

Cross Stitched Bookmark

Introduction

If you choose to do this project, you will create a cross stitched bookmark. No prior experience with cross stitch is required.

You can access the video that goes with this handout by following this link:

<https://youtu.be/2tDBeQpqnGc>

Steps

1. Choose one quantitative variable and two related categorical variables. There are examples in the section below called Examples and Templates.
2. Choose colors to represent the categorical variables. There are examples in the section below called Examples and Templates.
3. I will send you supplies (by mail or meet on campus).
4. Complete the template that is in the section below called Examples and Templates. You can do this on a computer or print and do it by hand.
5. Read the following cross stitch steps. Watch the accompanying video.
 - Cross stitch fabric is called Aida. It has holes where the needle can go in.

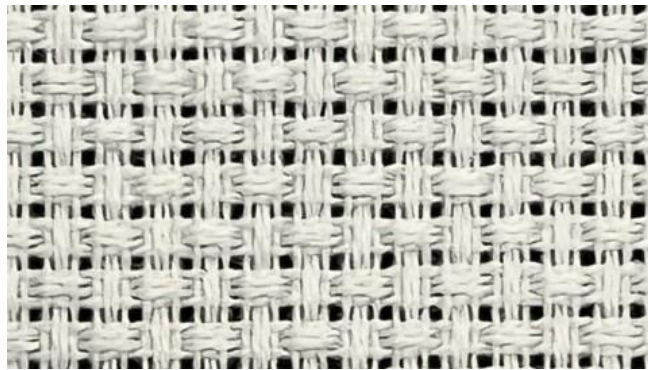


Figure 1: *Close up of Aida fabric*

- Cross stitch thread is called six-stranded floss. It comes with six pieces of thread twisted together. You'll need to separate out two threads.



Figure 2: *Separating strands of floss: (a) original with all six strands twisted together, (b) separating two strands, (c) three sets with two strands each*

- Thread the needle with two strands of floss. Pull the thread so that one side is longer than the other. Tie a knot at the end of the long side.

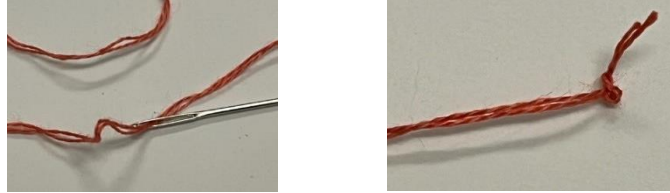


Figure 3: *Threading and knotting: (a) threaded needle, (b) double overhand knot*

- To cross stitch, bring the floss up through one hole and down through a diagonal hole.

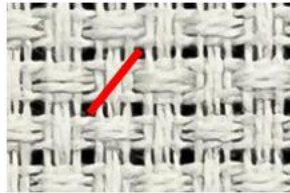


Figure 4: *One half of a cross stitch*

- I usually do a full row in one direction before going back to complete the X's.

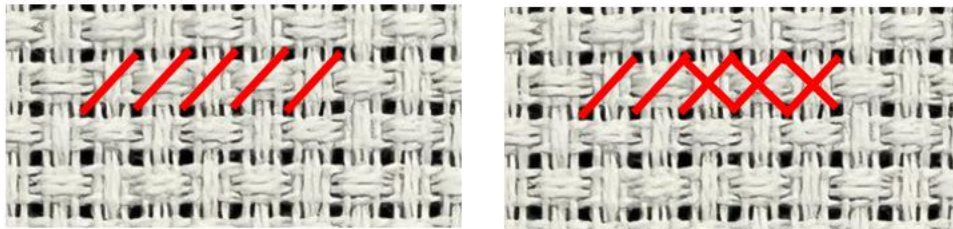


Figure 5: *Cross stitch process: (a) one row with five half stitches, (b) one row with three complete crosses and two half stitches.*

- After you finish stitching, run the needle through a few stitches in the back of the bookmark. Pull the thread through and then cut it close to the fabric.

