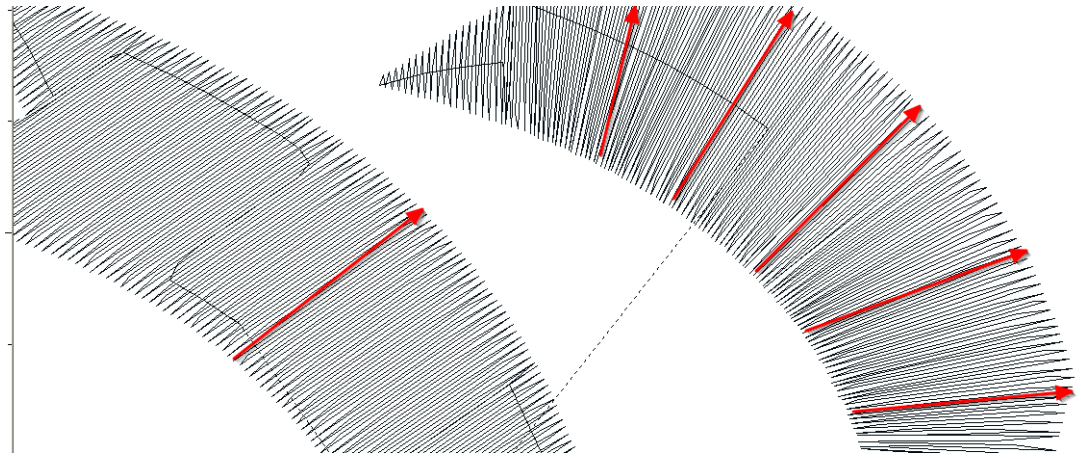


**Image 29 – Variable Angles**

## *Stitch types cost comparison*

In this sub chapter I will present a comparison of all the stitch types we have seen, regarding their stitches and thus their real cost. In table 4 you can see this comparison data.

| Stitch type | Size | Stitches | Estimated Cost | Comparison of Stitch number |
|---|---|---|---|---|
| **Running Stitch** | 8.1 x 5.49 in | 543 | $11.45 | 2.09 |
| **Satin stitch** | 8.1 x 5.49 in | 5,758 | $12.21 | 22.18 |
| **Fill Stitch** | 8.1 x 5.49 in | 25,959 | $15.17 | 100.00 |
| **Cross stitch** | 8.1 x 5.49 in | 8,025 | $12.54 | 30.91 |
| **Applique** | 8.1 x 5.49 in | 8,527 | $12.62 | 32.85 |
| **Variable angles** | 8.1 x 5.49 in | 25,959 | $15.17 | 100.00 |

**Table 5 – Stitch Types Comparison**

The comparison is about the design “mouse” that is used as an example in this course. In the first column you can see the stitch types. The stitch types used are the ones we have learned, that is, Running stitch, Satin stitch, Fill stitch, Cross stitch, Appliqué and Variable angles. Note that the mouse is not appropriate to be

made with variable angles, but variable angles number of stitches is approximately the same as fill stitch, so this is the assumption made here, that variable angles results in the same stitches number for this design as fill stitch for the same design.

In the second column you can see the size of the design. Of course I have used the same design size for each stitch type, in order to be able to compare their resulting stitches. The size I chose is 8.1 x 5.49 inches. The third column is the most important one, and shows the number of stitches for the same design with the same size, but with different stitch types. Here you can see for example what a big difference there is between making the mouse with running stitch and making it with fill stitch. Running stitch only results in 543 stitches, while fill stitch (step satin) results in 25,959 stitches. The satin stitch is the second lower cost stitch type after running stitch, but with a big difference of 5,758 – 543 = 5,215 stitches more. Then cross stitch and appliqué have similar stitches number of 8,025 and 8,527 stitches respectively, being the third lower cost stitch type. Fill stitch and variable angles are the most expensive stitch types with 25,959 stitches.

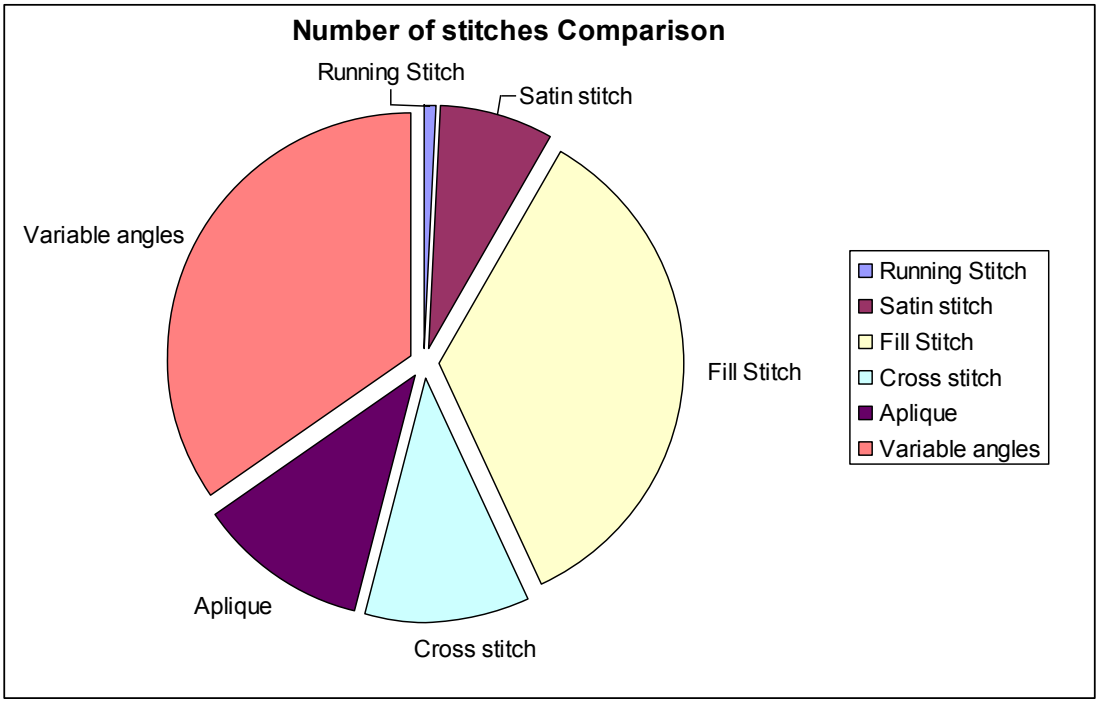



**Chart 3 – Number of Stitches Comparison Pie**

In the last column of table 4, you can see the comparison of the stitches number if we assume that 25,959 stitches of fill stitch and variable angles are the "100". If that is the case, then appliqué is 32.85, cross stitch 30.91, satin stitch 22.18 and running stitch only 2.09. That means that running stitch will only use 2.09% the thread that fill stitch is going to use for this design. If for example this design uses 430 feet of thread, then running stitch will only use 8.987 feet of thread! In Chart 3 you can see the same thing in a "Pie" type chart. Note how bigger Fill stitch and variable angle's piece of the pie is than other stitch types, something that shows how much more thread these stitch types will use in order to embroider the same design. You can understand the difference, which is huge in thread usage, but how important is this difference in the actual cost of the end product?

Column four of Table 5, named "estimated cost", shows us an estimation of cost by using the above different stitch types. The starting cost is the fill stitch, and I have used the estimation of $15.17 that we did in "Table 4 – Calculation of product cost" in Chapter 5. So we assume here that the fill stitch mouse costs $15.17. What I have changed in order to calculate the cost for the rest of the stitch types, is the time it will take you to digitize and embroider this, the different thread quantity that you will use, and the piece of fabric that you will need for the appliqué. Chart 4 presents these findings:

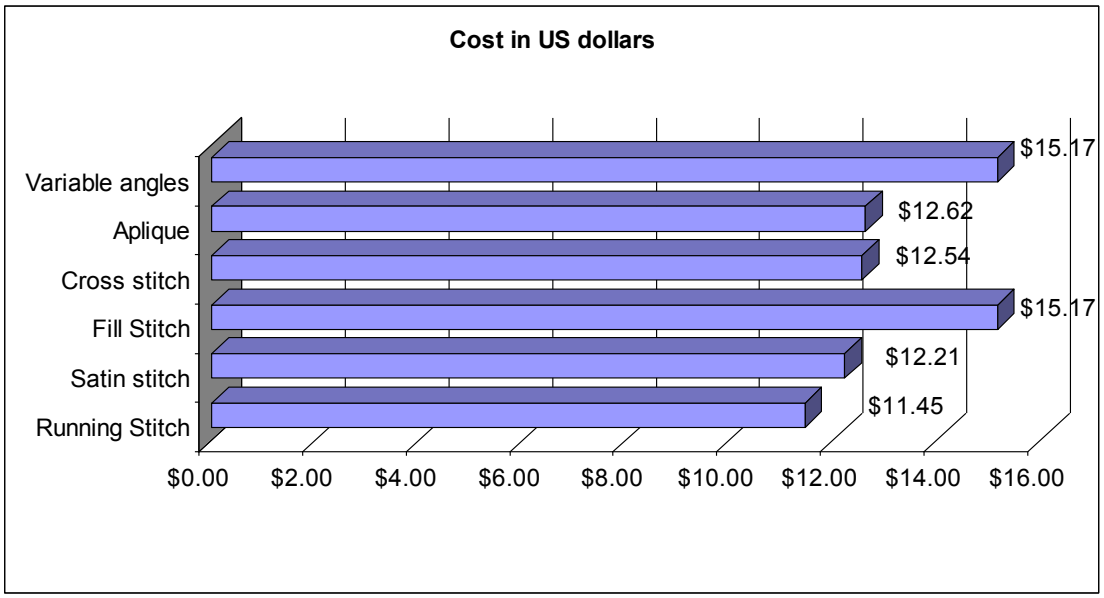



**Chart 4 – Different Stitch types Final Product Cost in US Dollars**

The difference in cost is not as important as we would have imagined by seeing the huge difference in thread usage. That is because the thread and the digitizing and embroidering time play a less important role when other costs, as we have seen them in “Table 4 – Calculation of product cost”, are to be taken into account. Now, the impressive 25,416 stitches difference between fill stitch and running stitch, is being translated to only $15.17 - $11.45 = $3.72 real cost in dollar. Other stitch types are in between, with even less difference.

Let me tell you this: When you are selling to niche market with high profit margins, $3.72 more cost is not so important. It is considerable, but not the main factor for calculating how to embroider the design. So, just decide what stitch type to use by imagining which one will be more beautiful, and which one the customer will appreciate most. On the other hand, if a customer asks for an offer for multiple embroideries, for example team namedrop with logo of the team, then lowering the cost by using different stitch types should be considered.

### *Entry exit points and stitch angle*

Entry exit points and stitch angle are some advanced settings you can apply in your embroidery designs. These settings will help you create more beautiful and more efficient, as far as the embroidery process is concerned, embroidery designs.

Let’s start with entry and exit points, which your embroidery software might put automatically, but it is even better to control the whole digitizing process manually, in order to be sure that you have created a perfect design.

So, let’s assume we want to create and embroider letters “ABCD”. In sub chapter “Connecting the stitch blocks” of this chapter, we will learn different ways of connecting the stitch blocks, but whatever of those different options we choose, these stitch blocks will have an entry and an exit point, which will control how the machine moves while embroidering them.

In Image 30 you can see the correct way of setting entry and exit points in the “ABCD” design. The red dots represent the entry points, which are the points that

the machine starts embroidering each letter. The yellow dots are the exit points, which is the last stitch before the machine jumps to the next letter. The blue arrows show you how the machine will move when creating the “ABCD” design.

