

Livo - Software Test Document

Applicant Information

Name :
Phone number :
Email address :
Degree :
Current location :
If selected when can you join :

Software Proficiency and Technical Experience

1. How many years of experience do you have with the following languages:
 - a. Javascript:
 - b. Java:
 - c. C++:
 - d. Python:
 - e. Others, please specify:
2. Number of years of experience in the past projects:
 - a. Web applications:
 - b. Desktop applications:
 - c. Mobile applications:
 - d. Others, please specify:
3. How many years of experience do you have with documentations and repositories in the past experience:
 - a. SVN:
 - b. GIT:
 - c. Others, please specify:
4. List the development framework used in the past projects:

IMPORTANT: General instruction for solving the questions

- If the instructions are not followed your solutions will not be reviewed.
- Assume missing information and state your assumptions.
- Optimize solutions for time and space complexity. Showcase what steps you have taken for the same.
- **Cite references** and give proper credits/links and note down search fields/input fields when you use the internet or any references.
- Note down the start and end time/date for each question.
- Document the solution with inputs and outputs, if the output is shown in question in image, **add images of the output (not the code)** along with explanation.
- Don't assume that we will run your code. You don't have to copy the code in this document or any other document. Just attach your IDE project files for each question in a zip file separately, if you wish to submit the code.
- Do not take screenshots of the code and paste in the solution document.
- Document your solutions with clear comments.
- Your representation of the solution document holds weightage in the selection process. (20 points)

Software Aptitude Questions**Q1. Part 1:** Triplet random number generator (5 points)

Write a function named “generateRandomNumber” to generate three uniformly distributed random numbers whose sum is equal to input parameter SumOfRandomNumbers (Variable name).

This variable “SumOfRandomNumbers” is an input to the function given by the user.

function outputArraytriplets = generateRandomNumber(SumOfRandomNumbers). The generated random values should be in the range of 0 to SumOfRandomNumbers. There should be no bias in the values.

Example Pseudo code for Q1. Part 1:

```
outputArraytriplets = generateRandomNumber(255)
```

```
Display(“Three random number : ”)
```

```
Display(outputArraytriplets )
```

Example:

Input: 255

Output: Three random number : [83.406, 109.866, 61.727]

Test Input value which is to be presented in the solution document: 200

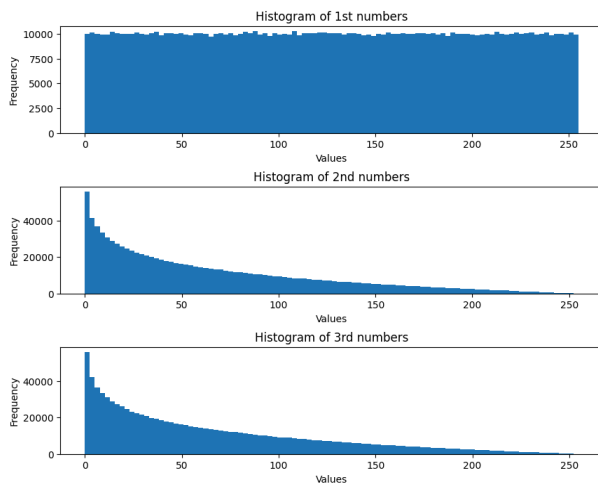
Q1. Part 2: Histogram (10 points)

Now use the above function from Q1. Part 1 to generate 1000000 arrays of outputArraytriplets. Display histogram of all the generated 1000000 1st numbers, all the generated 1000000 2nd numbers and all the generated 1000000 3rd numbers, for the same value which the user entered that is SumOfRandomNumbers.

Display the time taken for generating 1000000 triplets.

Display the individual histograms(In .png format as shown) for each set of 1st, 2nd and 3rd set of numbers.

The following histogram is incorrect, it's just for example, as the distribution of different numbers are not the same. (Don't print the complete array in the document, no one is going to read the numbers, we have not asked for it). **Expected output** is a Histogram PNG image as showcased below.



Generate three histograms and in the solution document paste only the correct histogram and not the code.

