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**University Examinations 2015/2016**

THIRD YEAR, FIRST SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE IN COMPUTER TECHNOLOGY

**CIC 3327: SOFTWARE DEVELOPMENT TOOLS AND ENVIRONMENT**

**DATE: NOVEMBER, 2015 TIME:** $2$ **HOURS**

**INSTRUCTIONS:** *Answer question* ***one COMPULSORY*** *and any other* ***two*** *questions.*

**QUESTION ONE – (30 MARKS)**

1. Differentiate between software tool and software Environment. (2 Marks)
2. Use a diagram to describe any two tools used to manage project scope. (4 Marks)
3. Give an example of the most appropriate programming language for the following tasks.

(4 Marks)

1. Deploying a web server
2. Develop a simple web site
3. Develop interaction website
4. Develop MIS interface
5. Explain any two models that can be used by the analyst to understand software requirements specifications (SRS) (2 Marks)
6. An organization would want to implement a system that will be used among different departments. Explain two issues to be considered when developing a program to be deployed across the organizations network. (4 Marks)
7. Explain the role played by the operating system during the program execution.(3 Marks)
8. Distinguish structured design and object oriented design giving at least two tools used in each type of design. (4 Marks)
9. With a formula illustrate ways of estimating the effort required to develop a system.

(3 Marks)

1. Explain the meaning of the following terms as used in Java programming. (4 Marks)
2. Byte code
3. Java virtual machine

**QUESTION TWO (20 MARKS)**

1. Why is software maintenance difficult? Why is it necessary? (3 Marks)
2. Why does a “quick-fix” approach to maintenance rapidly degrade the quality of a software system? What alternatives are there? (4 Marks)
3. Software maintenance activities can be classified as corrective (fixing errors), adaptive (responding to change) and perfective (improving the original software). Why is this distinction useful? How would you expect the proportion of time spent on each activity to change as the software ages? (4 Marks)
4. Lehman’s laws of software evolution identify a number of regularities, including;
5. Conservation of organizational stability, which states that the work output (e.g new functions added per month) of a development team is roughly constant over the life of a software system.
6. Conservation of familiarity which states that the amount of new functionality in each release of a system is roughly constant. What are the causes of these regularities? Under what circumstances might these laws not hold? (4 Marks)
7. Your company has just acquired a smaller company that sells office automation software. The smaller company’s spreadsheet software has a large market share, with many satisfied users (A major reasons for the acquisition was that these existing users are potential customers for your company’s other products). Unfortunately, no documentation for the spreadsheet software can be found, and the source code is not commented. How would you go about maintaining this software to keep the customers happy? (5 Marks)

QUESTION THREE (20 MARKS)

1. Complexity of systems development nowadays has seen evolution in programming environments with emergence of integrated development environment. Describe the purpose of any four IDE components. (4 Marks)
2. Make a clear comparison between other physical infrastructure projects and the software project. (6 Marks)
3. Students register for a course by submitting their details to the admission department who verify the details and store the records. Verified details are sent back to students for verification then a copy is stored in the institute registration file. After sitting for an exam, candidate scripts are marked and marks compiled, sorted are stored in marks database. Students are then issued with result transcripts.
4. Design a level 1 DFD to represent the system (6 Marks)
5. Use the above data flow diagram to indicate the following requirements of the above examination system justifying your answers:
* The number of interfaces required
* Number of database tables required

**QUESTION FOUR (20 MARKS)**

1. Leon Osterweil published a famous paper entitled “Software Processes Are Software Too”, in which he argued that software development processes could be modeled at a fine level of detail, as algorithms or even programs. What are the advantages of modeling software development processes to this level of detail? What are the difficulties?(4 Marks)
2. The capability Maturity Model (CMM) rates software companies according to how well they identify and manage their software processes. The model has five levels: Initial , Repeatable, Defined, Managed , and Optimising. Briefly describe each of the five levels. What advantages are there for a company to move up to the top level? (6 Marks)
3. Why is process improvement unlikely to occur unless an organization defines and manages its processes? (2 Marks)
4. What notations would you use to define your software development process? What are the advantages and disadvantages of these notations? (4 Marks)
5. The company you work for is considering instituting a company-wide software process modeling effort, and plans to set up a Software Engineering Process Group to take responsibility for this effort. What advice would you give to this group to help ensure its success? (4 Marks)

**QUESTION FIVE (20 MARKS)**

The New Town Mall needs to develop software to encourage regular customers. For this, the customer needs to supply his name, address, telephone number and driving license number. A customer is assigned a unique customer number (CN) by the computer. When a customer makes a purchase, the value of the purchase is credited against his CN. At the end of each year, surprise gifts to 10 customers who have made the highest purchase is given. In addition, a 22 carat gold coin is given to every customer who has made a purchase over Ksh.10, 000.The entries are rest on the last day of the year.

1. Draw the context diagram (3 Marks)
2. Give data dictionary entries for:
* Address
* CN
* Gold-coin-winner-list
* Total - sales

b) Describe data dictionary and its components. (4 Marks)

c) Explain COCOMO model with its relevant equations and attributes of cost drivers used in COCOMO model. (4 Marks)

d) Explain two building blocks for CASE. (6 Marks)