114-1 MATLAB Midterm Exam

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Please upload **all the four m-files**, including **midterm_1.m**, **midterm_2.m**, **midterm_3.m**, and **midterm_4.m**, to the **2025.10.30 Midterm** folder in the E3 system. Please have a copy of all files and bring them to the classroom next week for correction.

Please change the current folder to the **MImaterials_midterm** directory!

1. Program Debug (25 points)

Note: Please open the **midterm_1.m** file in the **MImaterials_midterm** directory and follow the steps below to debug the script.

Steps:

(1) Please identify one error on Line 5 and correct it. (5 points)

(2) Please identify two errors on Line 11 and correct them. (6 points)

(3) Please identify one error on Line 16 and correct it. (5 points)

(4) Please identify one error on Line 23 and correct it. (5 points)

(5) Please identify one error on Line 28 and correct it. (4 points)

Once all the errors are corrected, you should be able to create an ROI on the MIP image and get the resultant masked image as shown in **Figure 1**.

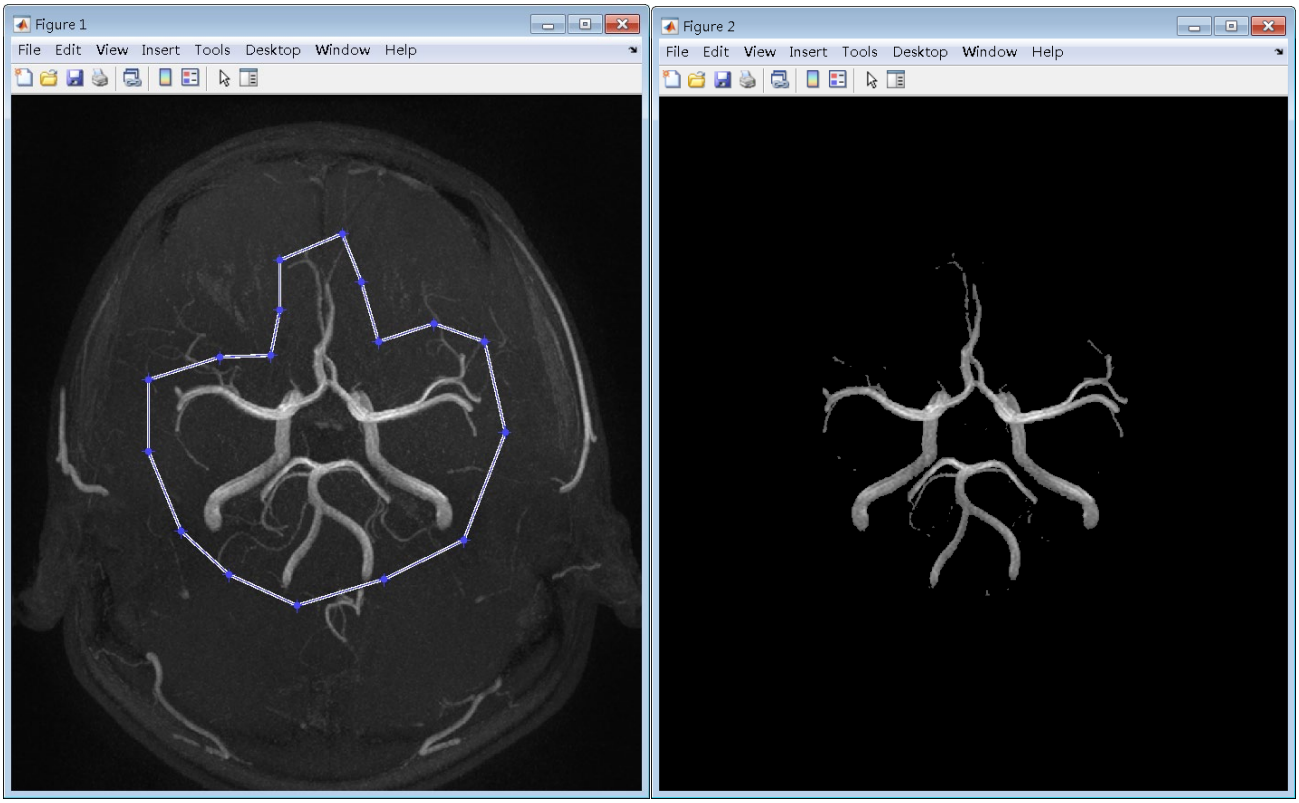


Figure 1

2. Fill in Program - DICOM Anonymization (25 points)

Note: Anonymization of DICOM images can protect patients' privacy. Please open the **midterm_2.m** file in the **MImaterials_midterm** directory and follow the steps below to rewrite specific fields of the DICOM header.