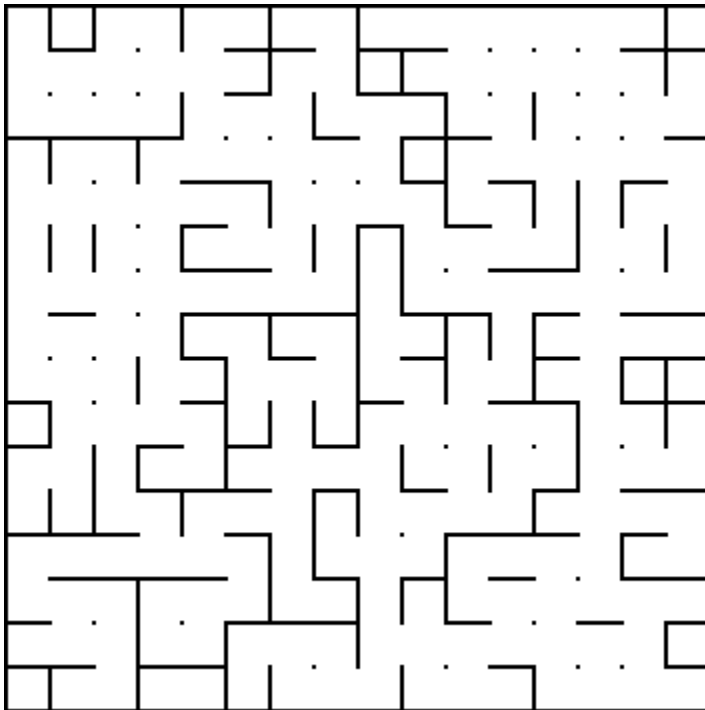
Q2. Maze (40 points)

Design a program that generates a customizable maze image based on user-defined dimensions (MazeRow, MazeCol), allowing the user to specify the probability (WallProbability) of walls being present within the maze? The generated image should be saved in PNG file format, copy your generated image in your solution documentation, not the code.

Example 1:

Inputs: MazeRow : 16
 MazeCol : 16
 WallProbability : 0.37

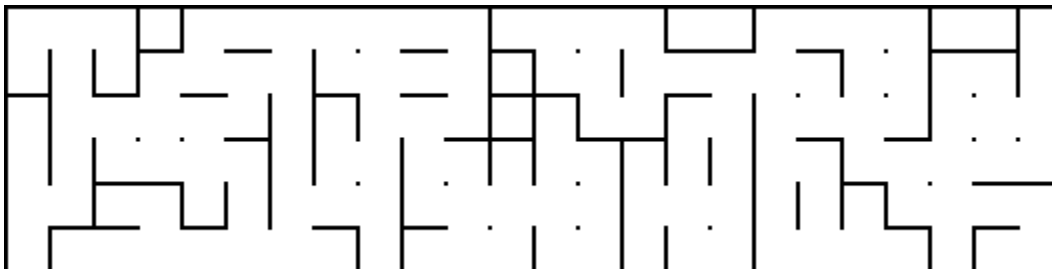
Expected Output:



Example 2:

Inputs: MazeRow : 6
 MazeCol : 24
 WallProbability : 0.37

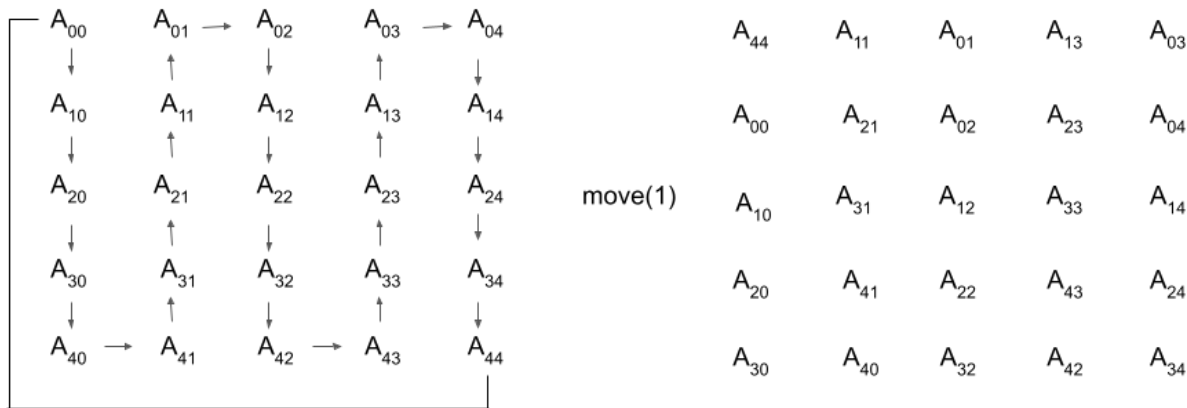
Expected Output:



Q3. Movement Pattern (10 points)

You are given a 2D matrix, a , of dimension $R \times C$ and a positive integer M . You have to move the matrix elements M times and print the resultant matrix. Movement direction should be as shown in the figure below.

Eg: Movement of a 5x5 matrix is represented by the following figure. Note that in one movement, you have to shift elements by one step only (refer sample tests for more clarity).



Example Input: $M = 1$

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25

Example Output:

25	7	2	9	4
1	12	3	14	5
6	17	8	19	10
11	22	13	24	15
16	21	18	23	20

Document your inputs and outputs only and not the code. Run with different matrix sizes like 3x4 or 4x5.

Q4. Shape plot (15 points)

Design a program to plot the following image, where the user will define the “Expansion rate”, “Total rotations”, “Initial skip rotation” as shown in the examples:
(Total rings will be “Total rotations” - “Initial skip rotations”)

Example 1:

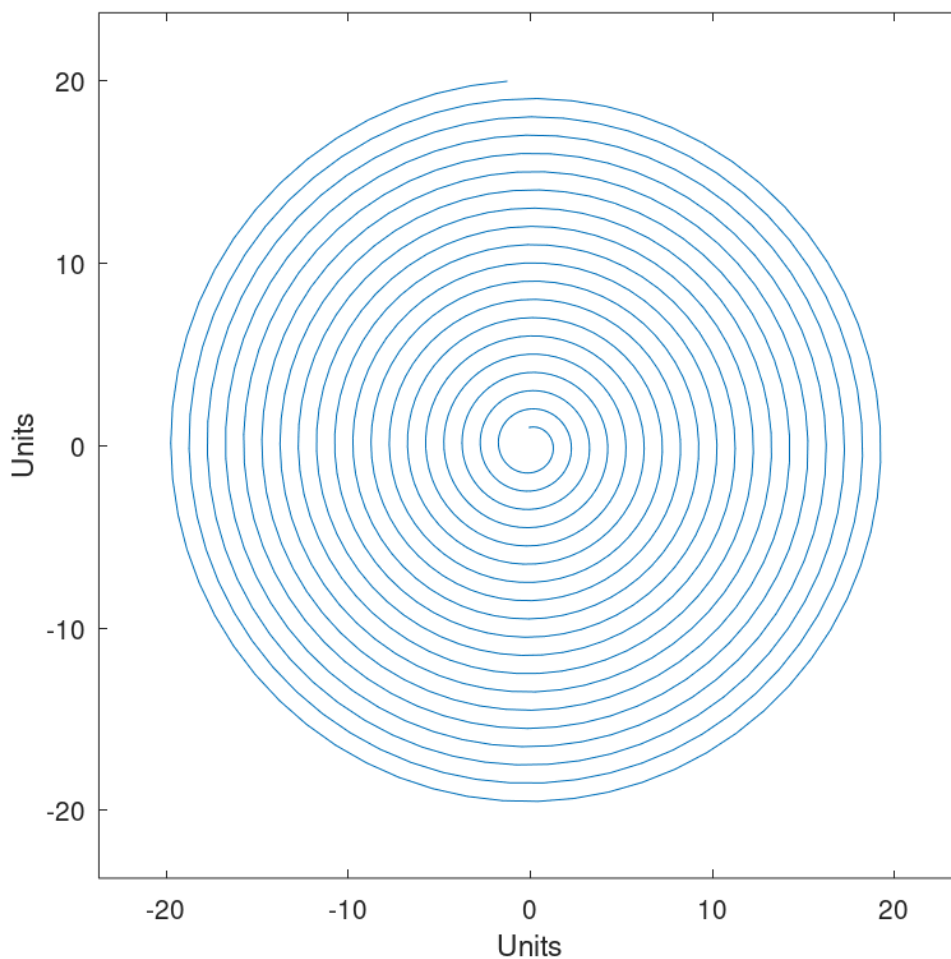
Inputs:

Expansion rate = 1

Total rotations = 20

Initial skip rotation = 1

Expected Output:



Example 2:

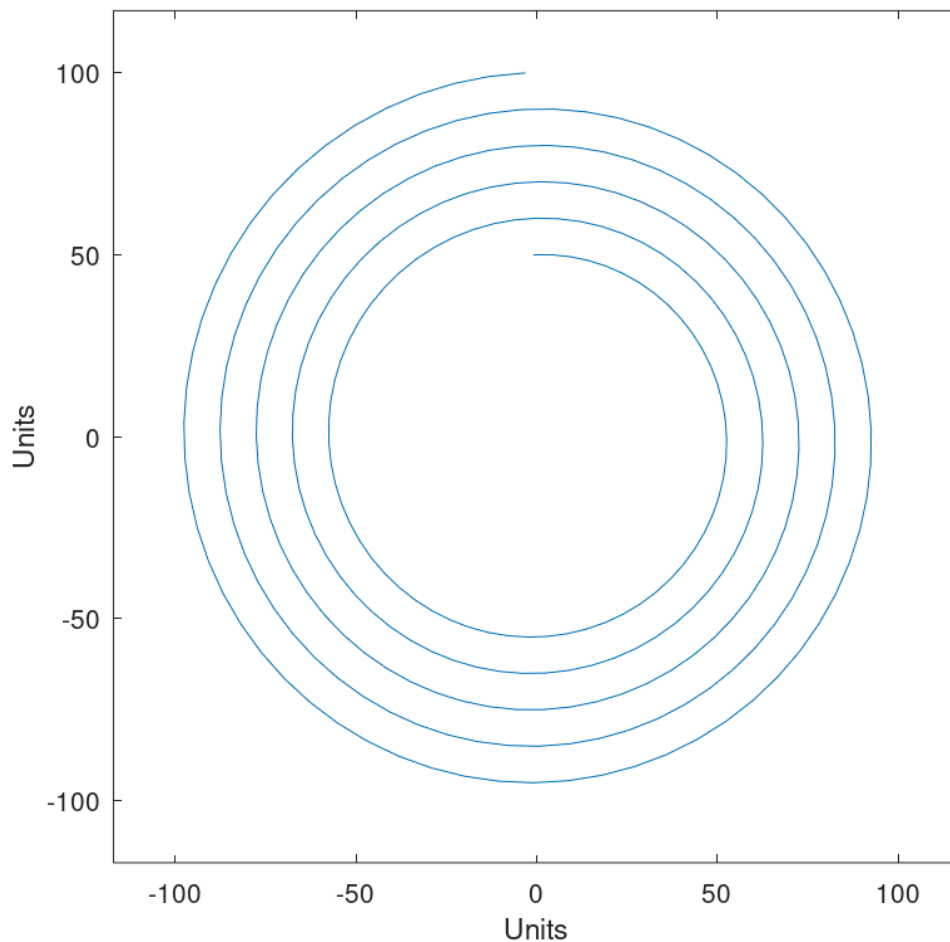
Inputs:

Expansion rate = 10

Total rotations = 10

Initial skip rotation = 5

Expected Output:



Generate the plot image with different inputs like the following and keep it in the solution document. Do not copy paste the code.

Expansion rate = 2

Total rotations = 2

Initial skip rotation = 5

Software UI Question

QS1: Develop a dynamic image annotation and cropping tool (30 Points)

Requirements

Loading an Image: Implement functionality to load an image onto a canvas.

Creating and Moving Boxes: Enable users to click on the canvas to create a movable box at the pointer location. Ensure the box remains within the canvas boundaries.

