**THEORY PRACTICE CORRESPONDENCE**

1-Intoduction to software development life cycle:-

Key Concepts :-

It is a term used in software engineering and describes an information system by explaining its process for planning, creating, testing and deploying. Factors defining software development life cycle are customer expectation, time frame, reusability, life line, transaction, interfaces, ease of maintenance, cost, rigidity and user inputs. Different approaches to life cycle methodologies are iterative and incremental, waterfall, spiral, agile and prototype.

Important and sustaining concepts are :-

1- preliminary analysis :- Describing costs and benefits with the help of it conduct a preliminary analysis and submit a plan with required recommendations

2- System Analysis, requirements definition : - Collect facts, scrutinize the existing system and analyze the proposed system.

3- System's design: Documentation describing desired features and operations in detail.

4- Development :- Coding

5- Integration and Testing :- Checking for errors and bugs

6- Acceptance , Installation, Deployment :- Software is run as a business.

7- Maintenance :- Initial software is changed and evaluated.

8- Evaluation :- An extension of maintenance phase.

9- Disposal :- Discarding hardware and software and transit to a new system.

Explore Concepts Significance and Relevance :-

SDLC and its phases matter because, for the development of a software if any of the above phases are missed, problems may arise as to what to do next, how to proceed. Phases give a structure of the SDLC model, thus providing ease to the developer.

SE Course students by 2020 would know that SDLC model and its phases is a must without which the software could eventually break down into pieces. Without SDLC model, there is no documentation to support the software and its development and later on the inability to handle programs with complex needs arises and duplication of software may occur if SDLC documentation is not there to refute that fact.

There is a huge relevance in health care industry in phases like designing of systems for their machines, planning, testing for medicines, maintenance for hospitals, etc

Also in dance software relevance is in phases like planning, implementation and design.

Establish Relevance and Make Sense and Meaning:-

Real World Concepts :-

Electronic hardware and systems, Pharmaceutical Companies for development of drugs, Auto -mobile Industry, Aerospace Industry and Fast food chains around the world.

It reduces effort, wastage of resources, adds clarity to the development process, transparency and allows the completion of projects in a stipulated time frame and have better control over development process.

Interdisciplinary Concepts :-

Economics, Entrepreneurship, Geography, Computer Science, Psychology are some of the interdisciplinary connections.

Engage in Critical Thinking:-

Well defined Requirements :- waterfall, V model, Spiral, Incremental , Prototype

Availability of Reusable Components :- Spiral and Prototype

User Involvement in all SDLC phases :- Prototype

Complexity of the System :- Waterfall, Incremental are relatively simple. Spiral and prototype are complex.

Technology Tools and Techniques : -

Design : - starUml, argoUml

Coding :- Text Editor, IDE

Requirements Specification :- Text Editor

Testing :- Software tools for testing like selenium, Postman.

Maintenance :- Github

Plan Project Management:-

According to our software, the most important part being the requirements, the deliverables here would be deciding on which sdlc model to follow and also communicating with the client and agreeing on the same.

Project Specification and Project Briefs :-

For any of the software project development, the study of software development life cycle is essential because it teaches the developers about the path they could use as a life cycle for their software development. This saves a lot of time and effort along with the necessary requirements within the stipulated time.

2-Various Software Development Methodologies:-

Key Concepts :-

It is a framework that is used to structure plan and control the process of developing an information system. Every methodology is further divided into various other phases like requirements, design, Implementation, analysis, evaluation, etc. different for each one of them. Some of the models are waterfall, prototyping, interactive enhancement, spiral, etc.

Explore Concepts' Significance and relevance :-

A software methodology basically helps us develop a software product. Every one of them is different and are applicable in various scenarios. They are used depending upon the resources, cost and customer requirements. For any kind of project the developer needs to decide which of the methodology is he/she going to use.

Every industry uses an SDM that is best suited to the business and will put the company in the best possible position to be competitive. For example, IT industry, Music, health care, etc.

Challenges that excite us :- Create new logic for problem solving based on programming environments for high performance computer systems, Devise and construct software tools that are supportive of the methodology being used and facilitate a flexible environment.

Establish Relevance and Make Sense and Meaning :-

Find Real-Life Contexts :-

Airplane, a bridge, any floor building - these are built using waterfall model. Here the Client cannot change their requirements mid way else the above all would have to be first demolished to meet the customer's needs.

IBM, Microsoft, TCS use spiral model for their business which includes risk based approach and is intended for large and complex projects.