(1) Please read the DICOM information (metadata) and the DICOM image in the ***LungCT.dcm*** DICOM file. (4 points)

(2) Please rewrite the DICOM information as follows (6 points):

- ✓ Rewrite the field of PatientName as ***'anonymous'***;
- ✓ Rewrite the field of PatientID as ***'0000'***;
- ✓ Rewrite the field of PatientBirthDate as ***'00000000'***.

(3) Please use the **dicomwrite** function to create the anonymous DICOM file with a file name of 'anony_DICOM.dcm'. (7 points)

(4) Please show a success message as follows using the **msgbox** function. (8 points)

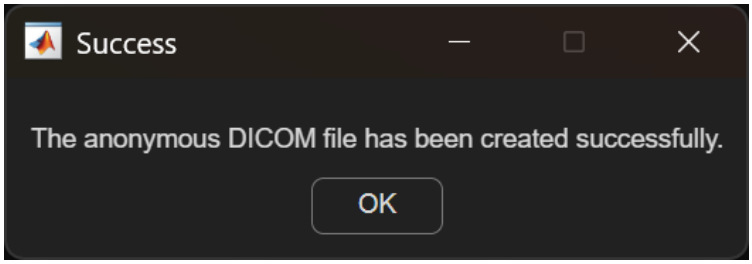


Figure 2

3. Collaboration with Copilot (20 points)

Note: You have a secret message hidden in the ***SecretMessage.png*** file, along with two clues to help you solve it (**Figure 3**). You must use Copilot to write a script to display the hidden message. Please save the script, **including your prompts**, as **midterm_3.m**.

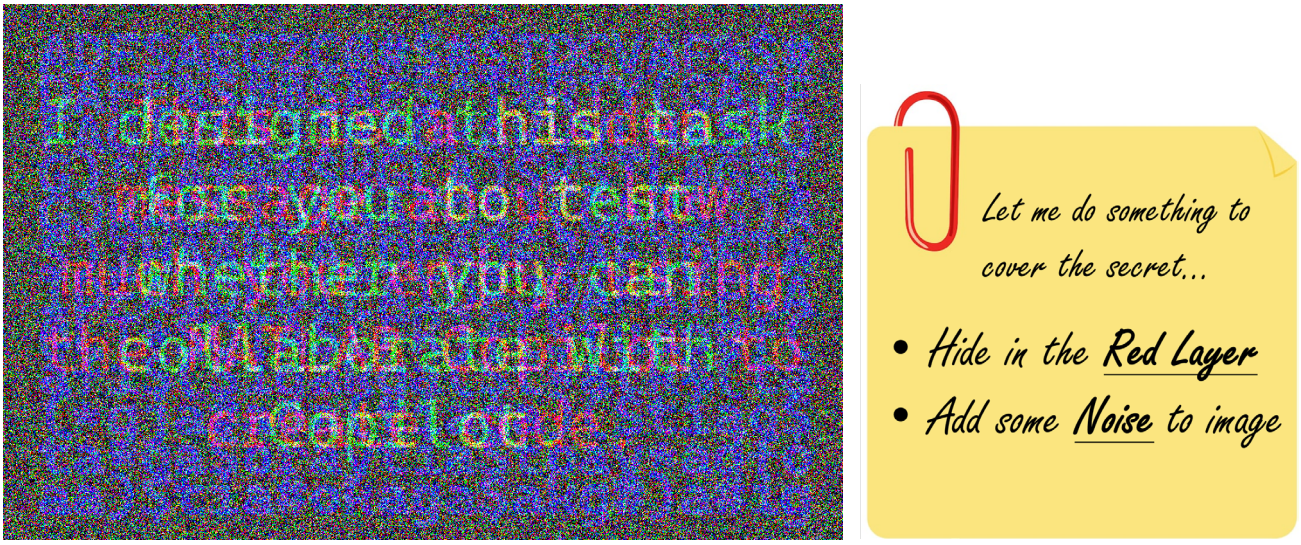
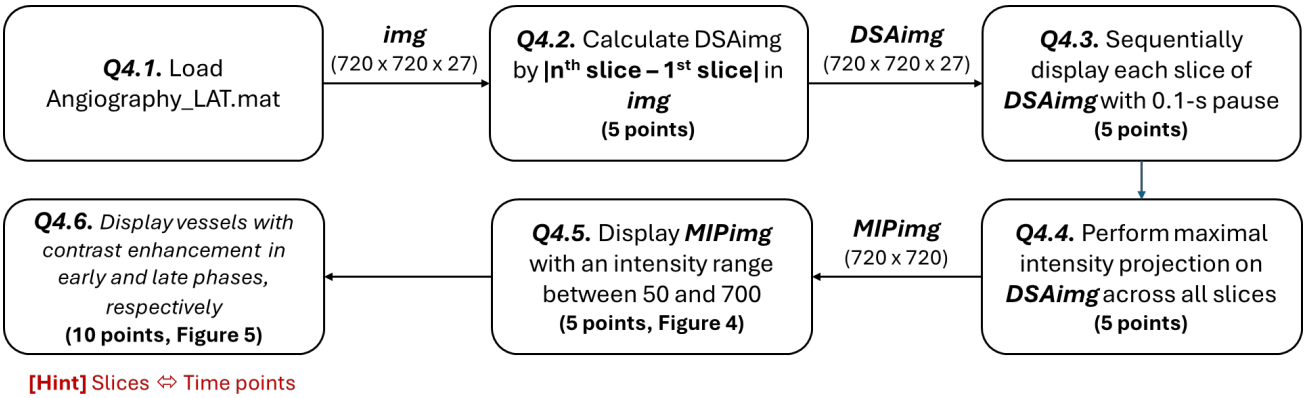