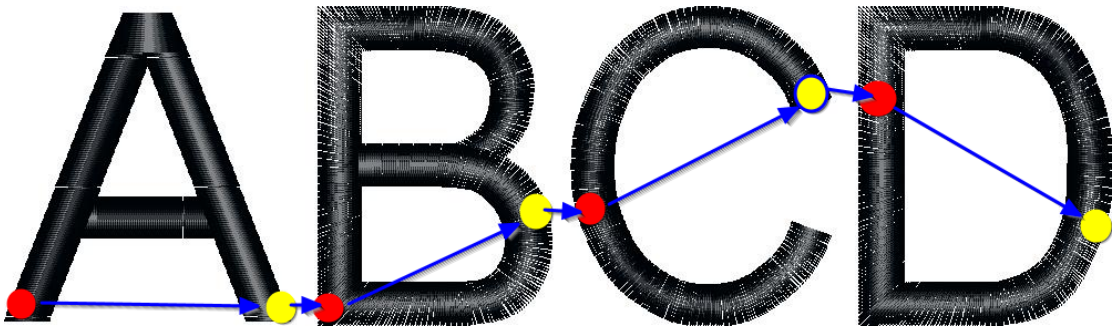


**Image 30 – Correct Input of Entry and Exit points**

As you can see, the machine in Image 30 moves in a smooth and efficient way. It starts the embroidery at the lower left side of letter “A”, then finishes letter “A” at the lower right side of it, then makes a tiny jump and starts embroidering letter “B”. When letter “B” finishes, it makes another tiny jump and moves to letter “C”, and the same happens with letter “D” as well. This is good embroidery, which will be embroidered fast, with minimum cost on time, electric power and thread, and will give excellent result.

On the contrary, in image 31 you can see an example of wrong input of entry and exit points in the same design. It is a bit tricky to follow the red and yellow dots, so just follow the blue arrows in order to understand how the machine will move when embroidering this design. It will start at the upper right side of letter “A” and finish at the bottom left side of letter “A”. Then it will make a huge jump to the upper right side of letter “B” and will end at the middle to upper left side of letter “B”. Then it will again make a huge jump to letter “C” and the same goes for letter “D”. I am sure you have already understood what a waste of time, electric power and thread wrong input of entry and exit points creates.

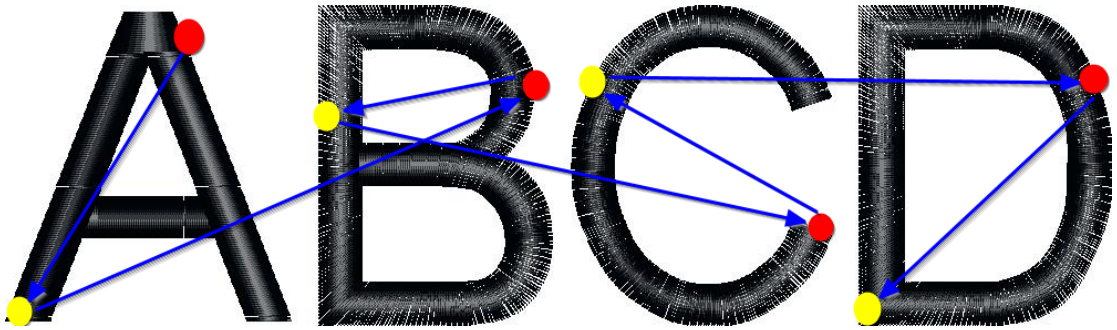


**Image 31 – Wrong Input of Entry and Exit Points**

Most embroidery software will automatically set entry and exit points in good places for simple designs like this. For more complicated designs though, they may not do it correctly. So, in any case, I would advise you to control entry and exit points manually, in order to have full control over your design. Setting those points manually is not a lot of extra work, and it will surely spare you from unpleasant surprises.

Let's move on to stitch angle. You have probably already understood what it is, at least after learning the "variable angles" technique. In any case, it is very useful to learn more, since you are going to use this in every design that you will make, if you want it to be perfect.

In every stitch block that you will create, you can set the stitch angle that the embroidery machine will stitch it at. Satin and running stitch do not have stitch angles. Running stitch has no fill, so it cannot have a stitch angle, and satin has a standard stitching pattern, which is hitting opposite stitches, so it is a standard stitch angle for this stitch type. For fill stitch type though (step satin), you are able to set desired stitch angle for each stitch block.

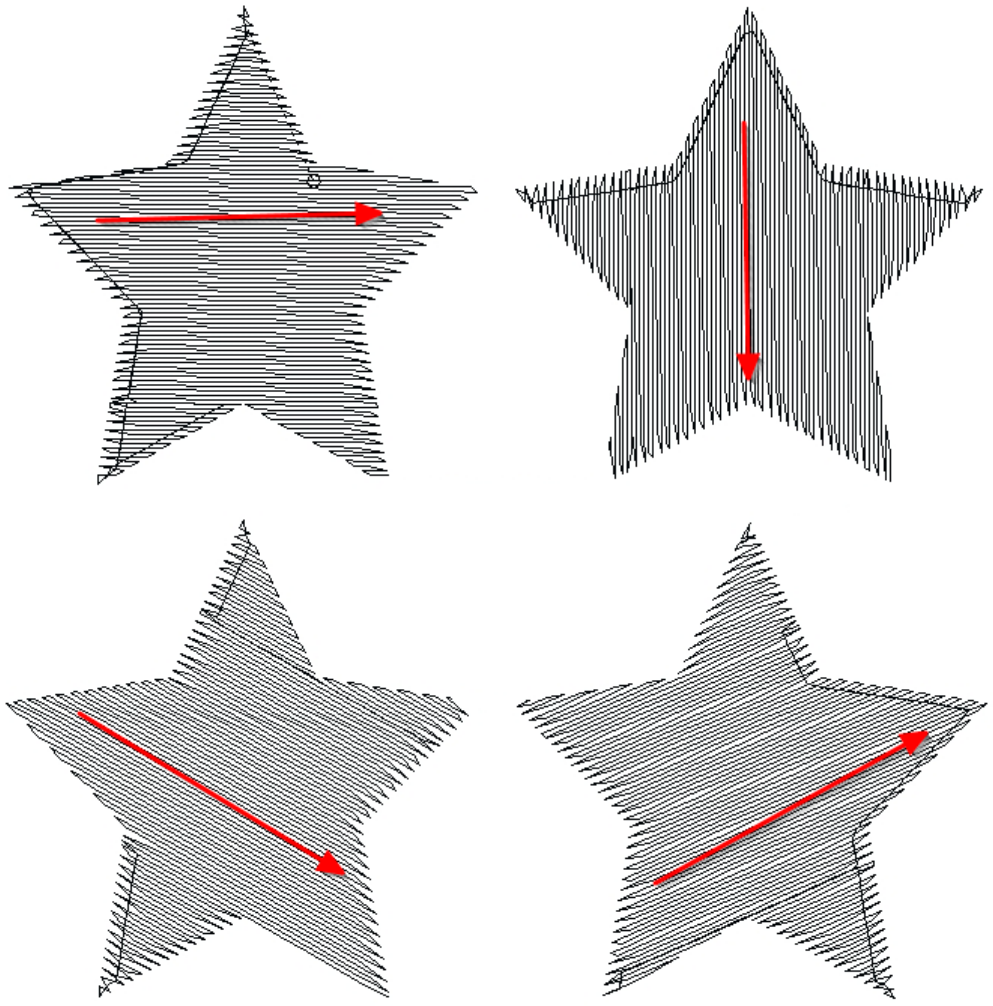


**Image 32 – Different stitch angles**

Setting different stitch angles is important, since it will affect the visual outcome of the actual embroidery, your finished product. It will affect what your customer will see, and how happy he will be with your product. In image 32 you can see four variations of a star, with four different stitch angles. In variation one, on the upper left I have set horizontal stitch angle. In variation two, on the upper right, vertical stitch angle. In the other two variations, on the lower part of the image, stitch angle has a 45 degree tilt. In reality, horizontal and vertical stitch angle are not used extensively, except if you would like to use them for a particular reason, like toning a part of a design which is meant to be horizontal or vertical. The reason is that horizontal or vertical stitch angles don't look good, and also

sometimes might not be so stable. Some degree of stitch angle is always used in embroidery, usually between 15 – 75 degrees up or down. I would advise you to use a stitch angle between these numbers, but don't be afraid to improvise when you think it will create a better result. Experimenting is the best thing you can do in embroidery. Once you gain some experience, especially in your niche market, you will be able at a glance, to tell which stitch angle is available for each design stitch block.

### *Resizing and stitch processor*

Resizing an embroidery design is a service most embroidery digitizers charge for to their customers. If their customers new the truth about how easy it is to resize an embroidery design, they would never pay for it again, but they would buy a low level embroidery software to do it themselves instead! Resizing an embroidery design is literally just a click of a mouse. You can either do it manually for an approximate resizing, like resizing a window in your Microsoft Windows operating system, or you can open the appropriate window, type the exact dimensions, press "OK" and, voila, your new design size is ready within seconds. What you need to know though, is the difference between different embroidery files, when it comes to resizing them.

You have already learned about the difference between embroidery stitch files and block files. Block files contain linear information, so you have full editing capabilities when working with them. That means that even if you want to change size on a block file, the embroidery software will automatically calculate new stitch points and places, in order to keep the same density with the previous state of the file. On the other hand, in stitch files, there is no linear information included in the files, which means that the software can only understand stitch points, so if we instruct it to resize it, it will just keep the same number of stitch points, technically lowering the density. This used to be a big problem, until embroidery software developers created an automatic function that calculates new stitch points in stitch files as well. This function is called "stitch processor" or whatever else some developers might calls it, it still does the same thing.

The stitch processor makes editing, thus resizing, stitch files as easy as resizing a block file. Like any automatic process though, it might make mistakes some

times. The only absolute resizing way, is by resizing linear files, which are block files. If you lack the block file though, and you need to resize a stitch file, just make sure you have the stitch processor enabled. Your embroidery software should have some kind of stitch processor, even an automatic one. If you can't find it, just contact the vendor and ask, because this is important.

### *Stitch repeat*

We have already learned what density is, and also that running stitch has no density setting, since it has no fill. If someone could say that running stitch had density setting that would be "stitch repeat". Of course stitch repeat is available in all stitch types, not only running stitch.

What stitch repeat actually does is hit in each stitch point more than once. Since it will go back in order to hit again, it must go forward again in order to continue the embroidery, so the number of stitch repeats is always odd. Another setting you have available here, is the frequency of each repetition. You can adjust stitch repetition in every stitch point, or in every two, three, etc stitch points. Intermediate stitch points will only have one stitch, while the other will have 3, 5, 7, or whatever stitch repeat number you have set.

Most times we use 3 or 5 stitch repeats, or even more if you want to make embroidery bolder. Running stitch is a good example, since stitch repeat is the only way to make it look bolder, or to tone some parts of the embroidery. What actually happens is that you have more than one layer of thread on the same stitch points, which creates a different visual outcome, bolder and stronger. This is not advised for the whole design, but only for some parts of it. For example you can create a design, then add some running stitch blocks with stitch repeat in order to tone some parts of the design and give the illusion of shadow on them. As always, I advise you to experiment on this as well, remembering that we usually use 3, 5 or 7 stitch repeats. Three stitch repeats make it look a little bolder, five more bold, and seven a lot bolder. More than that should be considered only if you are not satisfied with seven, because it will also increase the embroidery time and thread used considerably.

## *Step length*

Step length is another important term you need to know about and use in order to perfect your embroidery designs, and is only available in fill stitch types. Fill stitch type stitches (step stitches) can fill large areas, and the distance is divided into steps of a predetermined distance. So the step length is the distance between those stitches. Step fills are created by using parallel rows of stitching and you can achieve different effects by changing the step length within a fill area. This is very important, and you can create real artwork by just using this setting. There are practically unlimited possibilities for filling with step fill. Experiment with it and have it in your mind for creating top class embroidery designs that will have no match.

