

KENYA METHODIST UNIVERSITY
END OF TRIMESTER EXAMINATION, APRIL 2007

FACULTY: SCIENCE
DEPARTMENT: MATHEMATICS AND COMPUTER SCIENCE
COURSE CODE: COMP 322
COURSE NAME: PROGRAM DESIGN AND DEVELOPMENT
TIME: 3 HOURS

Instructions:

- Answer question one and two other questions.

QUESTION ONE (30 marks)

- A. Define the following terms as used in this course:
- a) Data structure
 - b) Design reviews
 - c) Entity
 - d) Program specification (4 Mks)
- B. Outline at least 6 stages of testing a program system (3 Mks)
- C. Using diagrams, briefly explain 2 types of relationship (2 Mks)
- D. . Draw a DFD for Repeat-Until structure below:
- REPEAT B*
UNITL K>MAX
ENDREPEAT (5 Mks)
- E. What is the difference between:
- a) Top-down design and Bottom-up design
 - b) System design and program design
 - c) Data flow diagrams and entity relationship diagrams (6 Mks)
- F. Discuss the several methods used for error detection (4 Mks)
- G. Explain the 3 characteristics of a well structured design (6 Mks)

QUESTION TWO (20 Marks)

- A. Explain the term Module and give 2 good examples (2 Mks)
- B. What are the 3 important objectives to keep in mind when developing Modules (3 Mks)
- C. Describe the algorithm that will draw Pascal's triangle to the power of a positive integer n (6 Mks)

- D. Use the following algorithm to build a magic square of n is 7:
- (i) Draw a grid of n rows and n columns, (ii) Determine the set of numbers that is to fill the grid. It can be any set of positive integers as long as it forms a sequence that increases by a uniform amount e.g 1, 2, 3, 4,, (iii) Place the lowest number in the sequence in the center cell of the top row of the grid, (iv) Enter the next number of the sequence in the cell that is one row above and one cell to the right. Consider the bottom rows to be the row “above” the top row, and the leftmost column to be the one to the “right” of the rightmost. Thus , if a move leaves the top of the grid, make the entry in the bottom to the right. If the move leaves the rightmost column of the grid, make the entry in the leftmost cell of the row above, (v) If the move in step (iv) is impossible because that cell is already occupied, make the entry in the cell immediately below the previous entry, thus beginning a new diagonal. Consider the top row to be “below” the bottom row,
 - (vi) Repeat steps (iv) and (v) until cell contains a number. (9 Mks)

QUESTION THREE (20 Mks)

- A. Build a well labeled KEMU’s grading system data flow diagram that shows the following:
- Computing students grades: Get the student details, grade (numerical), convert grade to “Letter grade”, compute trimester credit hours and points, compute trimester GPA, compute cumulative hours, points and GPA.
 - External entities: Students, trimester and department.
 - Data store: Student detail, cumulative points, hours and GPA, trimester details and results.
 - Process: Student details, getting grades, converting grade to “letter grade”, computation of trimester credit hours, points GPA and their cumulative, and final destination. (11 Mks)
- B. With diagrams, briefly explain the 4 types of entities (4 Mks)
- C. Using diagrams, explain the 5 associations between entities (5 Mks)

QUESTION FOUR (20 Mks)

- A. Briefly explain the types of errors encountered in program testing (8 Mks)
- B. In program review, describe the 3 types of reviews (3 Mks)
- C. Explain the 4 steps in testing a system (4 Mks)
- D. Maintenance focuses on four major problems simultaneously, namely? (2 Mks)
- F. Explain the following terms:
- 1) Adaptive maintenance
 - 2) Perfective maintenance
 - 3) Preventive maintenance (3 Mks)

QUESTION FIVE (20 Mks)

- A. When presenting the details of a design to the entire review team, name at least 7 characteristics the review team checks in the design (7 Mks)
- B. Briefly describe the 9 important points in examination of data types (9 Mks)
- C. Using appropriate diagrams what are the 4 common notations used in data flow diagrams (4 Mks)