Figure 3

4. Digital Subtraction Angiography (30 points)

Note: Digital subtraction angiography (DSA) is a technique with injection of contrast agent to visualize vessels. The blood vessels are enhanced sequentially according to the circulation of the injected contrast agent. Please follow the steps below to accomplish the process and visualization of DSA. Please save the script as **midterm_4.m**.



[Hint] Slices ⇔ Time points

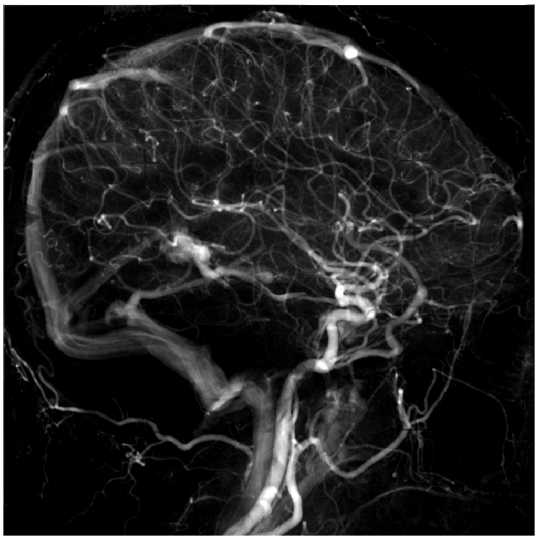


Figure 4

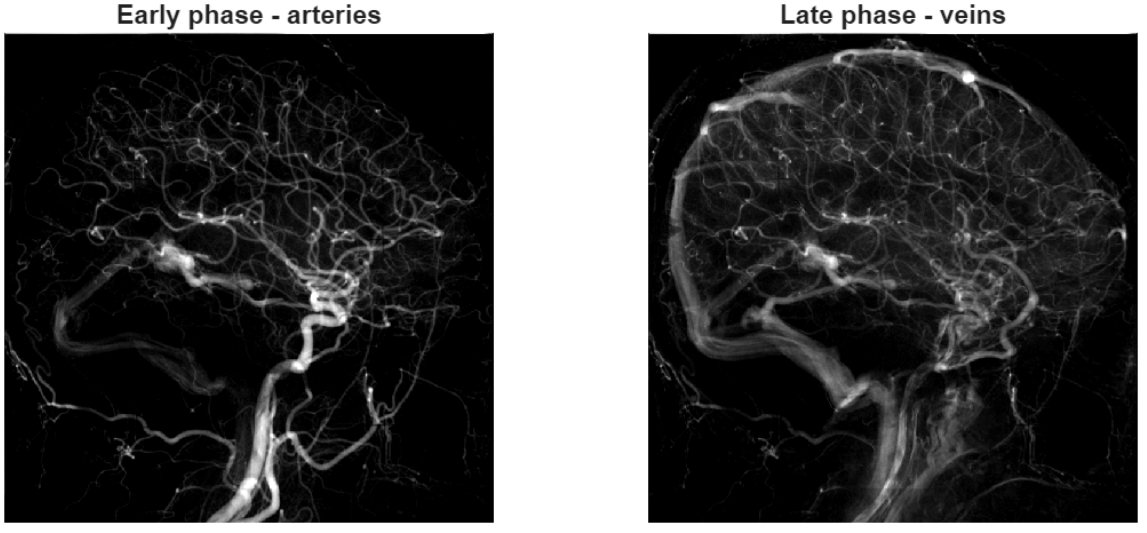


Figure 5