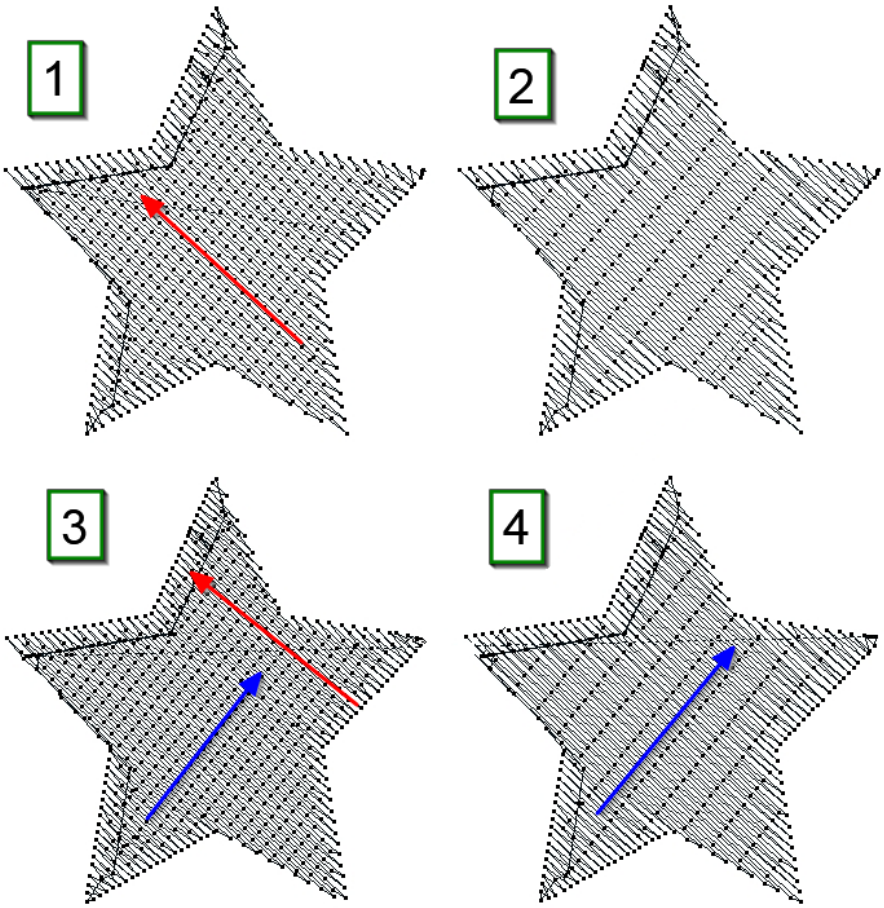



**Image 33 – Step length and Density comparison**

Image 33 will help you understand step length. Stars 1 and 3 have thicker step length than 2 and 4, and stars 3 and 4 have thicker density than 1 and 2. The red arrow shows which way stitches become thicker when we set thicker step length, and blue arrows show which way stitches become thicker when we set thicker density. The black dots are the stitch points. This is a very important image for you to understand how designs become thicker, and use this knowledge in order to achieve better quality designs.

You can see that when we set thicker density, stitch points come closer and closer to each other (blue arrow), in order to create a denser embroidery. Step length is entirely different, and it makes stitch rows, no matter their density, get closer. The actual visual result is different. Density is the setting that you will use mostly, but step length can help you make the difference and create the perfect design, if you use it appropriately. Embroider small designs with different settings in order to understand how it works, and then use it accordingly.

## *Auto outline*

Auto outline is a function that most good embroidery software have. It spares you a lot of work, and the quality of the actual embroidery is perfect despite being an auto function. That is because the digitizer has already digitized the design, and this function only adds auto outline to the already digitized linear design, so quality is excellent.

In image 34 you can see a circle made with fill step satin stitch type and green color, and auto outline with satin stitch type and red color:

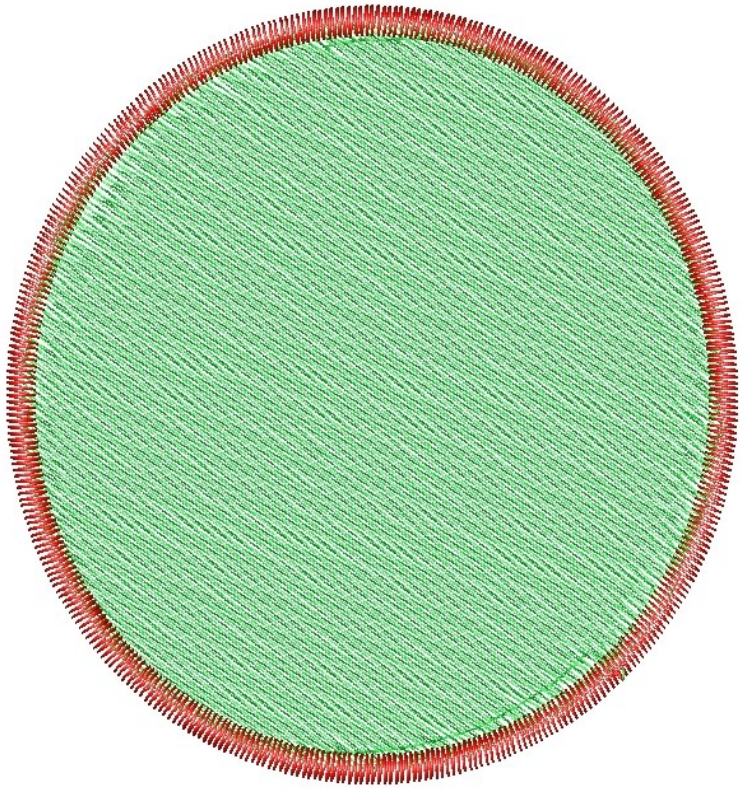


**Image 34 – Auto Outline Embroidery**

Auto outline is pretty easy and it makes embroidery much more beautiful. You will have full control over it, at least most embroidery software offer that option. You can decide if your auto outline will be done with running stitch or with satin stitch and what color it will be. Also for each stitch type you will have all the appropriate settings available, so you can set the outline's density, underlay etc.

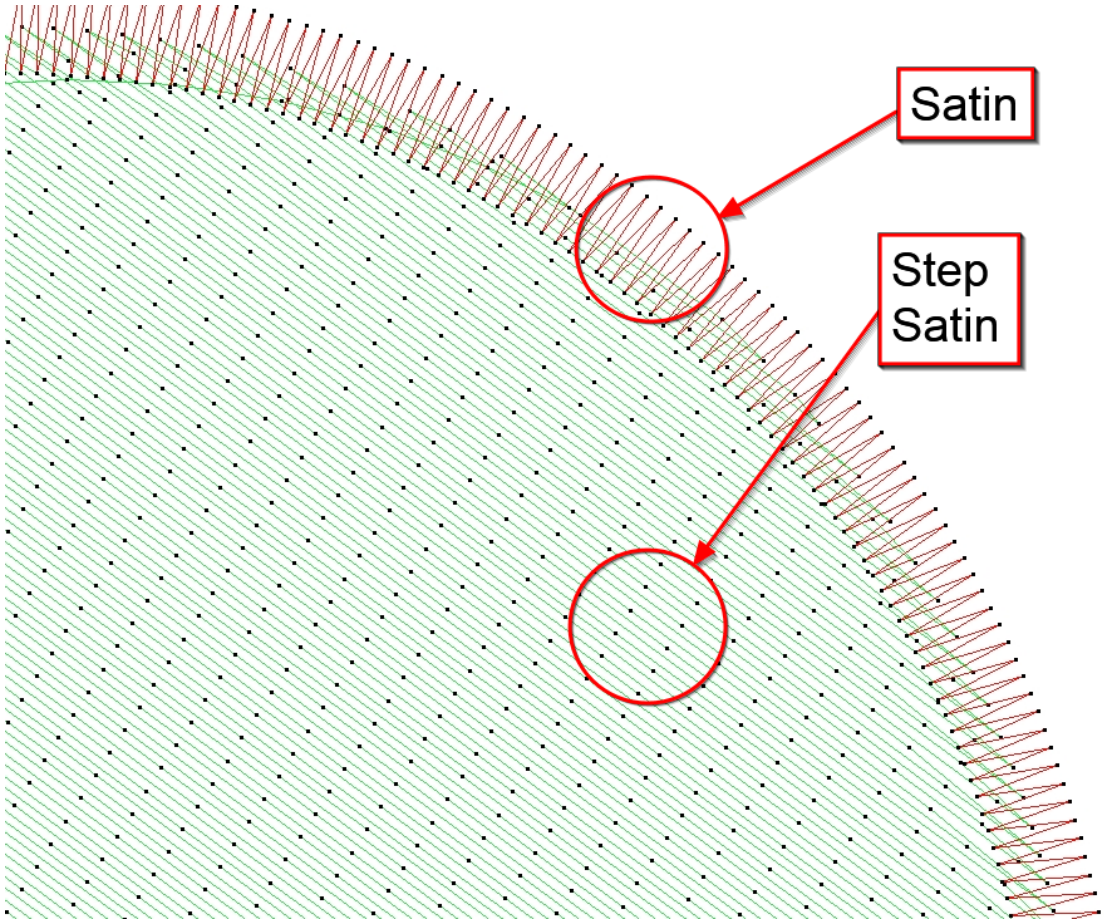



**Image 35 – Close view of Auto Outline Embroidery**

In image 35 you can see a close view of the above circle with outline. You can see the fill stitch (step satin) and where the stitch points are, and the difference with the auto outline. Also, it is important to see how the software auto covers the fill stitch with the satin stitch. The fill stitch goes approximately to the center of the satin stitch, something that is adjustable, but I would advise you to keep this to the center, since it creates a firm and strong embroidery. The outline, apart from being beautiful, creates a more stable embroidery, so consider using it also for this reason as well. Finally let me share with you a secret of many digitizers and embroiders: Auto outline will cover any flaws your embroidery might have, due to bad digitizing or to bad embroidery, and many use it for this reason. Of course as we said your embroideries must be perfect, but inevitably, at least at the start and while you learn, you might make some mistakes, which is acceptable. Outline would be a good way to cover those mistakes.

### *Connecting the stitch blocks*

All the stitch blocks of your design are being connected to each other in some way. There are different types of connections, and the digitizer can control them. There are actually two main connection types:

1. Connection with running stitch
2. Connection with jump stitch

When we set to connect the stitch blocks with running stitch, it means that all the way between the point that the embroidery finishes in the first stitch block until it reaches the point that starts the embroidery in the second block, goes with running stitch. You can see that in image 36 between stitch block 1 and stitch block 2.

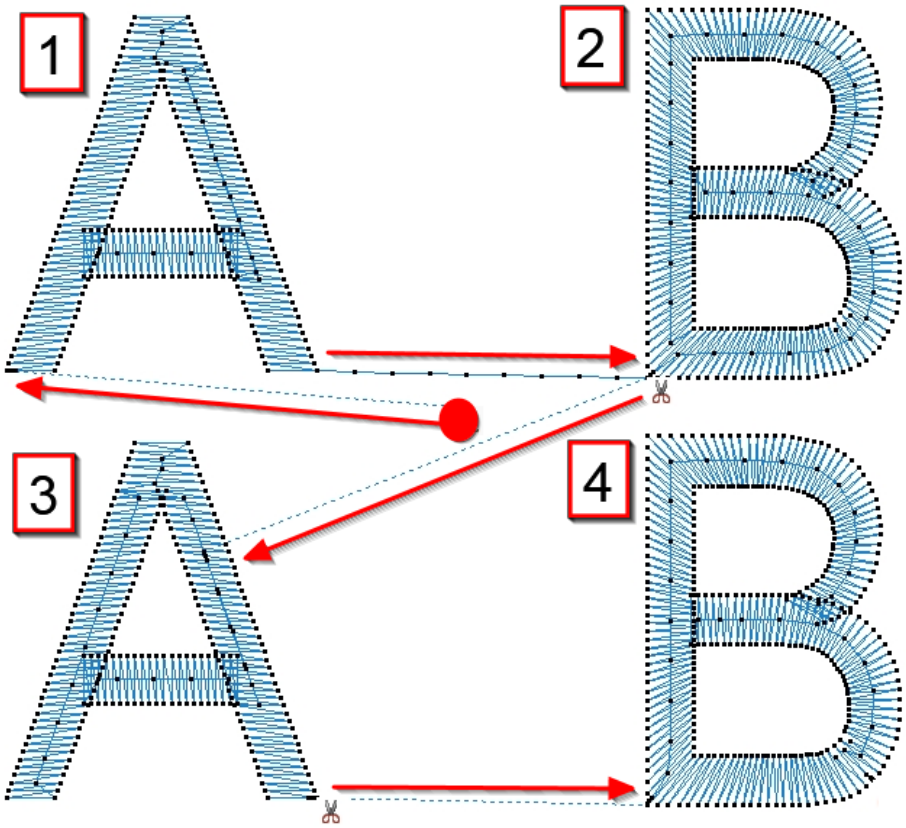



**Image 36 – Connecting Stitch Blocks**

Let's see how embroidery goes in image 36. The red spot is the center of the design and its starting point. The first red arrow shows how the machine goes from that point to the first stitch of the upper left "A" with a jump stitch, which is shown by dash line. A jump stitch normally means that the machine drags the thread with it all the way until it reaches the first stitch, and then this thread must be cut manually, but since this is the start of our design, the thread is not in the fabric yet, so this jump stitch will not leave any uncut thread. After stitch block number 1 finishes, we can see connection with stitch block number 2 with running stitch. Running stitch connection means that the machine puts actual stitches all the way from upper "A" to upper "B", so we cannot cut this thread afterwards. You can see that jump stitch is being shown with dash line and no

stitch points are visible since there aren't any, while in connection with running stitch, you can see little black dots, which as you already know represent stitches. So, stitch block 1 is connected with running stitch with stitch block 2.

