"Investing in Africa's future"

COLLEGE OF BUSINESS PEACE LEADERSHIP GOVERNANCE (CBPLG)

CSC 413: SOFTWARE ENGINEERING 2

END OF SECOND SEMESTER FINAL EXAMINATIONS

August 2019

LECTURER: …T. MUTERO

DURATION: 3 HRS

INSTRUCTIONS

Answer **ALL questions** from **Section A (COMPULSORY)**

Answer **any two (2)** questions from **Section B**

All questions carry equal marks (25).

DO NOT repeat material.

Write legibly.

SECTION A: ANSWER ALL QUESTIONS

Question 1

a) Explain what is wrong with the notion that computer software does not need to evolve over time. **[4 marks]**

b) Explain how software characteristics differ from hardware characteristics. **[4 marks]**

c) Describe any 4 tools used in requirements gathering. **[8 marks]**

d) Discuss the three levels of testing. **[6 marks]**

e) Software engineering has been described as a "soft" engineering discipline but nonetheless an engineering discipline on its own merit. By giving concise examples from the discipline, explain why this is so. **[3 marks]**

[Total marks 25]

Question 2

a) Distinguish between functional and non-functional requirements. **[4 marks]**

b) Write test cases for the login page for a social networking service (e.g. Twitter, Facebook, etc.). Include both positive and negative test cases. **[6 marks]**

c) Explain the concept of "design pattern" in software engineering, clearly showing how it can support software reuse. **[5 marks]**

d) It has been asserted that "Software testing can only detect errors present in a software system; it is not possible to show through testing that a system is 100% error free". Discuss the validity of this statement with respect to modern software engineering testing practices world over. **[4 marks]**

e) Quality can be described in many ways, some of which are given below:

- Quality means "to make without any errors";

- Quality means "to make fit for the client's purpose";

- Quality means "to make each product statistically the same as the previous product"

By justifying your answers, discuss the view (s) of quality which best address (s) the development of software. **[6 marks]**

[Total marks 25]

SECTION B: ANSWER ANY THREE (3) QUESTIONS

Question 3

a) Explain what you understand by risk management in software production. Use a risk characterization table in your solution. **[5 marks]**

b) Explain how a DFD differs from an ERD. **[4 marks]**

c) State and explain 8 rules that govern DFD construction. **[8 marks]**

d) Explain what SRS is. In your solution list and explain 3 components of an SRS. **[8 marks]**

[Total marks 25]

Question 4

a) Differentiate between verification and validation. **[4 marks]**

b) Distinguish between static and dynamic verification. **[4 marks]**

c) White-box tests are being done on a newly developed system. Who between the developer and an independent tester is a better option on conducting the tests? Support your argument.

d) State 4 things software testing reveals. **[4 marks]**

e) Explain what smoke testing is and its purpose in software engineering. **[4 marks]**

f) Explain the following quality management activities:

   i) Quality assurance **[3 marks]**

   ii) Quality planning **[3 marks]**

   iii) Quality control **[3 marks]**

[Total marks 25]

Question 5

a) Student registration at JKL UNIVERSITY starts with processing of applications in the Admissions Department where the students are issued with registration numbers. The students then register their appropriate modules offered by different departments in their faculty including those they have to shop from other departments. The registration process ends after the students have paid tuition fees or have their bursary applications in the Accounts Department. In the meantime, once the student has been issued with a registration number, they can process their IDs at their faculties. The faculties have computers, digital cameras and printers for this. The student also has to register with the university library.

The whole process is taking too long and is chewing up a whole lot of lecture time. Again there is a lot of chaos in the student affairs department which deals with allocation of accommodation to students who have been offered rooms at the campus as some students are offered double or even triple accommodation places. Senior students are taking advantage of this loophole and end up subletting the extra rooms at a fee.

Integrating and computerizing all these processes can help solve the current problems. Design a data flow diagram up to level two (2) that may be used to develop a computerized system for all the above processes. **[19 marks]**

    b) Differentiate between upper CASE and lower CASE tools. **[6 marks]**

[Total marks 25]

Question 6

    a) It has been argued that "software reuse is the only realistic approach to bring about the gains of productivity and quality that the software industry needs". Comment on this statement, making arguments for and against its validity. **[5 marks]**

    b) Standards are the key to effective quality management. They may be international, national, and organizational or project standards. State and differentiate between the two types of standards in software engineering. **[6 marks]**

    a) React to the following statements which are often made by IT professionals. You are expected to make use of your knowledge to describe any facts which support the statement or give any explanation for any false myths and highlight the real problem:

        i)   As software will always contain bugs, it is a wastage of time and money to invest in software quality assurance. **[2 marks]**

        ii)   The only way to guarantee good quality is to exhaustively test software. **[3 marks]**

        iii)   Maintenance phase in the software development life cycle is not an important phase as it comes after the main contract has been signed and delivered. **[3 marks]**

        iv)   The IT function is better delivered by external companies rather than by internal IT departments – all IT functions should be completely outsourced. **[3 marks]**

        v)   A CASE tool just provides tools to make pretty diagrams and does not help in the design of real software. **[3 marks]**

[Total marks 25]

End of Paper