AIKTC, School of Engineering & Technology

UNIT TEST 1
SE- All Branches
Sem IV (CBSGS)
FEB 2014
Applied Maths IV

Q.1 a) Prove that Eigen values of a Hermitian matrix are real numbers. (12)

b) \( A = \begin{bmatrix} -1 & 2 & 3 \\ 0 & 3 & 5 \\ 0 & 0 & -2 \end{bmatrix} \)

Find the Eigen values and Eigen vectors for \( A^3 + 5A + 8I \).

c) \( A = \begin{pmatrix} \pi & \pi/4 \\ 0 & \pi/2 \end{pmatrix} \)

Find \( \cos A \)

Q.2) Given \( A = \begin{bmatrix} 2 & 1 & 1 \\ 2 & 3 & 2 \\ 3 & 3 & 4 \end{bmatrix} \) (8)

a) Find Eigen values and eigen vectors of \( A \).

b) Is \( A \) Diagonable? Explain.

c) Is \( A \) derogatory? Explain.

OR

Q.2) Given \( A = \begin{bmatrix} 1 & -2 & 0 \\ 1 & 2 & 2 \\ 1 & 2 & 3 \end{bmatrix} \) (8)

a) Find Eigen values and Eigen vectors of \( A \).

b) Is \( A \) Diagonable? Explain.

c) Is \( A \) Derogatory? Explain.
1. Define the following:
   a. Alphabet
   b. String
   c. Language

2. What is finite Automata? Give the graphical notation in finite automata.

3. Explain different types of machines and state at least one application of each.

4. Differentiate between DFA and NFA

5. Design the DFA for the languages below:
   a. Strings ending with 11, $\Sigma = \{ 0, 1 \}$.
   b. $L = \{ w \mid w \text{ starts with zero and has odd length or starts with one and has even length} \}$
   c. Strings containing substring $ab$, $\Sigma = \{ a, b \}$.
   d. Strings with even a's and b's.
   e. $L = \{ w \mid |w| \mod 3 = 0 \text{ on } \Sigma = \{ a, b \} \}$. 
Q1. Attempt **any 5** of the following (Each question carry **2 Marks**)

   i. Explain the **garbage collection** with example?
   ii. Explain the term **final** class with example?
   iii. Explain the **finally** keyword with example?
   iv. Explain the **static** keyword with example?
   v. Explain **Association** and **aggregation** with example?
   vi. Write a program to count the number of upper case, lower case and digit in the given string?

Q2. Attempt **any 1** of the following: (5 Marks)

   i. Explain the life cycle of Multithreading? & write a multithreading program to print
      */*/*/*/*/*/
   ii. Explain the life cycle of Applet & write a applet program to draw a “Olympic” symbol

Q3. Attempt **any 1** of the following: (5 Marks)

   i. Explain difference between Abstract class and Interface class & write a program which contains Interface area with calculate method & class circle, rectangle & triangle. Calculate & display the area of each class
   ii. Draw the class diagram and the sequence diagram for the library management system. Consider only 1 scenario for the sequence diagram.
Instructions: Q No. 1 is compulsory and attempt any three out of remaining four.

Q.1 What are the Graphics Input primitives (Logical and Physical) with suitable example.

Q.2 What are the different types of Graphics Display Devices. Also Explain any one Display Device in detail.

Q.3 List and Explain the Different Basic Primitives in OpenGL with a suitable example.

Q.4 Write any one Algorithm for Line Drawing and plot the points A(2,2) and B(7,8).

Q.5 Write Any five Application of Computer Graphics.
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Subject : COA  Test : Unit Test 1  Class : SE COMPUTER
Marks: 20  Duration: 1 Hr

Instructions: a. Q No. 1 is compulsory
b. Attempt any two out of remaining three.

1. Answer the following: [10 marks]
   a) What is the difference between Computer architecture and Computer organization?
   b) What is Data representation and encoding? Explain it with examples.
   c) Convert \((-47)_{10}\) and \((-10)_{10}\) into 2's complement format (8 bit format).
   d) Convert \((-20)_{10}\) and \((-7)_{10}\) into 2's complement format and subtract (Using minimum number of bits).
   e) Booth algorithm is used for multiplyng
      i. Only positive operands.
      ii. Both positive and negative operands.
      iii. Only when the multiplier is positive.
      iv. None of the above.

2. Answer the following: [5 marks]
   a) Give the rules for the addition, subtraction, division and multiplication of IEEE 754 Single precision floating point numbers.
   b) Convert the following numbers into IEEE 754 Single precision binary format
      i. \((132.25)_{10}\)
      ii. \((44.75)_{10}\)
      And perform the their addition using floating arithmetic operations only.

3. Draw the flowchart of Booth's algorithm and multiply \((-11)_{10}\times(-3)_{10}\). (Using Booth's algorithm only). [5 marks]

4. Draw the flowchart for non-restoring division and perform \((1100)_{2}\div(11)_{2}\). [5 marks]

-----------------------------------------------------------------------------------------------All the Best
I Compulsory question(5*1=5)

Q 1. Draw an E-R diagram for the company database. Be sure to indicate various attributes of each entity and relationship set, also specify the cardinality ratio, key and participation constraints for each relationship set. (5m)

II Attempt any three (5*3 =15).

Q2. a) What is Database and DBMS? (1m)
    b) Write the Advantages of DBMS? (2m)
    c) List the four significant differences between file processing system and DBMS? (2m)

Q3 a) Explain the three schema Architecture of a database? (3m)
    b) What is Data independance? Explain Physical and Logical Data independance? (2m)

Q4 Explain the Structure of a DBMS with a neat diagram? (5m)

Q5 a) Explain DDL and DML statements in SQL with examples? (3m)
    b) Explain the different types of attributes. (2m)