**Examination Answer Book**

**UNIVERSITY EXAMS**

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| REGISTRATION NUMBER | | | | | | | | | VU-BSF-2407-0432-DAY | | | | | | |
| Title of The Program (eg BBA, BSC, BPH, BSWA) | | | | | | | | | | | | | BSF | | |
| Bachelor of Science in Software Engineering | | | | | | | | | | | | | | | |
| Department | | | | Other Depts in Faculty of Science and Technology | | | | | | | | | | | |
| Faculty | Faculty of Science and Technology | | | | | | | | | | | | | | |
| Year Of study (YrI , YrII, YrIII, or YrIV) | | | | | | | | | | | 1 | | | | |
| Module Code and Name | | | | | | | 1215 ST | | | | | | | | |
| Principles of Software Engineering | | | | | | | | | | | | | | | |
| Semester | | | 2 | | | | | | | | | | | | |
| (Copy from the heading to the Examination Paper) | | | | | | | | | | | | | | | |
| Retake: | | Yes | | |  | | | No | |  | | (Tick whichever is applicable) | | | |
| Date of examination | | | | | | Sun Dec 08 2024 15:00:00 GMT+0300 (East Africa Time) | | | | | | | | | |
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| **DIRECTIONS TO CANDIDATES (Turn to page ii for more instructions).** | | | | | | | | | | | | | **FOR USE BY EXAMINERS ONLY** | | |
| **Question Number** | **Internal Examiner** | **External Examiner** |
| 1. Leave margin blank. 2. Begin each answer on a fresh page. 3. Write the number of each question and theCandidate's Number at the top of each page. 4. Write the numbers of the questionswhich you have attempted, with subsections where necessary, in the spacesprovided below | | | | | | | | | | | | |
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| **TOTAL** |  |  |

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| **NUMBER OF QUESTIONS** you have answered in the order in which you have written them | | | | | | | | |
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**How and where should I submit my examination script?**

Every student will be required to attend their examination via [VClass Students Portal](https://vclass.ac/) E.g. you go to [www.vclass.ac](http://www.vclass.ac) and login, to your account, then on the left sidebar menu **click on Examinations**.

Under examinations you will see the following: -

1. Instructions for that particular examination with time required to finish your examination as per instructions,
2. A student will be required to download the question paper and the answer sheet provided by the university within the same module examination, or a student can be required to attempt structured questions within the system depending on how the examination was set.
3. Submission of answered questions is done,
4. Student is required to click to **consent** to show that the answered exam belongs to them.
5. **Note** that if an examination is for download, a student will be required to download the question paper and answer sheet, write their examination within the given stipulated time.
6. Required to scan and upload back the answered booklet through the same portal as per format available.
7. Examinations uploaded will directly be received by the Registry department.
8. Students here are required to use [VClass e-Learning system](https://vclass.ac)for all examinations and for any failure they can contact the Registry department for guidance.
9. No late submission will be accepted.

**Avoid any examination malpractice because this will attract severe penalties such as invalidating the exams answered script whose consequences will attract retakes.**

**NUMBER ONE A**

**A**ccording to the following illustration, it shows that time, scope and cost have a similar function in order to attain a successful project.

SCOPE

TIME COST

QUALITY

Time and cost depend on how the scope of the project is situated:

**Cost and scope**

A gradual decrease in the costs involved may lead to a decrease in the project scope such as eliminating the non-essential features to stay in the budget for example usability enhancements and advanced reporting tools thus attaining a successful project management.

**Time and scope**

When a project is behind its schedule, this leads to a decrease in the project scope for example less features in a software project can help meet deadlines without increasing costs hence attaining a successful project management.

**Time and cost**

If a project has a tight deadline, additional resources may be required hence an increase in the costs. Additional resources for example staff may be required to meet the timeline.

**NUMBER ONE B**

* Understanding software engineering concepts is more important even when you know programming because of the following reasons:
* Software engineering emphasizes testing and quality assurance hence ensuring that software is reliable and meets user needs. This is because learning about testing tools and methods involved leads to a high quality software delivery.
* Understanding software developments concepts and methodologies for example the waterfall and iterative models helps someone manage projects effectively and meeting deadlines hence adapting to changing requirements.
* Learning software engineering concepts helps someone to collaborate with others. This is because many software projects involve teamwork hence collaboration. This collaboration arises through coding standards and documentation making it easier to work with others.
* Software engineering concepts emphasize problem solving of the system such as requirements gathering, analysis, design, implementation, testing and maintenance hence leading to improved solutions.
* Understanding software engineering concepts teaches someone design principles and patterns such as architectural designs that help in creating maintainable and efficient codes.
* Software engineering concepts emphasize user experience principles hence ensuring that the software meets user needs and provides a good user experience.