Then, stitch block 2 is connected with jump stitch with stitch block 3 (bottom left "A"), but you can also see a pair of scissors over there. In my embroidery software that means that I put a thread cut on that point. Putting a thread cut means that after finishing stitch block 2, the machine will tie (see next subchapter), then it will cut the thread with its integrated knife, then go to stitch block 3 without leaving any thread behind, then tie again before starting embroidering stitch block 3, and then start the actual embroidery of stitch block 3. Tie is needed every time the thread is being cut, since if we don't put a tie, the embroidery will start unraveling from that point. Needless to say, that in order to cut, the machine must have an integrated knife. After finishing stitch block 3, the machine will cut again, go to stitch block 4 with jump stitch, and embroider this as well.

All in all, you can connect stitch blocks with running stitch or with jump stitch. If you connect with running stitch, there are no extra options. If you connect with jump stitch, you have the option to put a cut or not for the jump stitch. Putting a cut requires the machine to have an integrated knife and also requires putting a tie, in order to keep the embroidery. If you do not put a cut, then you will probably need to cut the leftovers after the embroidery finishes, which means you also need to put a tie as well. Sometimes these threads though do not need manual cutting, since they might be overlapped with embroidery, or you don't mind them being visible. The second case is usually true in letters, where small threads between letters are acceptable in most cases, except if the letters are big enough, and these threads look real bad. Also, running stitch is acceptable between letters, which is actually a better choice than jump stitch since it is more stable. The problem is, that if you don't like it, you cannot easily remove it, plus you haven't put a tie, so it is not advised to remove it. So, if you are sure you' re going to keep the connecting thread, you can put running stitch, if not, put jump stitch with a tie, and if you definitely don't want to keep it, input a cut, provided your machine has an integrated knife. In chart 5 you can see all the options you have as far as connecting stitch blocks is concerned.

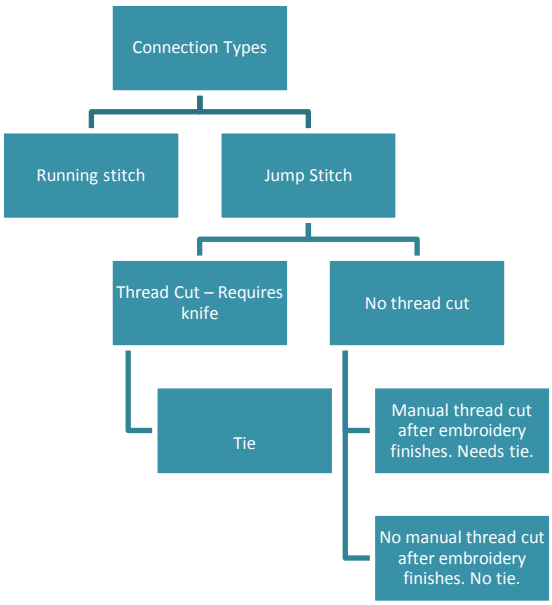



**Chart 5 – Connection Options**

Your software will most likely be able to put cuts and ties automatically after you set it. For example, it will allow you to set a cut only if the distance between the stitch blocks is bigger than X inches, a second option would be to always cut no matter how far the stitch blocks are, and the third would be to never cut. My advice would be to go for the first one, and set your desired distance up to where a visible thread is acceptable, but bigger is not. This way, you won't have to input it manually in every stitch block of your designs, which may be a couple of hundreds or maybe a thousand! Yes there are designs with a thousand or more stitch blocks, and you will have to digitize designs like this if you choose a niche market that requires you to.

Putting cut on embroidery spares a lot of time compared to if you had to remove those threads manually, but extents the actual embroidery time, since it takes time to tie, cut, tie again and resume embroidery. Especially if you have this lots of times inside a designs, the time extents a lot. On the other hand, cuts create clean nice looking embroidery. I would advise you to use tie when needed and don't think about the extra time needed to embroider, since it will create better final product. On the other hand, don't overdo it and put cuts all over the place when it's not needed. For example, you don't need to put cuts and ties in a small letter word, since the actual thread connecting the stitch blocks is hardly visible.

Don't sacrifice time for quality, but don't try to achieve better quality where its not needed, keep the balance when this does not affect your final product's quality.

## *Tie*

A tie is very important in case you manually or automatically cut the thread, because, if there is no tie, then your embroidery will quickly unravel from the point that you have cut the thread. You need to place a tie before and after the thread cut, in order to keep your embroidery strong and firm.

Most software will probably allow you to automatically place ties whenever the thread is cut, but you must check if your software does, and you must also know how to set it manually in case you need to. You embroidery software will most likely offer you a choice of different tie types. In image 37 you can see four different stitch tie types.

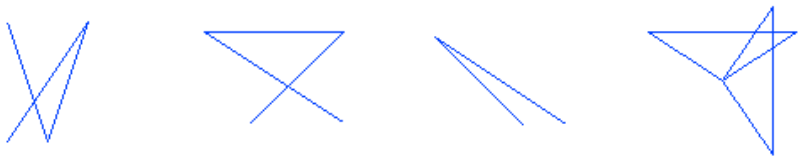


**Image 37 – Different Types of Tie**

I would advise you to just select the default type of tie, since it will not make much difference which tie you will use, as long as you use one. So, if you use cuts in your embroidery, make sure you choose a tie no matter what. It is very important, and you might lose customers if you make the mistake to not use ties, since the final product will be of low quality.

## *Changing stitch code*

Changing stitch code is advanced embroidery digitizing and gives you full control over your embroidery. Most digitizers don't use those functions, or at least they use only the basic ones, like changing needles. Stitch codes though offer you a lot more capabilities that will make your design more efficient, embroidery –

friendly and probably more beautiful. Sometimes, these codes are necessary, like needle changes. Let's see what you can do with stitch codes then.

The first thing you can do is **assign needles** to parts of your designs. So, if you want letter "A" to be embroidered with needle 1, in which we will use yellow color thread, and letter "B", which is the second stitch block, to be embroidered with needle 2, in which we will use red thread, then you can tell this to the embroidery machine, by choosing stitch code for letter A and letter B. What you actually do is tell the machine: "Bring down needle 1 and embroider this block of stitches (which forms letter A) and then bring down needle 2 and embroider that block of stitches (which forms letter B)". Some machines cannot read the needle change code, so what we do with those machines is put a "STOP", which is the second code that we will see.

When we use a **stop code** between two stitch blocks, for example between letter "A" and letter "B" of a design, we actually tell the machine: "embroider this block of stitches (which forms letter A) and then stop embroidering until I tell you to continue". So the machine will embroider letter A, and then pause, and it will not start again until we press the appropriate button on the machine.

You might wonder why we need to put "STOP" code to a design. We might want to put a stop in order to change thread on the needle (for example in single-needle machines), assign needles to stitch blocks, change fabric or do whatever else that requires the embroidery to be stopped. For example "Namedrop", that we learned about earlier, embroiders one name, stops in order for you to put the next fabric in the hoop (e.g. hat), press the appropriate button in order to proceed to the second name, and so on.

Another code you are able to change is the **"cut"**. We have already explained what the cut function is used for in subchapter "connecting the stitch blocks". Your embroidery software will probably have a menu dedicated to the connection of stitch blocks, but will also have "cut" as a code that you can add to a stitch. You are able to change a stitches' code to cut wherever in the design, even within the same stitch block if it suits you.

The next two codes that you can assign are **"jump"** and **"hit"**. Jump is what we have also learned in subchapter "connecting the stitch blocks", and with running stitch is the connection alternative of cut. Hit is the default code for most of the stitches within a design, and it means that this stitch penetrates the fabric with the thread. All the stitches in a design will have by default "hit" code, until you change it. Of course, you can change back any other code to hit. For example if you have changed the code of a stitch to cut, and then changed your mind, you can again change it back to hit.

The above five are the most important codes that you will use in your digitizing career. 99% of all digitizers use only these codes and nothing else. There will probably be some extra codes available in your embroidery software. These codes might be "sequin", "borer", "end of design" etc, but most of them are being put automatically, so digitizers don't really bother putting them manually. For example, if you create a sequin block, most likely the software will automatically put the sequin codes, so you will never have to do it manually. If you center a design like we have learned, the software will automatically put end of design code, so you will never have to do it manually. The five important codes that you have to learn and that you will use are the ones described in this sub chapter: needle, stop, hit, jump and cut.

### *Push and pull compensation*

Embroidery is sometimes tricky when it comes to various fabrics that we embroider on. Some fabrics are pretty stable, while others tend to shrink or stretch during the embroidery process. Embroidery software developers have created functions in order to help digitizers deal with these problems before they arise, because it is costly to create embroideries two or three times because of those kinds of problems. The functions that have been developed for the above mentioned problems are called "pull compensation" and "push compensation".

In the case that the fabric is going to stretch, you can use the pull compensation function. In image 38 you can see a clear gap between the green and the red stitch blocks, which were supposed to be connected. Of course a digitizer will not leave a gap like that on purpose, but this gap will be created once the fabric

stretches during the embroidery process. So, what the digitizer is going to do is enable pull compensation for one or even both of the stitch blocks. What I have done in Image 39, is enable a 10% pull compensation for both stitch blocks. The result, as you can see in image 39 is perfect and there is no gap between the two stitch blocks any more. On the contrary, the two stitch blocks overlap, which means there is not going to be any gap on the actual embroidery.

An experienced embroiderer and digitizer knows approximately how much each fabric will stretch, so he can set pull compensation settings accordingly. The digitizer sets X% stretch of the design in order to overcome the actual fabric stretching. So, if an experienced embroiderer knows that fabric X stretches about 15%, then the digitizer can set 15% pull compensation on the design. Setting higher percentage of pull compensation, like 20% is unnecessary, but it will not really affect the quality of the design, so feel free to set more at the start of your career, just to be sure. Setting too much though, might result in bad visual result, since the embroidery might extrude on that point.