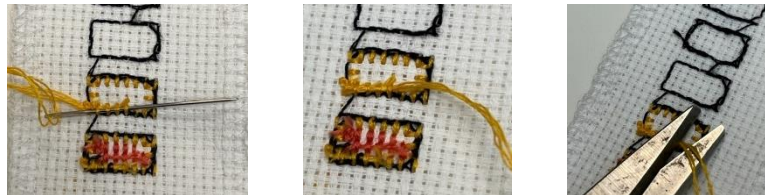


Figure 6: *Finishing: (a) weave needle through a few stitches on the back, (b) pull the thread through, (c) cut the thread close to the fabric.*

6. Cross stitch your bookmark using your template.
7. (Optional) Complete the bookmark by gluing the stitched piece to a bookmark backing. You may need to trim the Aida cloth. You can use a glue stick or white glue (like Elmer's or Mod Podge). When I use white glue, I use a foam brush to spread it out.



Figure 7: *Gluing to the provided cardboard backing: (a) use a glue stick or white glue to stick to back, (b) the backing is available in natural (brown) or white.*

8. Take a picture of your completed bookmark. Upload the picture and a copy of your template (either a digital copy or a picture/scan) to Blackboard or send it to me by email.

Examples and templates

Types of data

You will need three variables of data collected over 7 days. The three variables should be related to each other. You can collect the day yourself or you can use existing data.

You will need **one quantitative variable** that can be treated as a discrete quantitative variable with up to 10 units on average. Examples:

- If you use a step counter, you can count the number of steps you walk in a day, rounded to the nearest 1000 steps. This way, if you walk 10,000 steps or less you will get 10 units or less.
- The number of hours you sleep, rounded to the nearest hour. One hour of sleep = 1 unit. If you typically sleep 10 hours or less then you'll have at most 10 units.
- If you typically read for half an hour per day, you can use the number of minutes of reading where 3 minutes = 1 unit. This way 30 minutes is 10 units.
- You can use existing sports data. If you like basketball, you can use the number of points your favorite team gets, divided by 10. For example, if your team usually gets 120 points per game, you can say that 12 points = 1 unit. This way, 120 points is 10 units. You will need to use rounding. If they get 122 points, I would round that to 120 (10 units).

There are many other possible options. You can use the number of reps of exercise, the number of hours you work, the number of text messages you send, the number of episodes of a show you watch, etc.

You will also need **two categorical (qualitative) variables** that are related to the quantitative variable. Building on the examples above:

- What variables are related to the amount you walk each day? You might consider variables that affect your ability to walk, like the temperature or weather conditions if you walk outdoors. You may walk less if you have a lot of classes and need to be seated. You

may walk more if your job involves walking. You might also consider the effect of walking on yourself. Did walking reduce your stress level? Did it make you feel tired?

- What variables are related to your sleep? Some variables that may affect your ability to sleep are your stress level, the time you ate dinner, noisy neighbors, etc. Some variables that might be affected by your sleep include how you feel when you wake up (tired, refreshed, energized, etc.) and if you overslept, woke up too early, or woke up on time.
- What variables are related to your reading? Maybe the type of book (fiction, biography, etc.), your workload, if you have to run errands, etc. You can also consider how you felt while reading. Did you enjoy what you read? Were you distracted?
- What variables are related to your team's ability to score? Maybe if it's a home or away game. Maybe the ranking of the competing team. You can also track if they won or lost the game.

Color Choices

The categorical variables will determine the colors you use.

- The colors should relate to the variable. Example: To represent weather conditions, you can use yellow to represent a sunny day, blue for a rainy day, and grey for an overcast day.
- If you have an ordinal categorical variable, use shades of the same color to represent the order. Example: To rate books on a 5-star scale, you can use five shades of one color. The lightest shade would represent 1 star, and the darkest would represent 5 stars.

Detailed Examples

Walking

The following data set shows the number of steps walked each day, along with the ambient temperature and weather conditions.

- Index: 7 days in one week.
- Quantitative variable: Number of steps walked, rounded to nearest 1000. 1 unit = 1000 steps.
- Ordinal categorical variable: The ambient temperature split into intervals.
 - 77 degrees or less (lightest peach color, labeled P1)
 - 78-82 degrees (light peach, labeled P2)
 - 82-85 degrees (medium peach, labeled P3)
 - 86-89 degrees (dark peach, labeled P4)
 - 90 degrees or higher (darkest peach color, labeled P5)
- Nominal categorical variable: Weather conditions. Representative colors are used, such as yellow for "sunny", grey for "cloudy", and blue for "rainy".

Sleep

- Index: 7 days in one week.
- Quantitative variable: Amount of sleep rounded to the nearest hour.
- Nominal categorical variable: If I had to work late the night before. Two outcomes (two colors): worked late or didn't work late.