Agile is basically used for small projects and people have liked it because it alleviates pain.

Find Interdisciplinary connections :-

Economics, Financing, Resource Management, Computer Science, Geography, psychology, and Architecture are some of the interdisciplinary connections.

Engage in Critical Thinking :-

Well defined Requirements :- waterfall, V model, Spiral, Incremental , Prototype

Availability of Reusable Components :- Spiral and Prototype

User Involvement in all SDLC phases :- Prototype

Complexity of the System :- Waterfall, Incremental are relatively simple. Spiral and prototype are complex.

Technology Tools and Techniques : -

Design : - starUml, argoUml

Coding :- Text Editor, IDE

Requirements Specification :- Text Editor

Testing :- Software tools for testing like selenium, Postman.

Maintenance :- Github

Plan Project Management:-

Deliverables for the following are :-

Waterfall Model :- Requirements, design, Implementation, verification and maintenance.

Spiral Model :- Determine objectives, identify and resolve risks, development and tests and plan the next iteration.

Prototype Model :- Requirement Gathering, Quick Design, building prototype, customer evaluation, refining prototype and engineer product.

Incremental Model :- Analysis, Design, Code and Test. (Repeat again)

Spiral model involves a lot of risks and is usually considered by projects which last for more than six months, whereas waterfall model depends mostly on the requirements and prototype model depends on the customer inputs.

Project Specification and Project Briefs :-

The model we are using for our project is prototype model, because of the constant feedback received from our customer and making the necessary changes to our project. Thus the implementation of our project was done on the terms of customer feedback and requirements changing along the course of the project.

3-Requirement Analysis :-

Key Concepts :-

Requirement Analysis is the process of determining user expectation for a new or modified product. This requirements must be quantifiable and relevant. These are called functional requirements and the ones that cannot be measured are non functional requirements.

Explore Concepts' Significance and Relevance :-

Requirement analysis is important else there might be inconsistencies. During requirement gathering, most of the times the client is not sure as to what exactly is required because they come from a non technical background and hence if requirements are not proper it will cause a loop of rework in case of development.

In any industry whether it be small or big, requirements are analyzed with the help of the client and project needs. For example, in the making of a customized gift the requirements of the client are well kept in mind.

Establish Relevance and Make Sense and Meaning:-

Find Real Life Contexts :-

In the making of architectural structures, IT related projects, electronic related projects, customized projects, etc.

Find Interdisciplinary Connections :-

Tele Communications, Education System, Computer Science, are some of the Interdisciplinary Connections.

Engage in Critical Thinking :-

The flexibility of the requirements phase is different for every development methodology depending on the criticality of the project. For example, the requirements once submitted for a waterfall model cannot be changed whereas in prototype model changes can be incorporated. As also in the case of spiral model, requirements and their risk factor also need to be considered.

Technology, Tools and Techniques :-

AgroUml , starUml, Microsoft Word, Microsoft Excel.

Plan Project Management:-

The deliverables of the requirement analysis would output the essential functional and non functional requirements and will help us to budget out the cost for the requirements.

Project Specification and Project Briefs :-

For our project, we first had a discussion with our team members and later also had a communication with our client and asked him for the specific requirements and later documented them and further used that information for the development process.

4- System Design :-

Key Concepts :-

System’s Design is the process of defining the architecture components, modules, interfaces and data for the system to satisfy the requirements specified. The following things are specified in the design like input requirements, output requirements, storage requirements, storage processing, interfaces and how would you go about the project using all of this.

Explore Concepts' Significance and relevance :-

System design implies a systematic and rigorous approach to designing a system which fulfils aspects like flexibility, efficiency and security. The importance of the system also come into view when it comes to indentifying data sources, the nature and type of data that is available so that the system is designed considering all the relevant factors plus also it creates the system whichcan work efficiently within the time limit.

Establish Relevance and Make Sense and Meaning :-

Find Real Life Contexts :-

In terms of real life context, design comes into picture when we talk about electronic systems and how they are made and also software’s and how they are developed. Even designing advertisements and the way movies should go about also includes designing.

Find Interdisciplinary Connections :-

Computer Science, Electronics, Civil Engineering, Finance are some of the Interdisciplinary Connections.

Engage in Critical Thinking :-

When it comes to design of various things in the world especially software’s, every one of them follows a different route, different design process and methodology to go about with the project and that very different design makes all the difference in making the software unique and presentable. Comparing with real time designs, all of them have a peculiar goal to fulfil with respect to the customer needs.

