

Assignment 4 (100 points)

CS 475

Question 1 to 6: 12 points each + **3 extra credits points in Question 3** [75 points]

Question 8: 18 point [18 points]

Question 9 10 [10 points]

Question 7 extra credit: **Upto video_1, 25 points, upto video_2, 30 points [30 points]**

Total achievable points 133

CS 675 and CS 775

Question 1 to 6: 8 points each + **3 extra credit points in Question 3** [51 points]

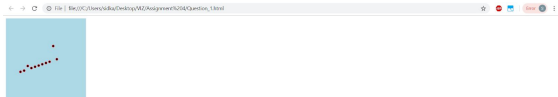
Question 7: Upto video_1 30 points, **Extra credits of 7 points for Video_2** [37 points]

Question 8: 14 points [14 points]

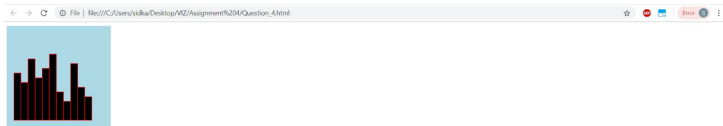
Question 9: 8 [8 points]

Total achievable points 110

Question 1: Get familiar with D3 data method. Use data method to attach data to svg elements (circles) and draw scatter plots. Detailed task provided in Question_1.html. The data used here is same as assignment 1. The output should look like as following:



Question 2: Get familiar with D3 data method. Use data method to attach data to svg element (rectangle) and draw bar charts. Detailed task provided in Question_2.html. The output should look like as following:



Question 3: In this function you get to use append and remove function. There are two buttons in the html page “**Add rectangle**” and “**Delete all rectangles**”, clicking these buttons respectively invokes addRectangle and deleteAllRect functions. With **Add rectangle** button, you should be adding a rectangle of width 25 and height 25 at a random position on your svg area. With **Delete all rectangles** you should delete all the rectangles on the screen. You will get to use append and remove functions. Detailed task provided in Question_3.html. After clicking Add rectangle 10 times, I get the following:

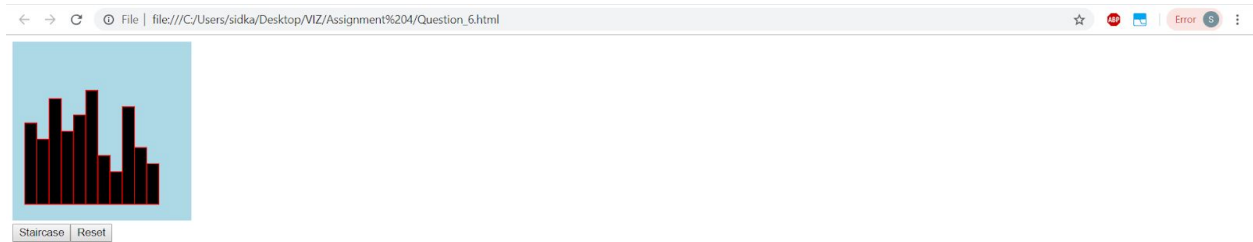


Question 4: This is where you get to see the strength of D3, here you will get familiar with D3's enter function. You have to create the same graph as question 1, but without manually adding the circle elements (in html), you are to use D3's enter function. The output should look exactly like question 1. Detailed tasks are provided in Question_4.html.

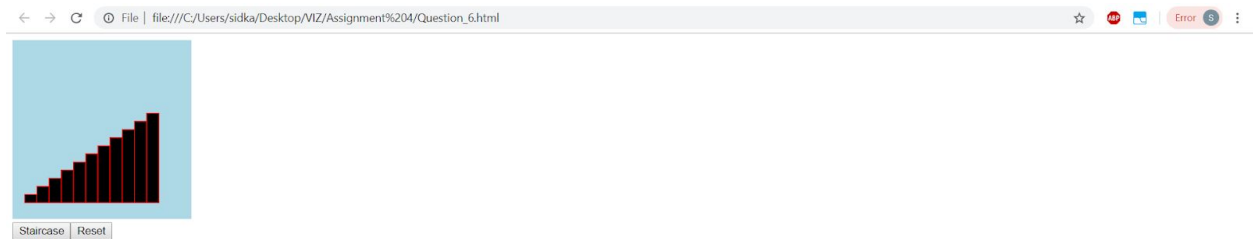
Question 5: This question is similar to question 4. You have to create the same graph as question 2, but without manually adding the rect elements (in html), you are supposed to use D3's enter function. The output should look exactly like question 2. Detailed tasks are provided in Question_5.html.

Question 6: In this question you will get to use both data and index argument of anonymous function passed to d3. There are two buttons **Staircase** and **Reset**. Initially your graph should load the data provided. On clicking the Staircase button your bars should resemble the structure of a staircase, as shown in the second image. The height of the smallest bar is 10, which increases by 10 with every stair. In order to create the staircase pattern you will have to alter the height and y value of the bars, you will do this by selecting all rects (selectAll) and using an anonymous function to alter the rectangles height and y attribute. You need to use the index (i) argument of the anonymous function. Note, i will vary from 0 to (#number of rectangles - 1) for

the rectangles (0 for first rectangle, 1 for the next and so on). When you click the reset button, you need to reset the graph to the use the provided data, here you will use the data argument of the anonymous function. This is how your graph should look initially (and also after clicking the reset button).



This is how your graph should look like after clicking the Staircase button.



Question 7: Extend assignment 3 to add the following features: (1) make the control points draggable, (2) add parameter to control the number of points on the bezier curve, The

parameter should be controlled through a slider, and its value should range from 2 to 100. When you move the control points, your bezier curve should move appropriately. See video_1 for reference. Video_2 is for extra credits, here you also add tags for the control points and make them movable.

Question 8: Huffman Encoding

I have quantized my images into 8 intensity levels. The resolution of my image is 100 x 100. If I use fixed length codes, then I will need 4 bits to represent my intensities. I observe that some of the intensities have less occurrence compared to others (see table). I decide to use huffman encoding to create variable length codes for the intensities.

1. What are the huffman codes ?
2. What is the size of your compressed image ?
3. What is the achieved compression ratio ?

Intensity	Number of pixels
0	50
1	2000
2	50
3	500
4	1000
5	400
6	6000

Question 9: Rainbow color map

Why is it not recommended to use a rainbow color map? Provide a brief explanation.