**NUMBER ONE C**

**The** following are the main concepts of a data flow diagram:

It stores data for example in form of databases for patient records, insurance information and billing.

It processes data for example in the above it includes patient registration, updating records, scheduling appointments and billing.

It also involves some external entities such as insurance companies, health providers and patients.

**A CONTEXT DATA FLOW DIAGRAM FOR THE HEALTH MANAGEMENT SYSTEM.**

**PATIENTS**

**HEALTH MANAGEMENT SYSTEM**

**INSURANCE COMPANIES**.

**NUMBER THREE A.**

Software testing refers to the evaluation of software against requirements gathered from users and system specifications. Software testing involves software validation and software verification.

Computer software refers to the intangible components of a computer such as the operating system and utility software whereas computer programming refers to a set of creating instructions such as codes that computers can execute to perform specific tasks.

**DIFFERENCES.**

|  |  |
| --- | --- |
| **COMPUTER SOFTWARE** | **COMPUTER PROGRAMMING** |
| A collection of programs and related functionality such as operating system. | A set of instructions written to perform a specific task such as codes. |
| Consists of multiple programs and data. | Consists of a single line of code. |
| Usually developed by many people. | Usually created by an individual. |
| Requires extensive planning and management | Requires minimal planning and management |
| More expensive and require more resources to develop. | Less expensive to develop. |
| Depends on the operating system for its execution. | Depends on compilers for its execution. |

**NUMBER THREE B.(i)**

A product is the final outcome that must meet user needs whereas the process consists of ideas, methods and the steps taken to develop a product.

Personally the product is more important than the process because of the following reasons:

* The ultimate goal of a software engineering process is to deliver a functional and valuable product(software) that meets user needs. This means that a well designed process without a successful product does not deliver value to the customer hence the product being more important than the process.
* The main focus in a software development process is satisfying customer needs and delivering a product that solves their problems hence making the product’s functionality and usability more important.
* A well designed product is highly demanded on market regardless of the development process used.
* A product generates income in terms of revenue according to its features and functionality that drive business value yet a process itself does not directly generate income.
* The effectiveness of process can be harder to quantify yet the success of a product can measured for example in metric units.

**NUMBER THREE B (II)**

Alpha testing refers to the type of software testing performed to identify bugs before releasing the product to the end users whereas beta testing refers to the type of testing that is performed by real users of the software application in a real environment.

**DIFFERENCES.**

|  |  |
| --- | --- |
| **ALPHA TESTING** | **BETA TESTING** |
| Performed at the developers site. | **Performed at** the end users site |
| Ensures the quality of the product before forwarding to beta testing | Ensures that the product is ready for real time users |
| Requires a testing requirement | Doesn’t require a testing environment |
| Takes a long period of time for execution | Takes a short period of time for execution |
| Uses both white box and black box testing | Uses black box testing only |

**NUMBER THREE C.**

Quality assurance for an image viewer app such as Google photos, Microsoft photos and JPEG view refers to a systematic process that ensures the app meets specific quality standards and specifications.

When developing an image viewer app such as Google photos, quality assurance involves the following:

Determining the apps speed and stability under a given work load.

Ensuring the that app is easy to use and easy to navigate.

Ensuring that the app works properly across different browsers such as phoenix, databases and operating systems.

Ensuring that all features of the app work correctly without problems.

Detecting and fixing errors and other issues that could impact the app’s performance, usability and user satisfaction.

**NUMBER FOUR A.**

**Operational feasibility.**

This refers to a measure of how well proposed a system or plan fits within an existing business environment. This mainly considers a system’s ability to solve problems and take advantages of the opportunities and meet requirements. For example

Work practices whether the work practices and procedures are adequate to support the system.

User satisfactions whether users are unhappy with current business practices.

Current operations whether the current mode of operation provides reliable services.

**Technical feasibility**.

This refers to the process of evaluating if a proposed project can be implemented using the available resources and technology. This helps organizations to make informed decisions early in the product life cycle.

