

ISO 9001:2008 Certified Institute

**JAVA INSTITUTE FOR ADVANCED TECHNOLOGY**

Department of Examinations



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| COURSE(S) – (LEADING TO) | PROFESSIONAL HIGHER DIPLOMA IN SOFTWARE ENGINEERING |
| ASSIGNMENT STARTING DATE | 05th May 2020 |
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| UNIT NAME | SOFTWARE ENGINEERING II (SOFTWARE TESTING, QUALITY ASSURANCE AND MAINTENANCE) |
| UNIT ID | HF2W 04 |
| ASSIGNMENT ID | HF2W 04/AS/01 |
| DESCRIPTION | Software test need |
| DURATION | 1 WEEKS |

**GUIDE LINES FOR CANDIDATES**

Student get idea about the software test need because of Software testing helps in finalizing the software application or product against business and user requirements. It is very important to have good test coverage in order to test the software application completely and make it sure that it’s performing well and as per the specifications. Student should describe the test need according to the assignment.

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| NAME : | KANDAGE DON ISHAN VIHANGA VIMUKTHI  .................................................................................................................................... (BLOCK CAPITALS) |
| NIC : | 960263812v  .................................................................................................................................... |
| SCN NO : | 177646148  .................................................................................................................................... |

Java Institute for Advanced Technology Sri Lanka

1. What is Software testing?[05 marks]

Software testing is a process of executing a program or application with the intent of finding the software bugs.

1. What are the things found when software testing ?[05 marks]

Bugs, Failure, False , Errors, Defects

1. Explain the PDCA cycle and where testing fits in?[15 marks]

P – Plan: a test that is aimed at improvement.

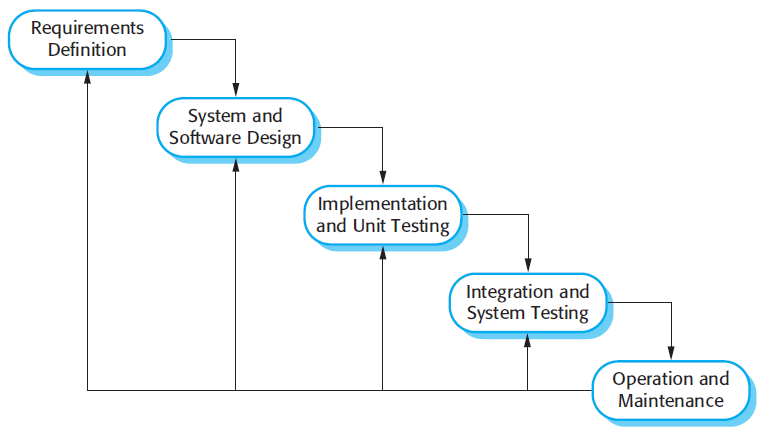
D – Do : Carrying the test.

C – Check: Leads to the results of issues, fixes

A – Act: Adopting the change.

PDCA cycle is designed for using as a dynamic model for testing. After completing the turn of one cycle leads to begin the next cycle. Followed by the continuous quality improvement, the process can be reanalyzed and a new test change begins. The continual cycle of change is represented for the ramp of improvement.

1. What is a software process? Explain with a diagram[ 15 mark]



A software process (also knows as software methodology) is a set of related activities that leads to the production of the software. These activities may involve the development of the software from the scratch, or, modifying an existing system.

1. Why is testing is important? [05 marks]

Software testing is important because it identifies faults/defects from a software system at an early stage which in turn improves quality of a product and builds confidence in it. By “early stage” I mean, where it is still feasible and effective to remove the existing defects.

Software testing is also important because it can save money, time and lives altogether for mission critical software systems. Read below example to know how:

Consider an example of a manned mission to Mars, where we are sending the astronauts to Mars, to orbit around it and come back safe. Now, out of several components and software that we are going to use for our mission, we have missed testing a software which will control the trajectory of our space shuttle. After years of research, training and development we arrive at the launch day of our mission. The launch is successful but months later when the space shuttle reaches Mars orbit, it crashes into Mars immediately instead of orbiting it.

After identifying the root cause of the failure we come to know that the accident was caused by the non-tested trajectory control software which used English units instead of the intended metric unit. But nothing can be done now, we have already lost time, money as incurred in the mission and valuable lives of our astronauts.

The above is just an example which clearly describes why testing a software is required and the importance of it. Software are used in almost every department be it medical, environmental, defense, aviation, banking and finance, etc… and it becomes very important to test the software before deploying or using it. We can eliminate severe consequences of a software defect by testing.

1. What is software bug explain it [05 marks]

A software bug is a problem causing a program to crash or produce invalid output. The problem is caused by insufficient or erroneous logic. A bug can be an error, mistake, defect or fault, which may cause failure or deviation from expected results.