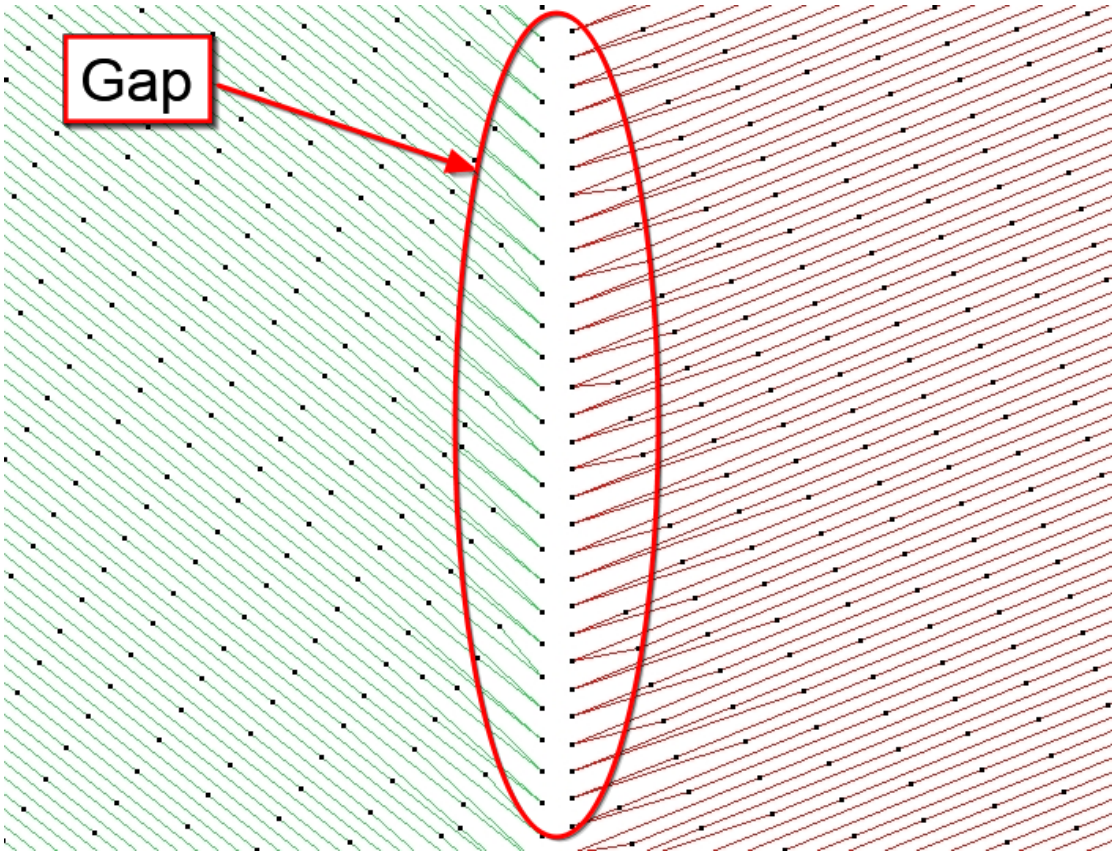



**Image 38 – Gap Between Stitch Blocks**

Apart from the X% setting for the pull compensation, your embroidery software will most likely offer you maximum stretch length as well. So, for example you might say to the software: “stretch my design by 15% but no longer than 0.01 inches”, so except for the X%, you set a maximum stretch length in order to avoid mistakes or overstretching. Of course all of these settings are editable in the software and you can try different settings, just to experiment.

Lastly, pull compensation is available to one or more sides of your design, and your professional software will most likely offer a similar setting. That means that you can enable stretch setting for all four sides of your design, or for some of them, maybe two or three. This is very useful because most of the times the digitizer wants to only stretch one or two sides of a stitch block, and more specifically those that are adjacent to other stitch blocks. Stretching sides that are not adjacent to other stitch blocks is usually not necessary.

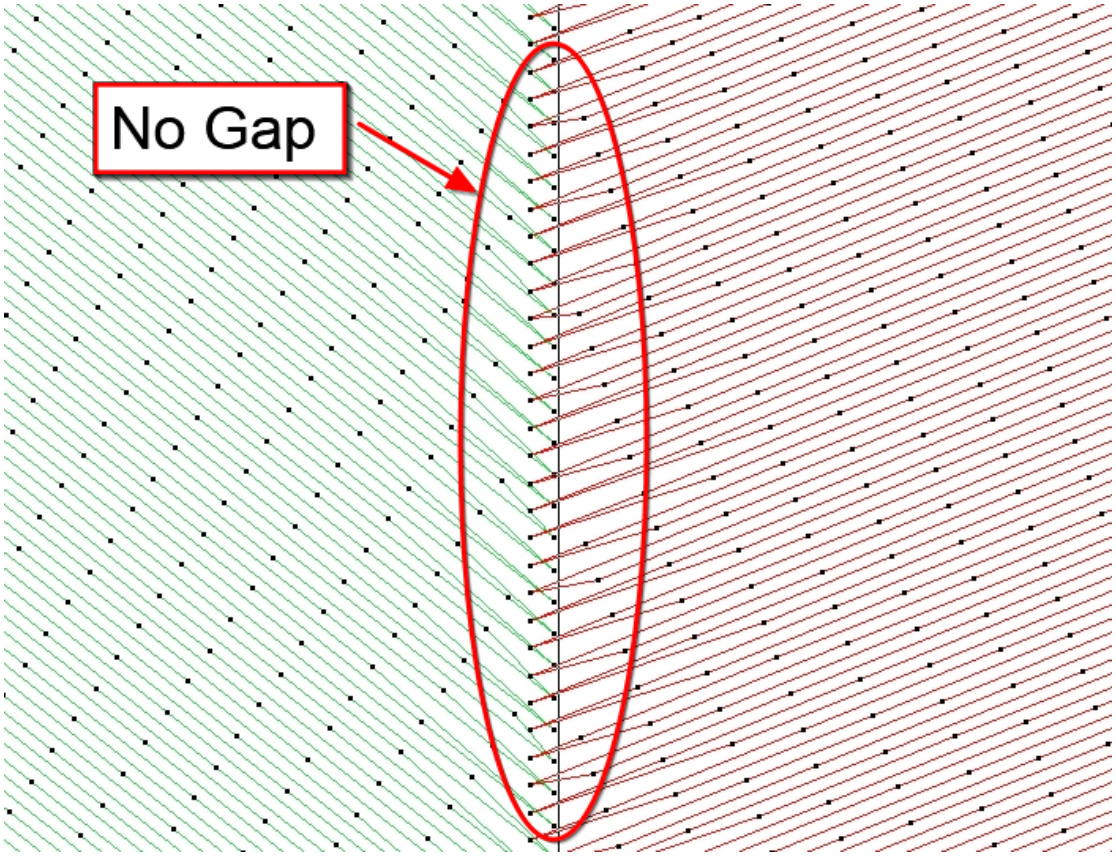



**Image 39 – Pull Compensation Enabled**

The alternative for pull compensation is manual overlapping of stitch blocks during the digitizing process. Manual overlapping is also a must if your software doesn't have pull compensation, or if it doesn't have options for which side to enable pull compensation for. Many digitizers do manual overlapping in order to fully control where the overlap will be, and how long it will be, since they might want to do more overlapping in an area between two stitch blocks than between another area between the same stitch blocks.

The second function is called "push compensation" and is the exact opposite of pull compensation function. Push compensation is appropriate for fabrics that tend to shrink when being embroidered, so push compensation actually shrinks the embroidery in order to fit the shrinkage of the fabric. It works the same way as pull compensation does, so the digitizer selects X% shrinkage of the embroidery. In addition, the digitizer can set maximum shrink length, plus which sides to shrink.

It is good to use push compensation on fabrics that shrink, but it is more important to use pull compensation on fabrics that stretch, since even the slightest gap is more visible than the overlapping, except if the overlapping is too much, in which case the visual outcome is also very bad. You can use automatic or manual push and pull compensation, whatever suits you, as long as the final goal is achieved and the final product is flawless.

## *Inserting holes*

Many images that are transformed to embroidery designs have various types of holes that need to be made. For example, when I digitized the mouse with fill stitch, I had to open two holes into the fill, one for the eye and one for the ear, as you can see in image 40:

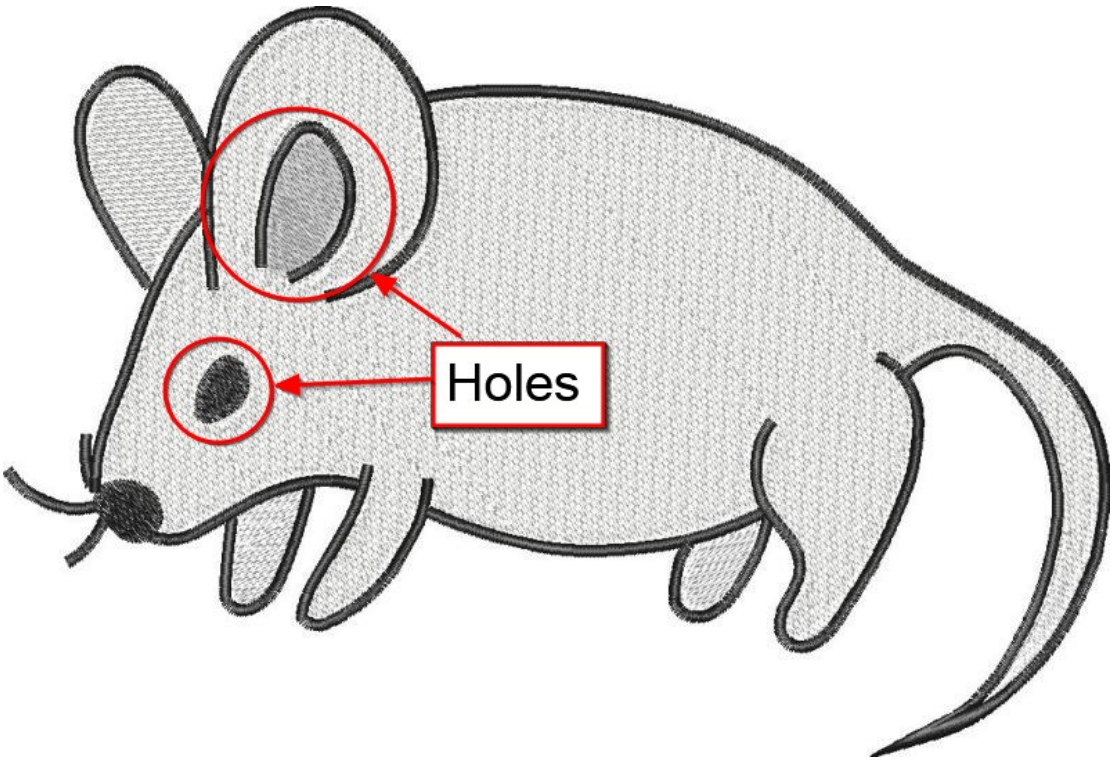



**Image 40 – Inserting Holes**

The reason I had to open those holes is because the eye and the ear are going to be embroidered with a different thread since they are a different color. The digitizer has actually two options when it comes to parts within a fill area that need to be embroidered with different colors or different stitch types. The first option is to fill the entire area with fill stitches (in our example the eye and the ear), and then make the other color or stitch type as a second layer, less dense than the first layer. So in our example, the mouse's eye and ear would have two layers of stitches, the first being the fill stitch which would cover its entire body and the second being the different colored eye and ear. Many digitizers use this option because it's much easier and needs less work, despite the fact that it uses more thread. I would not advise you to use this option, since the second option produces better quality embroidery.

The second option is opening a hole. What you actually need to do in our example, is first digitize the entire area of the mouse's body. Then, by clicking the appropriate function in your embroidery software, you need to open holes in the areas that the eye and the ear are. After that, you need to digitize the eye and the ear with the new stitch type or thread color. So, in that case there isn't a second layer of embroidery. It is more work to be done surely, but less thread will be used, and most importantly, the final product will be much better than the one without the hole.

Both options are acceptable and used in the embroidery world, but the hole option is better, and I would advise you to use this one. Remember that the business plan presented in this course requires top class embroideries, and it's up to you to create them, so just do it, work a little harder in order to have better results. Never sacrifice quality for time, cost or anything else, and you will see that your customers will appreciate that.