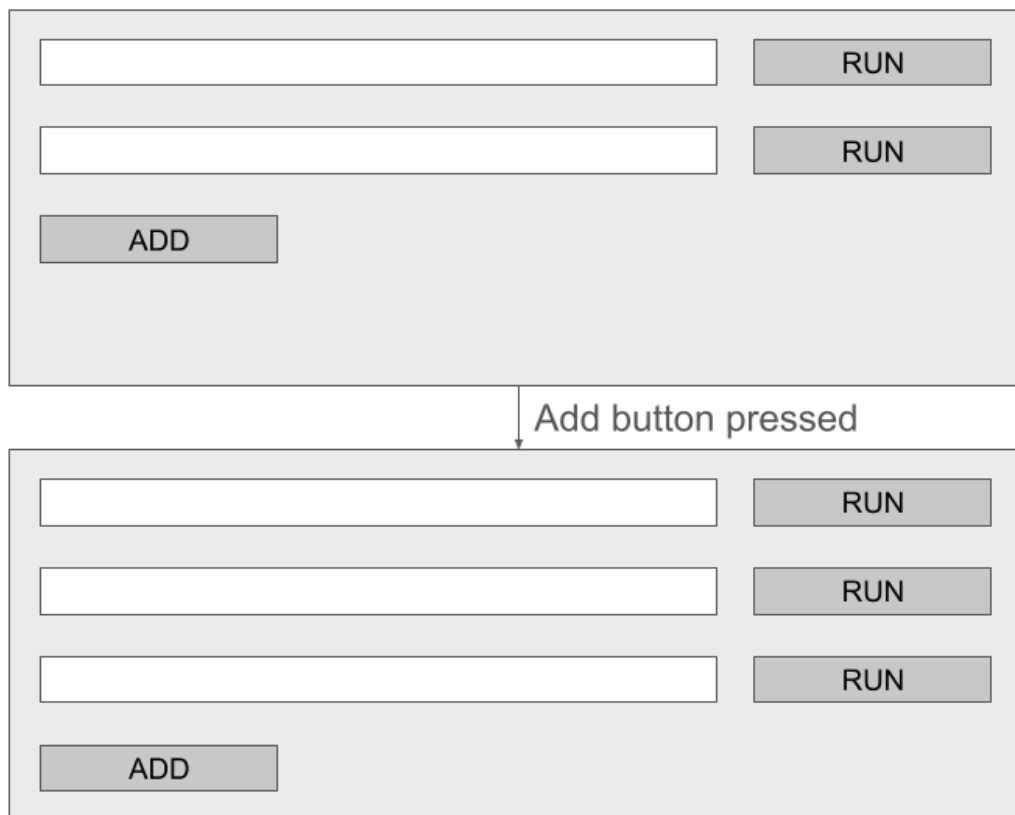
Resizing Boxes: Allow users to resize or shrink the box by dragging its edges.

Multiple Boxes with Labels: Facilitate the creation of multiple labeled boxes on the canvas.

Saving Boxed Image Parts: Integrate a save button that, when clicked, saves the image sections within each box.

QS2: Make an application (preferably: JavaFX or a UI platform of your choice) in which we can add multiple editable text rows by clicking a "Add" button and when the run button is pressed which is along the slide with each row. This run button should execute a system command. Display the output below the "ADD" button (30 Points)

Example GUI:

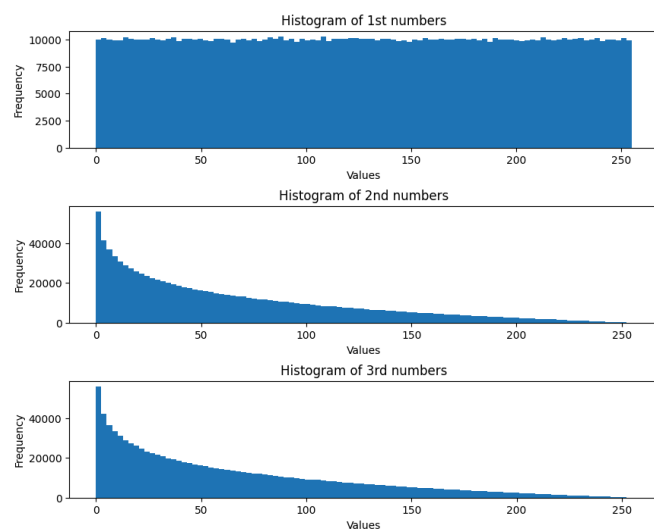


Important note:

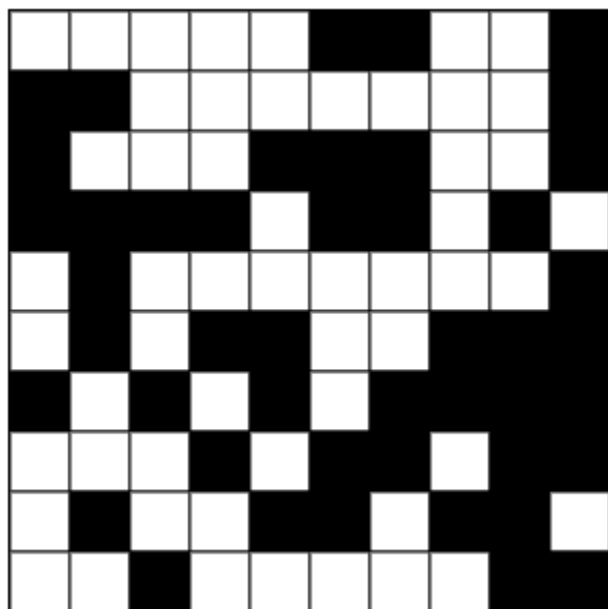
Please read each question carefully, you will have to solve these questions yourself as all the above questions will give incorrect answers if you copy paste from generative AI tools (or LLMs).

For example in question 1.

The graph shown is **incorrect**, as the distribution of different numbers are not the same.



In Question 2, this type of output is **incorrect** as it does not match the type of output shown in the question.



In Question 4, The plot **should not** start from the center when an initial skip rotation is given, the total rotation multiplied with the expansion rate should match the axis grid labels.

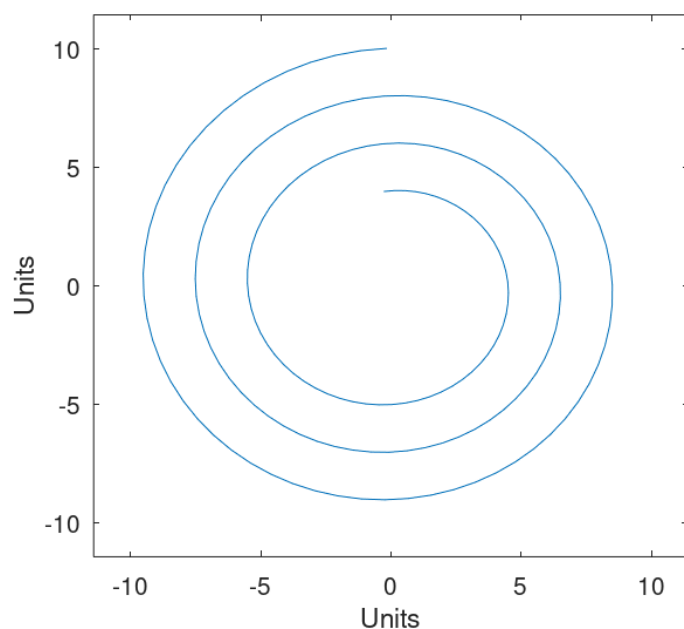
Let's say these values are entered as inputs:

Expansion rate = 2

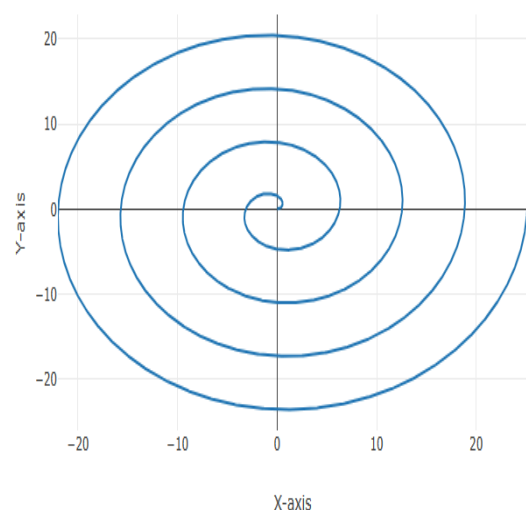
Total rotations = 5

Initial skip rotation = 2

This is the correct plot:



And the following graph would be **incorrect**, check the axis labels and all the inputs, none of them match.



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