Most bugs are due to human errors in source code or its design. A program is said to be buggy when it contains a large number of bugs, which affect program functionality and cause incorrect results

1. What are the factors Testing can involve? [15 marks]

When you create test plans and estimate the testing effort and schedule, you must keep these factors in mind otherwise your plans and estimates will mislead you at the beginning of the project and betray you at the middle or end.

The test strategies or approaches you pick will have a major influence on the testing effort. In this section, let’s look at factors related to the product, the process and the results of testing.

In Product factors the presence of sufficient project documentation is important so that the testers can figure out what the system is, how it is supposed to work and what correct behavior looks like. This will help us do our job more efficiently.

1. Explain the software testing team Key Players and Their Roles[20 marks]

In case of software testing every company defines its own level of hierarchy, roles and responsibilities but on a broader level, if you take a look you will always find the following two levels in a software testing team:

Test lead/manager: A test lead is responsible for:

Defining the testing activities for subordinates – testers or test engineers.

All responsibilities of test planning.

To check if the team has all the necessary resources to execute the testing activities.

To check if testing is going hand in hand with the software development in all phases.

Prepare the status report of testing activities.

Required Interactions with customers.

Updating project manager regularly about the progress of testing activities.

Test engineers/QA testers/QC testers are responsible for:

To read all the documents and understand what needs to be tested.

Based on the information procured in the above step decide how it is to be tested.

Inform the test lead about what all resources will be required for software testing.

Develop test cases and prioritize testing activities.

Execute all the test case and report defects, define severity and priority for each defect.

Carry out regression testing every time when changes are made to the code to fix defects.

Overview Of Software Engineering Team

How a software application shapes up during the development process entirely depends on the how the software engineering team organizes work and implements various methodologies. For an application to develop properly, it is important that all processes incorporated during the software development are stable and sustainable. Many times developers come under pressure as the delivery date approaches closer this often affects the quality of the software. Rushing through the processes to finish the project on time will only produce a software application which has no or minimal use for the customers. Hence, work organization and planning is important and sticking to the plan is very important. The project manager should ensure that there are no obstacles in the development process and if at all there is an issue it must be resolved with immediate attention.

Overview Of Software Testing Team

How soon and how well you can achieve your testing goals depends solely on the capabilities of the testing team. Within the testing team itself it is important to have the correct blend of testers who can efficiently work together to achieve the common testing goals. While forming a team for testing, it is important to ensure that the members of the team jointly have a combination of all the relevant domain knowledge that is required to test the software under development.

It is very important to ensure that the software testing team has a proper structure. The hierarchy and roles should be clearly defined and responsibilities too should be well defined and properly distributed amongst the team members. When the team is well organized the work can be handled well. If every team member knows what duties he or she has to perform then they will be able to finish their duties as required well within the time limit. It is important to keep track of the testers’ performance. It is very important to check what kind of defects the tester is able to uncover and what kind of detects he tends to miss. This will give you a fair idea about how serious your team is about the work.

All the team members should work together to prepare a document that clearly defines the roles and responsibilities of all the team members. Once the document is prepared the role of each member should be communicated clearly to everyone. Once the team members are clear about who is going to handle which area of the project, then in case of any issue it will be easy to determine who needs to be contacted.

Each member of the team should be provided with the necessary documents that provide information on how the task would be organized, what approach will be followed, how things are scheduled, how many hours have been allocated to each member and all details related to applicable standards and quality processes.

Software Tester Role

A Software tester (software test engineer) should be capable of designing test suites and should have the ability to understand usability issues. Such a tester is expected to have sound knowledge of software test design and test execution methodologies. It is very important for a software tester to have great communication skills so that he can interact with the development team efficiently. The roles and responsibilities for a usability software tester are as follows:

A Software Tester is responsible for designing testing scenarios for usability testing.

He is responsible for conducting the testing, thereafter analyze the results and then submit his observations to the development team.

He may have to interact with the clients to better understand the product requirements or in case the design requires any kind of modifications.

Software Testers are often responsible for creating test-product documentation and also has to participate in testing related walk through.

A software tester has different sets of roles and responsibilities. He should have in depth knowledge about software testing. He should have a good understanding about the system which means technical (GUI or non-GUI human interactions) as well as functional product aspects. In order to create test cases it is important that the software tester is aware of various testing techniques and which approach is best for a particular system. He should know what are various phases of software testing and how testing should be carried out in each phase. The responsibilities of the software tester include:

Creation of test designs, test processes, test cases and test data.

Carry out testing as per the defined procedures.

Participate in walkthroughs of testing procedures.

Prepare all reports related to software testing carried out.

Ensure that all tested related work is carried out as per the defined standards and procedures.