For example:

Marketing a product, building a house, developing software and digitization project.

**Economic feasibility.**

This refers to the assessment of whether a project or investment is financially viable and will generate benefits. It involves analyzing the costs and determining if the benefits outweigh the costs.

For example: health system and non-profit project.

**NUMBER FOUR B**

The size of a software product can be derived by measuring the functional size which involves the counting of functional points basing on features and complexity of the application. This is because of the following reasons :

Project management which is crucial in the planning phase of the software development process because it is used to estimate costs and allocate resources.

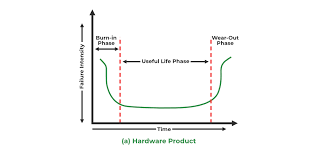
Decision making of the project managers because the managers need to know how long and how much it will cost to develop the software.

Resource allocation which ensures that the team has the right people, materials and tools when they need them.

**NUMBER FOUR C**

Software reliability refers to the likelihood that a computer program will run without errors for a specific amount of time in a specific environment.

**Hardware reliability** is the ability of the hardware to perform its function for some period of time. This may change during certain periods such as initial burn-in or the end of useful life.

* Hardware faults are mostly physical faults.
* Thorough testing of all components cuts down on the number of faults.
* Hardware failures are mostly due to wear and tear.
* It follows the Bathtub curve principle for testing failure.
* 

**Software reliability.**

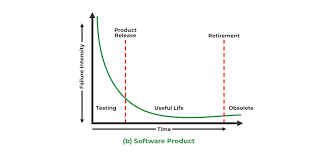
Software reliability starts with many faults in the system when first created.

After testing and debugging enter a useful lifecycle

Useful life includes upgrades made to the system which bring about new faults.

The system needs to then be tested to reduce faults.

Software reliability can not be predicted from any physical basis, since it depends completely on the human factors in design.



**NUMBER TWO**

Verification refers to the process of confirming if the software satisfies the business requirements whereas validation refers to the process of examining whether or not the software satisfies the user requirements. For example tik tok lite.

**Differences.**

|  |  |
| --- | --- |
| **VERIFICATION** | **VALIDATION** |
| Includes checking documents, codes and programs. | Includes testing and validating the actual product. |
| It requires static testing | It is requires dynamic testing. |
| Involves reviews, inspections and desk checking | Involves black box, white box and non functional testing |
| It checks whether the software conforms to specifications or not. | It checks whether the software meets the requirements and expectations of a customer or not. |
| It does not include code execution. | It includes code execution |
| It can find bugs in the early stage of development. | It can find bugs that could not be found in the verification process. |
| It comes before validation | It comes after verification |

**NUMBER TWO B**

The software manager should manage human resources to make sure that the organization has the right people on ground such that it can achieve its goals.

The software manager should set up the reporting hierarchy to improve on communication and increase on accountability.

The software manager should monitor the development process of the project in order to ensure that the project is on track and meets the required standard.

The software manager should undertake the responsibility of executing the software project in order to ensure its success.

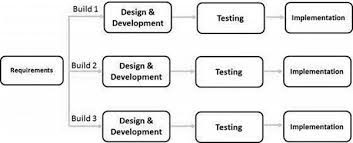
The software manager should execute various plans for the project to make sure the project is completed on time and at the required standard.

The software manager should arrange necessary and adequate resources to avoid delays, stay with in the budget in order to change and attain an improved quality.

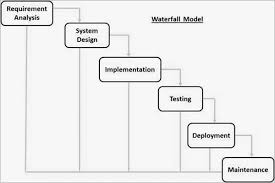
The software manager should monitor the progress and performance to help identify areas which need improvement and ensure that the goals are still.

**NUMBER TWO C.**

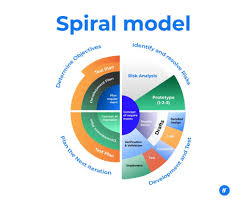
**Iterative model:** this model projects the process of development in cyclic manner hence repeating itself.



**Waterfall model**: this is the simplest model of the software development life cycle because all the phases of the software development life cycle will function one after the other in a linear model.



**Spiral model: this** model considers risks which often goes un noticed by most of other models.



**V model**: this model provides means of testing the software at each stage in resource manner.

**Big bang model**: this model requires little planning but lots of programming and it is not suitable for large software projects but good for one who is learning and experimenting.