### *Color blending*

As you have probably understood by its name, color blending makes you able to mix two or three colors depending on what your software offers, in order to create a different type of embroidery. This is very advanced embroidery, and very few digitizers use it. Only professional embroidery software have this function available.

What is actually being done here is that you create a block of stitches with more than one thread colors within the same block. The mix of the thread might be linear or uniform and each create a different result, with linear being the most used. The embroidery starts from one side of the block stitch, and makes the first color denser at the start and sparser as it goes to the other side. Then it starts again from the second side and creates a second layer in which the second color is denser at the side that the first color was sparser, and then sparser at the side that the first color was denser. These two layers overlap and create a very beautiful illusion of color blending.

You can see this example in Image 41, where our mouse fill stitches are being done with color blending of white and black. Black color is denser at the left, and white color is denser at the right. What the machine actually does is embroider the black color first from left to right, with left being more dense and right much more sparse. In order to create this illusion, the density difference is large. The density difference is also adjustable. In this design I have set density of 4 with maximum density on the sparse side at 20.

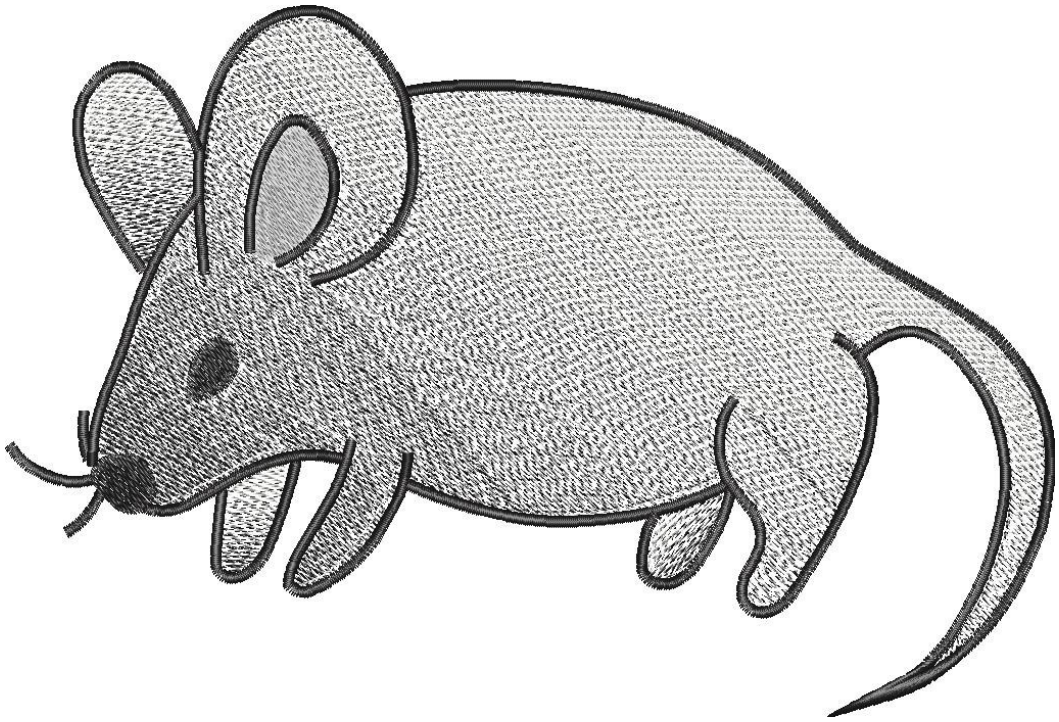


**Image 41 – Color blending**

After black is finished, the machine starts embroidering with white thread, which is the second color I have chosen for this color blending design. The white color starts embroidering with left being the sparsest and right being the densest. The visual outcome of image 41 is pretty impressive, if you compare it with simple fill stitch type. Let's remember how the mouse looked like with simple fill stitch type, by looking at Image 42. The difference is obvious.

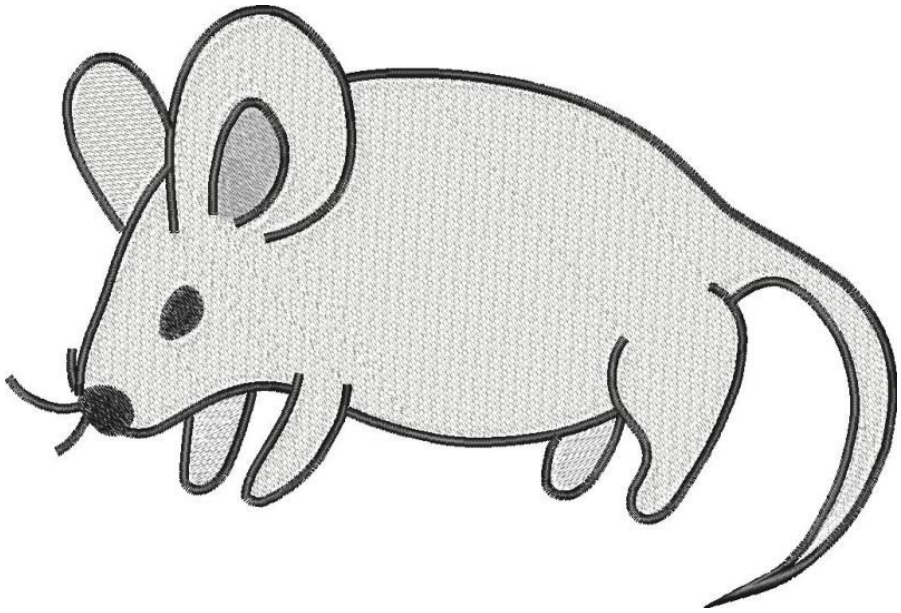


**Image 42 – Fill Stitch Type Mouse**

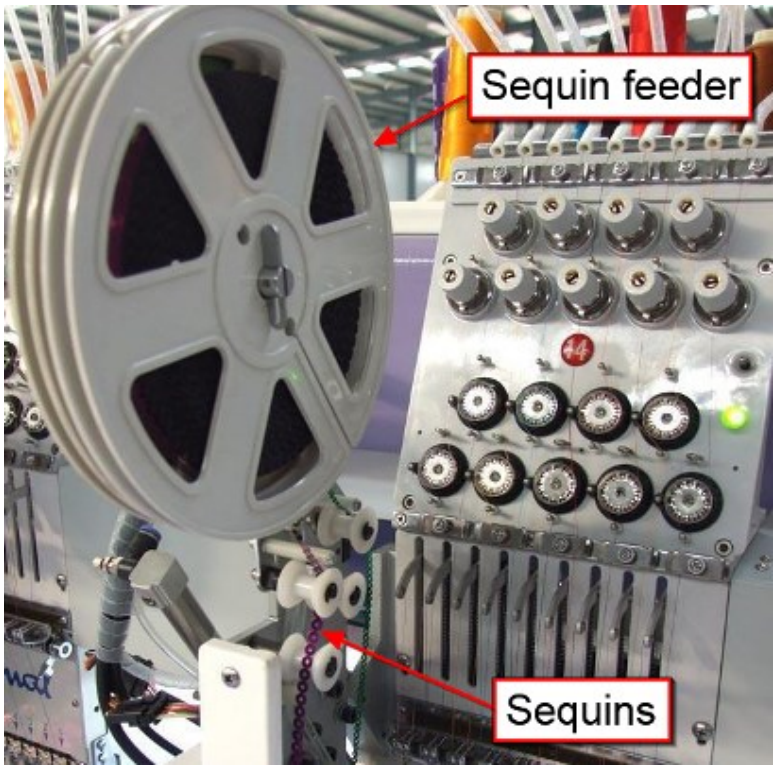
Color blending offers unlimited potential, with the result always being impressive. Your customers will be amazed by how beautiful their new embroidery is. I even heard people who couldn't believe that this was embroidery made by embroidery machine until they actually touched and closely examined the embroidery. Indeed the results of color blending are extraordinary if done properly. As we already said, embroidery digitizing is artwork, and the better artist you are, the better embroideries you will create.

## *Digitizing for sequins*

**Picture 8 – Sequins on shoes**

Sequins are disk – shaped beads that are used widely for decorative purposes. They are made of plastic, and they have a hole which is being used to stitch them on the desired fabric or other material. There are many different colors, sizes and shapes of sequins, and they have been used in the embroidery business for many years. Most embroidery software have an integrated function for sequins, which is considered to be advanced embroidery.

Sequin function can usually be found only in professional embroidery software. Also, your embroidery machine must support embroidery with sequins, so you might want to check this with the vendor of your machine. In picture 3 you can see a sequin feeder which is what your machine must have in order to be able to do sequin embroidery.




**Picture 9 – Sequin Embroidery Machine**

I am sure you are wondering how the embroidery machine is able to embroider sequins. What actually happens is that the sequin feeder feeds the embroidery with sequins, while the embroidery machine's needle embroiders those sequins on the fabric, by stabilizing them on the fabric with the thread. So, the embroidery feeder and the embroidery machine's needle are working together in order to achieve this extraordinary result. All the details of how this collaboration will take place are transported to the machine from our embroidery design that we create in our embroidery software. Our embroidery design includes codes that tell the machine when to load the sequin device, when to bring down sequin or thread, and how to combine those two in order to create the sequin embroidery design.

Let's move forward and see the digitizing part of sequins. In image 43 you can see the mouse made with sequins:

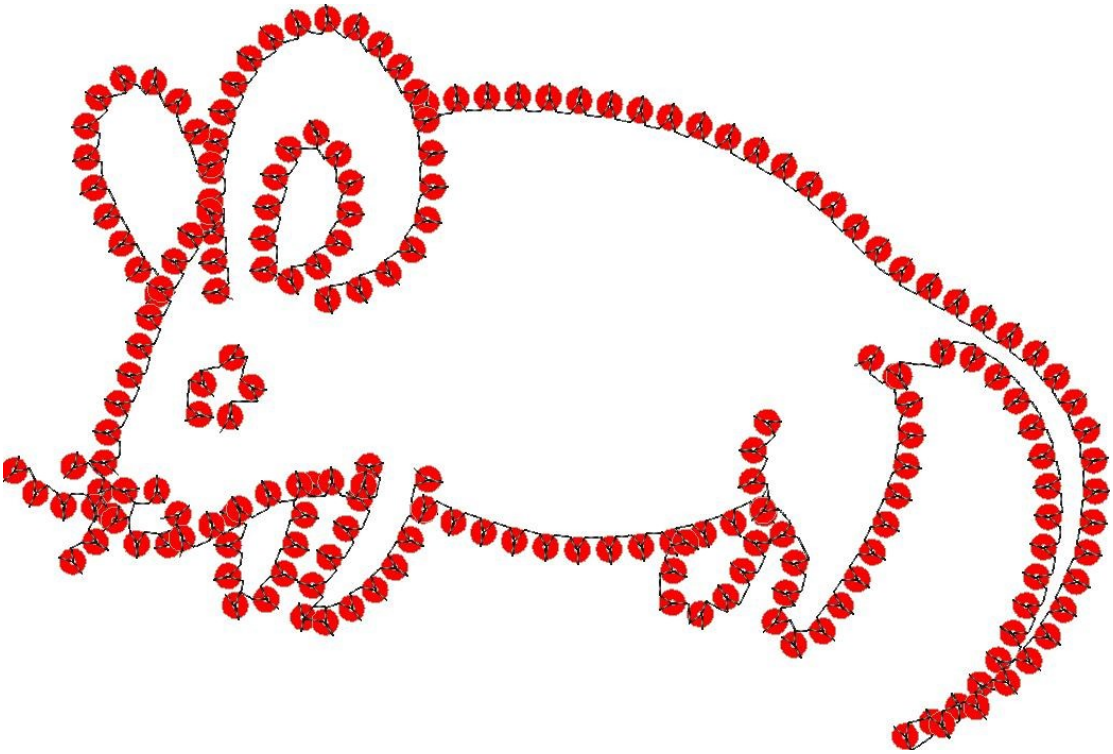


**Image 43 – Mouse with Sequins**

What a digitizer actually does in order to digitize with sequins, is that he starts digitizing choosing the appropriate tool in his embroidery software, and he starts making running stitch, fill stitch etc. After that he chooses sequin stitch, and the software adds sequins in the design. The software might show actual sequins like in image 43 or it may not. If it doesn't, it will probably have settings to show sequins or not. In image 44 you can see close view of the mouse's ear made with sequins.

