FACULTY OF SCIENCE

The question paper consists of 5 pages

Instructions:
- Answer all questions.
- Please write neatly and legibly.
- Do not write in pencil.
- Ensure that all diagrams are neatly drawn.
- Unless otherwise stated, diagrams do not constitute complete answers.
- Calculators may not be used.

QUESTION 1

In 2005, ComputerWorld lamented that "bad software plagues nearly every organization that uses computers, causing lost work hours during computer downtime, lost or corrupted data, missed sales opportunities, high IT support and maintenance costs, and low customer satisfaction."

As a software developer you are expected to develop quality software that will not waste valuable time or money, but before you develop quality software, you would first have to understand what is quality.

    1.1. Based on Pressman & Maxim (2015), explain what Quality is. (5)

    1.2. Discuss any five of Garvin's Quality Dimensions. (5)

[10]

QUESTION 2

Technical reviews should be applied with a level of formality that is appropriate for the product to be built, the project time line, and the people who are doing the work.

    2.1. With the aid of a diagram, discuss how you would determine the level of formality for a technical review. (10)

[10]

QUESTION 3

Some software developers continue to believe that software quality is something you begin to worry about after code has been generated. As a software engineer, you know this not to be true. Software quality assurance is an umbrella activity that is applied throughout the software process. You feel it is your responsibility to inform the software developers of the goals of software quality assurance to prove to them that it should be used before developing software.

    3.1. What are the 4 goals of software Quality Assurance? (4)

    3.2. Name and discuss any 3 SQA concerns or activities. (6)

[10]

QUESTION 4

Unit testing focuses on individual software components or modules to find bugs. Using the component-level design description as a guide, important control paths are tested to uncover errors within the boundary of the module.

    4.1. Discuss the 5 considerations that need to be addressed for Unit Tests (10)

[10]

QUESTION 5

Software configuration management tasks can be viewed as concentric layers. Software configuration items flow outward through these layers throughout their useful life, ultimately becoming part of the software configuration of one or more versions of an application or system.

5.1. Using a diagram, illustrate how the software configuration management tasks are layered. (6)

5.2. What are the four issues that should be considered when developing for WebApp configuration management? (4)

[10]

QUESTION 6

Tami's company would like to be more visible to the general public, giving them the impression that the company are specialists in the web development. As one of the company's software developers, Tami has been tasked with creating a WebApp that will achieve the company's two aforementioned targets.

She has been given 2 years to make a fully interactive, dynamic WebApp that is aesthetically pleasing and easy to use

6.1. Using the scenario above and applying the goal definition template, provide a measurement goal. (10)

[10]

QUESTION 7

Tami has started her own company and has had multiple successful projects and a few not so successful projects. Tami is now planning on expanding her business and so can't be in control to manage all the projects anymore. She has advertised a Project management position which needs to be filled.

7.1. What are the main focus areas of a Project manager in the management spectrum? Name and discuss them. (8)

7.2. Name and discuss any one of the four organizational paradigms for software engineering teams. (2)

[10]

QUESTION 8

Tami has made it one of her company's standards to document everything done in a project. She wants to make sure that her company has a full and complete knowledge base that can be used for reports. It also adds the added benefit of learning from the past and improving any area where there is room for improvement.

8.1. With the use of a diagram explain how the knowledge base can be used for future projects. (10)

[10]

QUESTION 9

Tami received two new projects. One from a local supermarket which is called the Shoppy project and another from international insurance company which is called Risky.

Shoppy is a WebApp that is required to handle all the online sales for the supermarket. They will now be delivering groceries to any requested destination at a customer specified time.

Risky is a full system implementation of all the insurance company's departments in one system which will require a complex database and a well-designed object-orientated implementation.

Because Tami only wants the best for her customers, she always starts her projects with the relevant design estimation interviews, and research. She begins with the estimations of a software project.

9.1. How would Tami do software project estimations for the Risky project? Justify your choice of the estimation methods. (7)

9.2. How would Tami do software project estimations for the Shoppy project? Justify your choice of the estimation methods. (6)

9.3. Name two examples of resources used in a project. (2)

[15]

QUESTION 10

After the commencement of the Risky project, Tami is told that the entire system must be complete within two months and that she should adjust her teams schedule accordingly.

After the first month the servers used to store the project crashes and has to be sent to a data recovery centre to recover the data on the one server. During the project a few members stopped communicating to the rest of the team due to the server being down, but because they are a hard working team, they continue with the project on their own.

Tami, being distracted by her sick mother, keeps half an eye on the project while worrying if her mother will improve.

Despite all the problems Tami remains positive but has to continuously update the schedule.

10.1. What could be assumed to be some of the root causes should the Risky system be late? (6)

10.2. Name and discuss five of the basic principles that guide the scheduling of a software project? (10)

10.3. Discuss 4 different ways that Tami could use to track the project is progress. (4)

[20]

QUESTION 11

Tami is now well underway with her projects. Her next step in the projects is setting up a checklist for risk identification. Tami is so fearful that something might go wrong that she always tries her utmost to avoid any risks from occurring.

    11.1. Name five subcategories within the checklist and briefly discuss their importance.   (10)

    11.2. Discuss some of the strategies Tami can use to mitigate/reduce the risk of something going wrong with her projects.   (5)

    11.3. What are the steps for a risk projection and what are they intended for?   (5)

[20]

QUESTION 12

Your CEO is very excited about a brand new idea that he would like the company to implement. The idea will require that the company's existing client information be sent to a third party for further analysis to extract brand new client trends.

You are naturally alarmed and tell him that POPI legislation would not permit this. He looks at you, terribly confused.

    12.1. Name and discuss the four POPI principles that are relevant to the CEO's request.   (8)

In this day and age, it is very important that we are extremely careful when it comes to conduct online. This is particularly true for job seekers as companies look beyond candidates' CVs and screen candidates' social media accounts.

    12.2. Do you agree with the above statement? In motivating your answer, include the following in your discussion: (7)

        • Are companies legally permitted to gain access to a candidate's social media accounts?

        • Would companies assessing a candidate's social media account(s) not be considered discrimination?

[15]

— *END OF EXAM* —

Grand Total: [150]