Software Test Manager Role

Managing or leading a test team is not an easy job. The company expects the test manager to know testing methodologies in detail. A test manager has to take very important decisions regarding the testing environment that is required, how information flow would be managed and how testing procedure would go hand in hand with development. He should have sound knowledge about both manual as well as automated testing so that he can decide how both the methodologies can be put together to test the software. A test manager should have sound knowledge about the business area and the client’s requirement, based on that he should be able to design a test strategy, test goal and objectives. He should be good at project planning, task and people coordination, and he should be familiar with various types of testing tools. Many people get confused between the roles and responsibilities of a test manager and test lead.For a clarification, a test lead is supposed to have a rich technical experience which includes, programming, handling database technologies and various operating systems, whereas he may not be as strong as Software Test Manager regarding test project management and coordination. The responsibilities of the test manager are as follows:

Since the test manager represents the team he is responsible for all interdepartmental meetings.

Interaction with the customers whenever required.

A test manager is responsible for recruiting software testing staff. He has to supervise all testing activities carried out by the team and identify team members who require more training.

Schedule testing activities, create budget for testing and prepare test effort estimations.

Selection of right test tools after interacting with the vendors. Integration of testing and development activities.

Carry out continuous test process improvement with the help of metrics.

Check the quality of requirements, how well they are defined.

Trace test procedures with the help of test traceability matrix.

Software Test Automator Role

Software test automator or an automated test engineer should have very good understanding of what he needs to test- GUI designs, load or stress testing. He should be proficient in automation of software testing, and he should be able to design test suites accordingly. A software test automator should be comfortable using various kinds of automation tools and should be capable of upgrading their skills with changing trends. He should also have programming skills so that he is able to write test scripts without any issues. The responsibilities of a tester at this position are as follows:

He should be able to understand the requirement and design test procedures and test cases for automated software testing.

Design automated test scripts that are reusable.

Ensure that all automated testing related activities are carried out as per the standards defined by the company.

Interactions between Software Test Team And Business Teams

If at all a customer has any issues related to testing activities and operational matters of the project then it is the software testing manager who is responsible for communicating the details to the client regarding how things are being managed. The software testing manager not only answers the queries of the customers but also ensures that the project is completed on time as per the requirement of the customer.

Interactions between Software Test Team And Development Teams

In order to produce good software applications, it is important that software testing and software development teams work together with good understanding. For this it is important that the testers and developers are comfortable with each other’s role and understand well that they have a common goal and it is wise to listen each other. A good communication skill is very important both for testers and developers.

Before getting started with testing work it is important to discuss the basic guidelines and expectations so that there is no confusion in later stages. Criticism should be taken in a positive sense. It is important to understand that developers and testers have a common goal of producing high quality software. A tester is not discovering bugs to show someone down, the idea is to learn from mistakes and avoid repeating them in future. A culture of constructive criticism can be of great help.

Interactions between Software Test Team And Release Management Teams

The release management teams are responsible for moving the software from development into production. This team is responsible for planning the releases for hardware, software and testing. It is also responsible for development of software development procedures and for coordinating interactions and training of releases. Software testing is considered to be a very important aspect of software engineering life cycle but it does not get over with development. Testing and verification is a very important part of release management exercise.

Interactions between Software Test Manager And Software Project Manager

The job of a software test manager is not an easy one. He has to recruit testing team and take responsibility for getting them trained. A software manager has to perform ongoing analysis of various testing processes and ensure that the testing team is carrying out all the processes correctly. This job is of great responsibility as the software testing manager is the one who selects, introduces and implement various tools for testing. A software test manager is responsible for finalizing templates for testing documents, test reports and other procedures.

Since a software tester manager has to deal with all the details of various testing activities, it is very important for him to be in constant touch with the project manager and provide necessary support in project planning and scheduling so that the project can be successfully completed in time within the specified financial budget limits.

1. Who does the testing? [05 marks]

Cloud based CRM platforms are on the crest of the wave. In 2008, 12% of companies were reported to use cloud based CRMs. A decade has passed, and now 87% of businesses use cloud based CRM platforms worldwide.

To be sure your cloud based CRM is stable and comprehensive, it has to be tested thoroughly. Cloud based CRM testing is quite different from the testing of on-premises software.

1. Write short description for following topics? [20 marks]
   * Error : An error is a mistake, misconception, or misunderstanding on the part of a software developer. In the category of developer we include software engineers, programmers, analysts, and testers. For example, a developer may misunderstand a de-sign notation, or a programmer might type a variable name incorrectly – leads to an Error. It is the one which is generated because of wrong login, loop or due to syntax. Error normally arises in software; it leads to change the functionality of the program.
   * Bug : A bug is the result of a coding error. An Error found in the development environment before the product is shipped to the customer. A programming error that causes a program to work poorly, produce incorrect results or crash. An error in software or hardware that causes a program to malfunction. Bug is terminology of Tester.
   * Fault : An incorrect step, process or data definition in a computer program which causes the program to perform in an unintended or unanticipated manner. A fault is introduced into the software as the result of an error. It is an anomaly in the software that may cause it to behave incorrectly, and not according to its specification. It is the result of the error.
   * Failure : A failure is the inability of a software system or component to perform its required functions within specified performance requirements. When a defect reaches the end customer it is called a Failure. During development Failures are usually observed by testers.