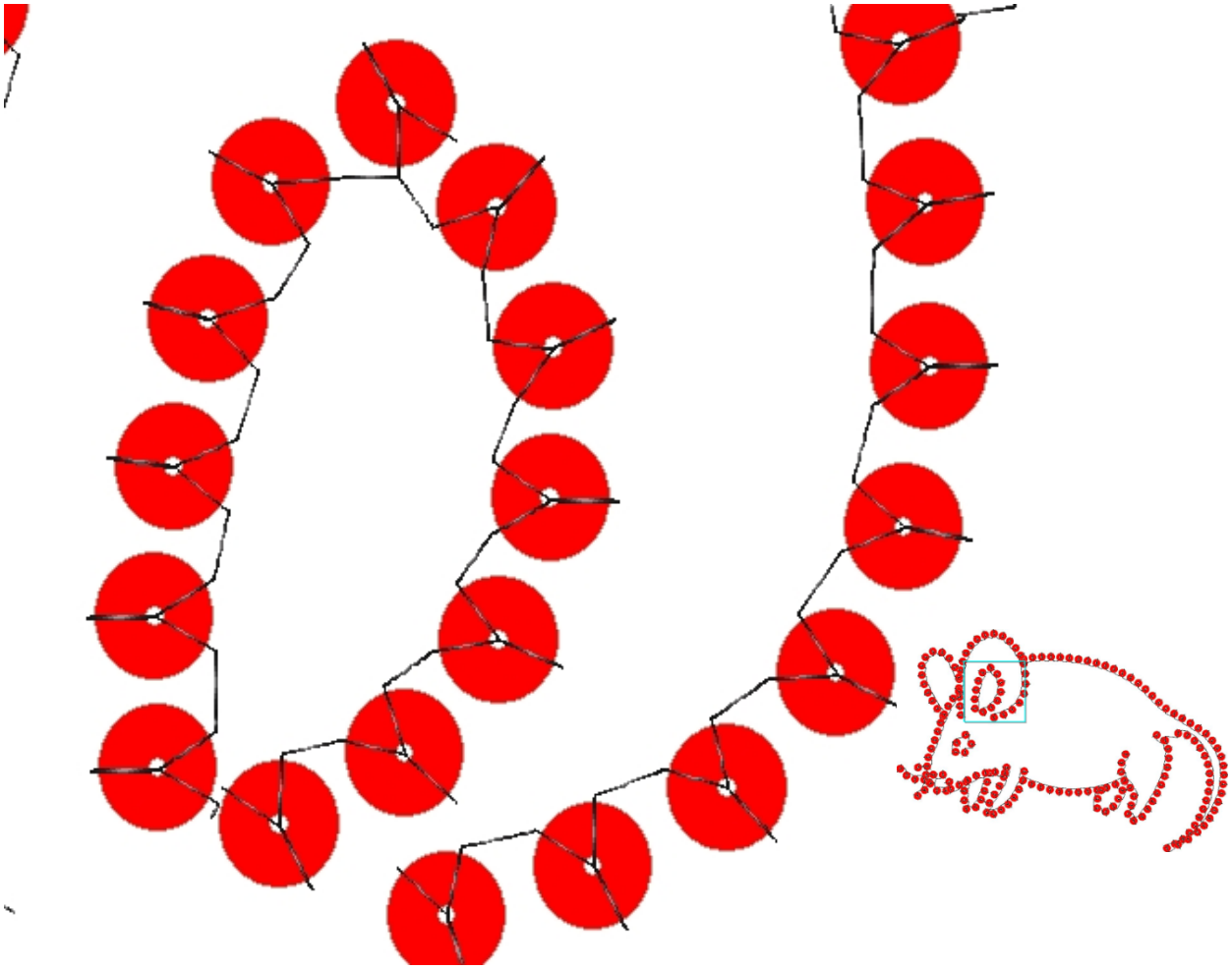


**Image 44 – Close view of Sequin Stitch**

As we have seen, the sequins come from a separate device, so what the embroidery software and machine actually does, is create the stitches that hold sequins on the fabric. In image 45 you can see the actual embroidery that the embroidery software creates. In Image 44 on the other hand, there is only a visual hypothesis of the end result. So, the embroidery software creates what is visible in image 45, the machine embroiders what you can see in image 45, but since the sequin feeder also feeds the embroidery with sequins, the end result is not image 45, but image 44.

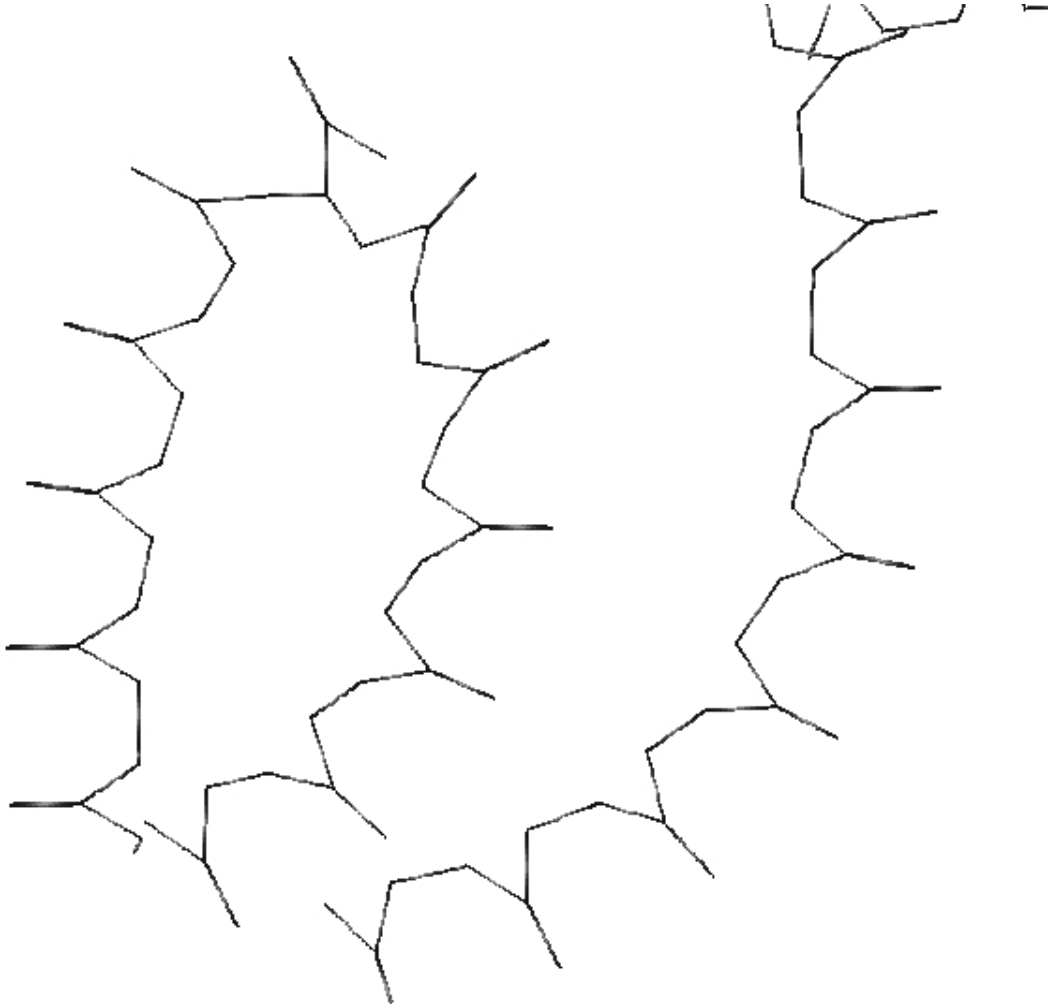


**Image 45 – Close View of What Sequin Stitches Really Look Like**

There are many types of sequins to choose from, which differ in color, size and shape. Your embroidery software will most likely have settings for the size of the sequins. Also, newest embroidery machines started supporting sequins with different shape than round, so your embroidery software and machine might support that as well. Finally, more recent sequin machines support double sequins function, which is exactly the same as single sequin; it just brings down and embroiders a pair of sequins instead of one. If you are interested in sequin embroidery, you might want to check exactly what functions the embroidery software and machine that you are going to buy support. Some older machines and software might not support double sequin for example, since it is quite recent technology.

## Motifs

A motif is an embroidery design created with the intention of repeating itself in an area filled with stitches or as an outline. The motif can be whatever design suits your needs, and your imagination is the only boundary in this embroidery technique. Motifs are advanced embroidery technique, used only by master digitizers.

The purpose of a motif is to help you automatically fill an area or an outline with repetitions of a specific design easily, after you have created the design. Doing this manually is almost impossible. So, motif is an embroidery tool that offers a unique function, only available to those who can master its secrets. Most digitizers won't speak about motif technique, because few know how to use it correctly, and don't really want to create competition.

I have created a pretty simple example for you to understand how motif works. You remember our mouse, and that we had also created it with running stitch. What I have done in our example is that I have taken our running stitch mouse and saved it as a motif in my embroidery software. You can create motifs with other stitch types as well, but running stitch is the most usual stitch type for motifs. I then created a star with running stitch, but instead of choosing running stitch as a stitch type, I chose motif. Then, the embroidery software gives you the option to choose which motif you want to be used. There should be many motifs inside your embroidery software, digitized by the developer of the software. Also, you can create and save your motifs for future usage, as I did with the running stitch mouse.

So, the steps to follow are:

1. Create an embroidery design you want to use as motif
2. Save this design as motif in your embroidery software.
3. Create a design with the shape you want your motif to have. (I created a star shape with running stitch)
4. Choose motif as your stitch type for this shape
5. Choose the specific motif

and…voila, you have a very beautiful design that will amaze most of your customers. Some of you might think it's not anything special, but believe me when a customer sees a design like this with an image he likes as a motif he will be amazed! You can see my mouse motif in image 46.