- Ordinal categorical variable: How rested I felt when I woke up, on a 3-point scale. This uses three shades of one color.

Reading

- Index: 7 days in one week.
- Quantitative variable: Number of minutes spent reading. I expect to read for 30 minutes each day. 3 minutes = 1 stitch.
- Nominal categorical variable: Book genre (historic, mystery, adventure, etc.). This is nominal with many possible values.
- Second nominal categorical variable: If I had to go to work on that day. This is a nominal variable with two values: Yes I worked or No I didn't work.

Basketball

- Index: 7 games played by my favorite basketball team.
- Quantitative variable: Number of points rounded to the nearest 10. This means 74 points would be rounded to 70, and I would stitch 7 stitches. (10 points = 1 stitch)
- Nominal categorical variable: If it's a home or away game. This is a nominal variable with two values (two colors).
- Second nominal categorical variable: If my team won, tied or lost. This is a nominal variable with three values (three colors).

Details for walking example

The following table summarizes the data collected, and how the data will be represented in cross stitch. I've also provided a video showing how to cross stitch this information.

Day	Temperature	Weather Condition	# of steps
	interior color, symbol	outer color, symbol	# of interior stitches
Monday	85°F	Sunny	9,000
	medium peach, P3	Yellow, Y	9 stitches
Tuesday	81°F	Sunny	10,000
	light peach, P2	Yellow, Y	10 stitches
Wednesday	78°F	Cloudy	12,000
	lightest peach, P1	light grey, G	12 stitches
Thursday	82°F	Rainy	4,000
	light peach, P2	light blue, B	4 stitches
Friday	85°F	Sunny	8,000
	medium peach, P3	Yellow, Y	8 stitches
Saturday	76°F	Cloudy	14,000

	lightest peach, P1	light grey, G	14 stitches
Sunday	92°F	Sunny	6,000
	darkest peach, P5	Yellow, Y	6 stitches

The following table shows how the data is represented visually using the rectangular pattern.

Y	Y	Y	Y	Y	Y	Y
Y	P3	P3	P3	P3	P3	Y
Y	P3	P3	P3	P3	Y	Y
Y	Y	Y	Y	Y	Y	Y

Monday

Medium peach P3

Yellow (sunny)

9 thousand steps

Y	Y	Y	Y	Y	Y	Y
Y	P2	P2	P2	P2	P2	Y
Y	P2	P2	P2	P2	P2	Y
Y	Y	Y	Y	Y	Y	Y

Tuesday

Light peach P2

Yellow (sunny)

10 thousand steps

	G	G	G	G	G	G	
P1	G	P1	P1	P1	P1	P1	G
	G	P1	P1	P1	P1	P1	G
	G	G	G	G	G	G	

Wednesday

Lightest peach P1

Grey (cloudy)

12 thousand steps

B	B	B	B	B	B	B
B	P2	P2	P2	P2	B	B
B	B	B	B	B	B	B

Thursday

Light peach P2

Blue (rainy)

B	B	B	B	B	B	B
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4 thousand stitches

Y	Y	Y	Y	Y	Y	Y
Y	P3	P3	P3	P3	P3	Y
Y	P3	P3	P3	Y	Y	Y
Y	Y	Y	Y	Y	Y	Y

Friday

Medium peach P3

Yellow (sunny)

8 thousand steps

		G	G	G	G	G	G		
	P1	G	P1	P1	P1	P1	P1	G	P1
P1		G	P1	P1	P1	P1	P1	G	P1
		G	G	G	G	G	G		

Saturday

Lightest peach P1

Grey (sunny)

14 thousand steps

Y	Y	Y	Y	Y	Y	Y
Y	P5	P5	P5	P5	P5	Y
Y	P5	Y	Y	Y	Y	Y
Y	Y	Y	Y	Y	Y	Y

Sunday

Darkest peach P5

Yellow (sunny)

6 thousand steps

Template

Use the following template to organize your data. You can complete it digitally or you can print it and complete it on paper. You will need to turn in either an electronic copy of it or a scan/photo image of it along with a picture of your cross stitch.

Index	Categorical Variable 1 Interior color	Categorical Variable 2 Outer color	Quantitative Variable # of interior stitches
Day 1			
Day 2			
Day 3			
Day 3			
Day 4			
Day 5			
Day 6			

Day 1

Day 2

Day 3

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Day 4

Day 5

Day 6

Day 7