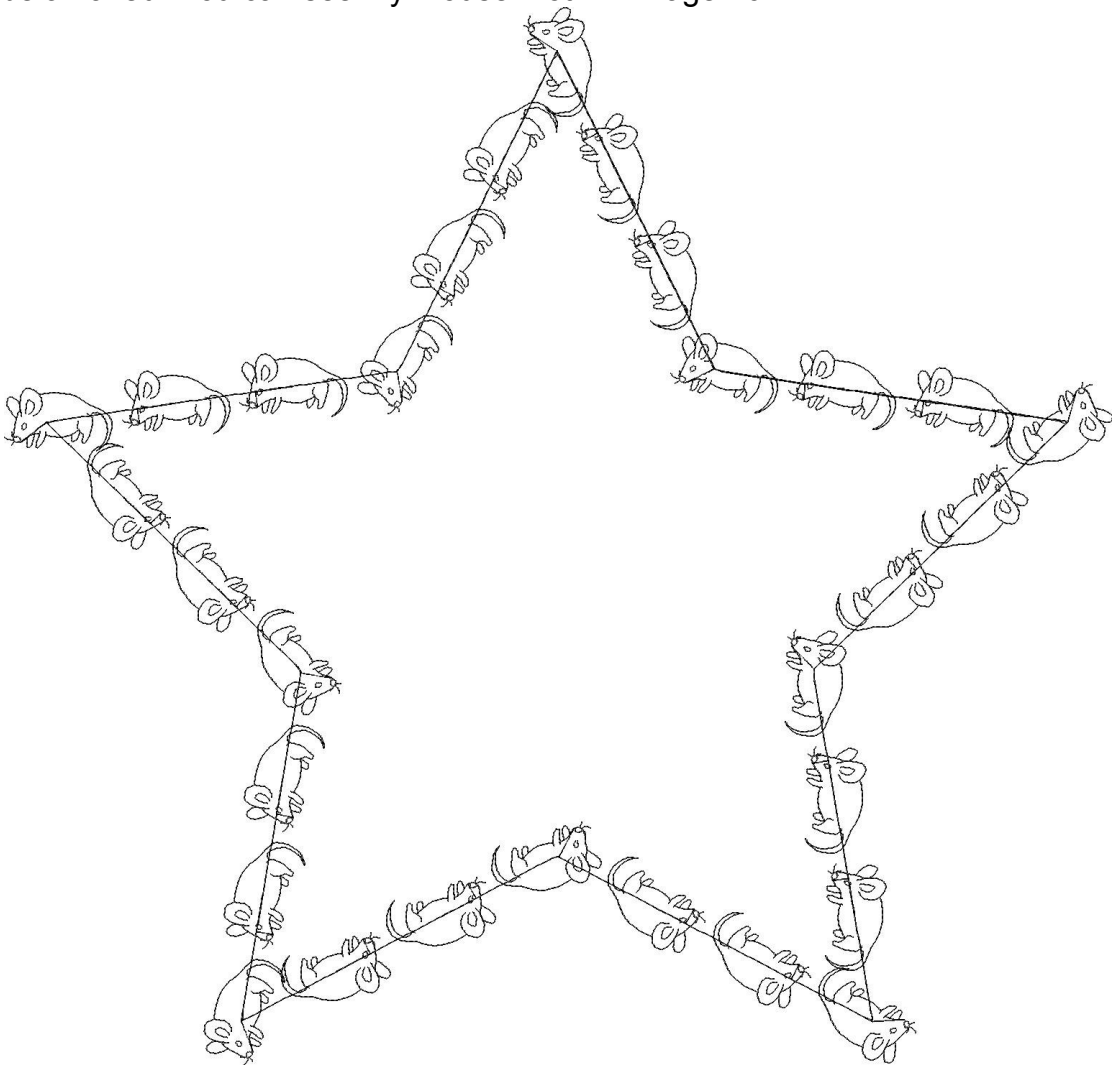


**Image 46 – Mouse Motif example**

If I want I can keep the mouse stable without any rotation, as you can see in image 47, or I can fill the entire star with mice! I told you, only your imagination is your boundary when it comes to motifs.

Imagine a customer asking embroidery with his name in red, white and blue color because he likes the American flag. That would be awesome. Imagine making a

counter offer of doing his name actually consisted of little American flags! I'd bet this is innovative, and he would have liked it better, since this would be something none of his friends would own. Of course, you would offer that for an appropriate price… And to tell you the truth, it would not be harder work for an experienced digitizer to create such a design, but the digitizer that could, is being paid more for his expertise.

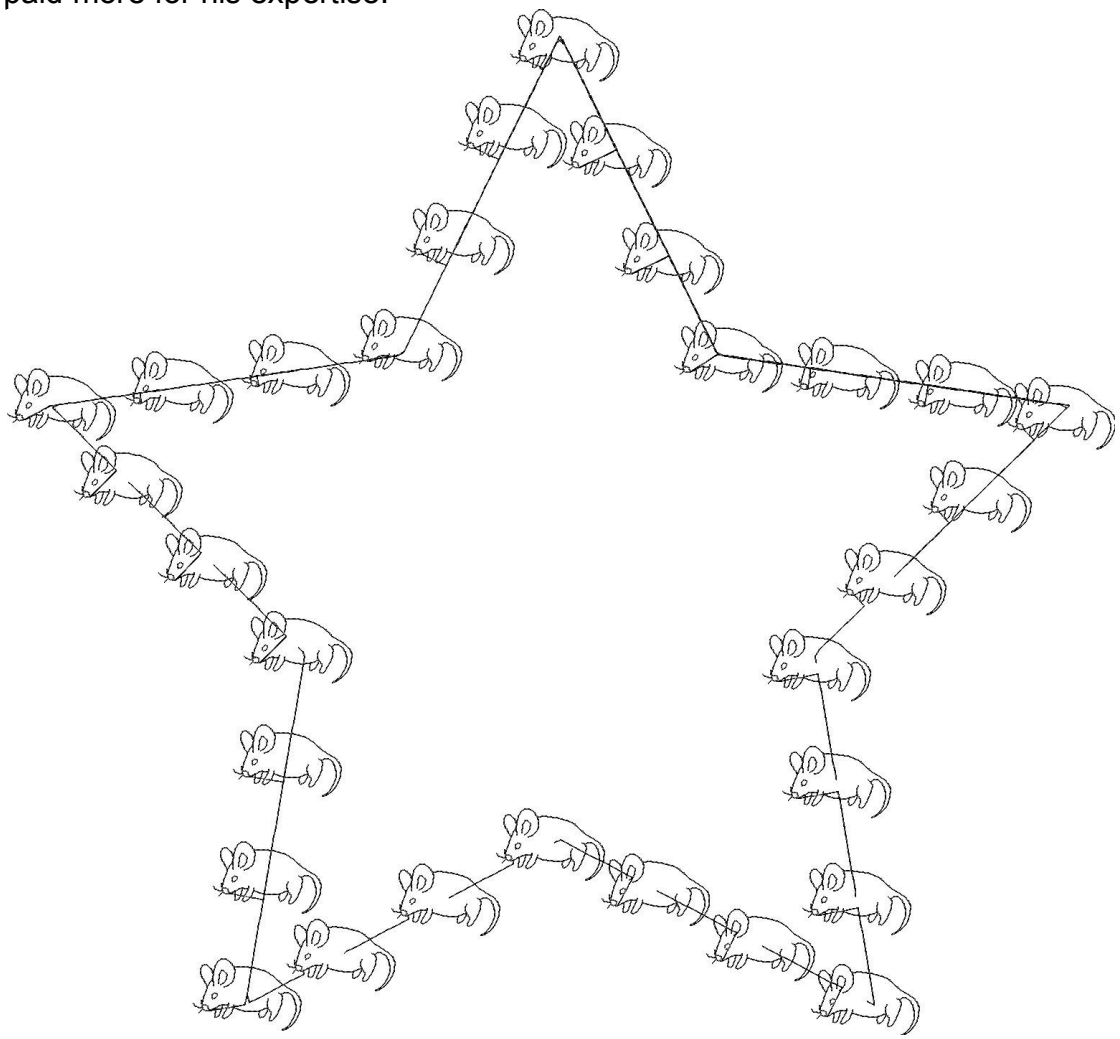


**Image 47 – Mouse motif example not rotated**

What you need to do for our example with the American flag, would be to first digitize the American flag and save it as a motif. Then write (digitize) the person's name with running stitch or fill stitch, depending whether you want the name to be comprised of one flag per point (like my star, which has one mouse per point

and is not filled with mice), or you want every letter of the name to have multiple flags per point (like fill stitch type). That actually depends on the size you are going to embroider it. For smaller sizes you must do the name using running stitch, thus one flag per point, but for bigger sizes you can do it with multiple stitches per point, thus fill stitch type. After digitizing the customer's name, you choose motif and choose the specific motif, which in our example is the American flag. It's that simple.

Imagine your customer is John, and you are offering him the following three design options:

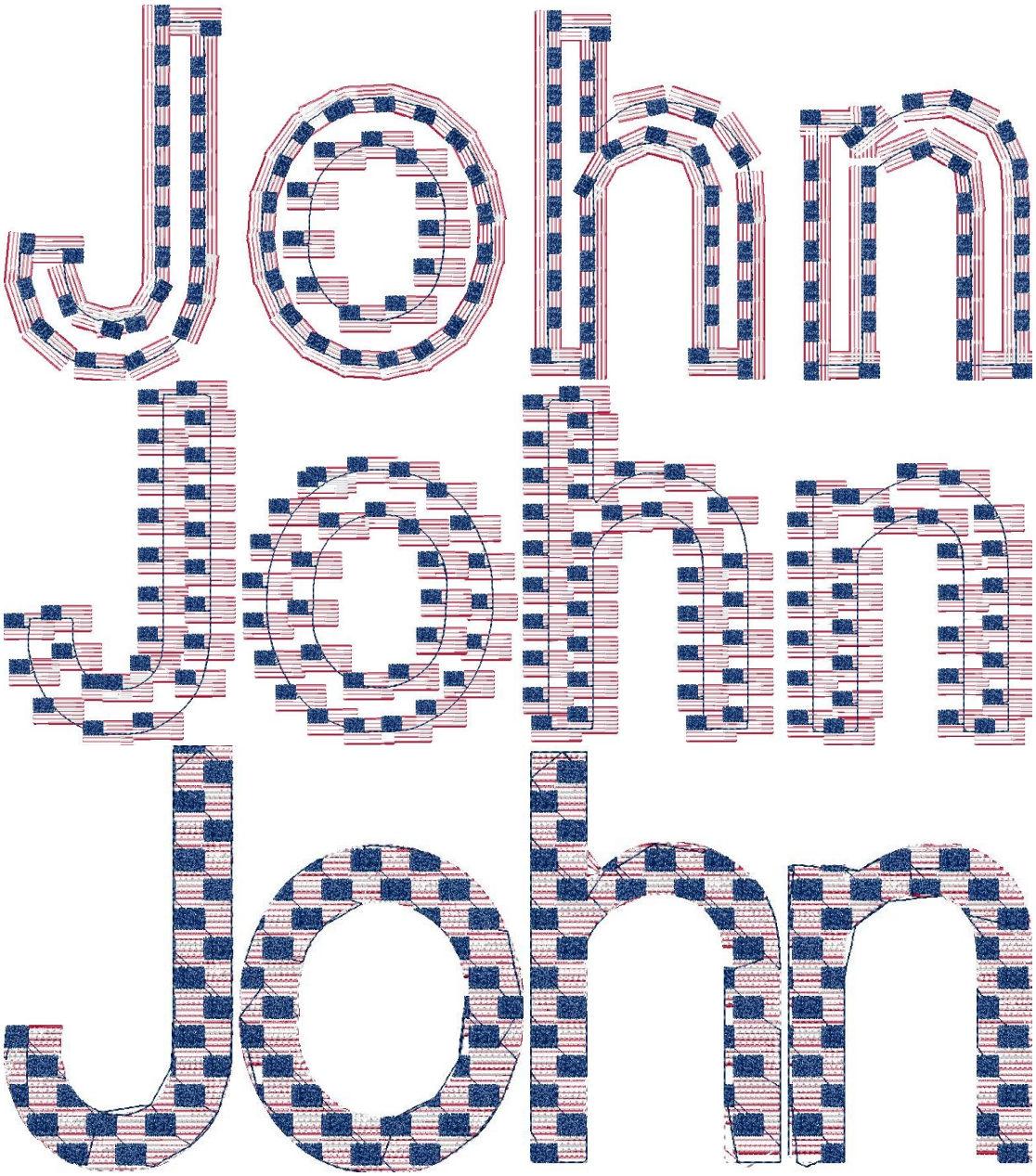


**Image 48 – American Flag Name Motif Variations**

I bet John would be willing to pay a lot more to have this embroidered on his T – shirt, than just having “John” in red, white and blue colors.

Motif is a very powerful tool in embroidery, and when it comes to embroidery for niche markets, then it becomes even more important. You can do whatever you

want with this tool, offer your customers unique designs no one else in the world offers. You can do whatever they ask you to, and of course charge the appropriate price. Price won't be a matter if you offer them what they want, and even more if you amaze them. As I said, your imagination is the only boundary, so amaze yourself and overcome this last boundary. Create amazing designs using motif and every other tool you have learned in this course, and your niche market customers will appreciate and value your work. They will come back to buy again from you, and they will advertize you mouth to mouth in their friends, which, as we learned, is the best advertizing method for niche markets. They will not even have to advertize you if you create such unique designs on their clothes, since your designs will advertize themselves once your customers wear them and go out! Be an artist, be a professional, be truthful and value your customers. This is the recipe for success of an embroidery business from home.