Technology, Tools and Techniques :-

In design, the tools used are:

ArgoUML, StarUML, Microsoft Word, Microsoft Excel.

Plan Project Management:-

In design, the system requirements along with those of customer are taken into consideration and thus create a design with intermediate deliverables being communicating with the customer and asking him for feedback after every phase of our project and finally get an approval for the design from the respective team members as well as the customer well keeping in mind the software and its technical requirements.

Project Specification and Project Briefs :-

For our system design, we made a document that consisted of use cases, class diagram, sequence and state diagrams that gave us the flow f the work to be done and how to go about implementing the project.

5-Coding :-

Key Concepts :-

Coding is basically done to maintain the source code of computer programs , and to design, test, and debug them. Coding is a process that converts an original computing problem to executable computer programs, generates algorithms and creating a sequence of instructions that will automate a task or solving a problem.

Explore concepts’ significance and relevance:-

To meet with the client requirements we need to automate their particular request and make it easier for them o handle. Thus to picture this very scenario, we require codes or a sequence of instructions that the computer may follow to generate programs, so that when such programs, many of them are amalgamated give rise to an application or the very product that the client requires. Coding being a very important part of software engineering, its relevance comes into play in almost all of the industries where the procedure of developing anything right from a marble to food to bigger machines is automated.

Establish Relevance and Make Sense and Meaning :-

Find Real Life Contexts :-

Real life contexts would be in almost all of today’s industries like all software industries, food industries, automobile, aviation, anything of today’s world that a person can think of is almost done with the help of programs that is making life easier.

Interdisciplinary connections:

Computer science, web development, app development, game development, data analysis, artificial intelligence, cyber security etc.

Engage in critical thinking:-

To complete the design phase of any software coding is required and every product thus developed can use any legitimate languages keeping in mind the ease of use and thus develop programs using various platforms. And it is pretty well known that the source code for various products would be different depending upon the process of design and technical requirements at every level of the design phase.

Technology, Tools and Techniques:-

Any coding language like C, C++, Java, PhP , Python, and their compilers.

Plan Project Management:-

Before the amalgamation of all the programs into one source code, it is important to test every module and check whether its working or not and its efficiency and cost should also be kept in mind. Also the final source code should be tested to see if its running and if errors occur then they should be corrected.

Project Specification and Project Briefs :-

For the frontend of our project, we used HTML and CSS and the coding of our backend was done using PhP.

6. Testing:-

Key Concepts:-

The testing for any software is done to understand the practicality, reliability, validity and impact of the software thus produced. Any particular software may have errors and so as to remove bugs before submitting them to the customer it is absolutely essential to test them, debug errors and make them hassle free. White box testing and Black box testing are some important test that are conducted for a software to check the above factors.

Explore concepts’ significance and relevance:-

Sometimes the software that has to be shipped to the customer company might of such importance in terms of market as well as competition. Thus defected software cannot be put into the market because the company would be put to shame and the customer would not need that and will never use the software. Thus testing of the software is absolutely essential and the following can be used to test the software: software metrics, white box, black box testing etc. These factors will help define how far is the software efficient and error free.

Establish Relevance and Make Sense and Meaning :-

Find Real Life Contexts :-

Real life concepts of testing exist almost everywhere like we all as kids were tested in schools to understand how much we have learnt and applied our knowledge and how worthy we are to get to the next level. Other examples would be testing of food before setting out any new menu, automobile testing, gadgets testing , software testing etc.

Interdisciplinary connections:-

Some of the interdisciplinary connections would be computer science, embedded systems, etc.

Engage in critical thinking:-

Testing for one particular software may be done in different ways but their result being almost the same. Testing of various softwares require different software metrics for every different language that has been used for coding and to develop test cases for the product different applications can be used depending on various factors that need to represented during its test.

Technology, Tools and Techniques:-

JUnit, Postman, Selenium etc.

Plan Project Management:-

Testing every module and its interdependence on other modules should be done after every phase of the project development. This assures that the project is working efficiently and free of errors and can be reused if further developments are required.

Project Specification and Project Briefs :-

The project we developed was tested using projectcodemeter, phpmetrics, selenium etc to generate test cases and software metics.

7. Software project management:-

Key concepts:-

This is an art of managing the resources as well as the process of development of the software. The management of the project would also mean how well is the communication process amongst the team member as well as the client and the maintenance of the required files and documents. Concepts would include:

Scheduling, resource assignments, cost control, quality management

Explore concepts’ significance and relevance:-

Managing a project shall help the work to be systematically completed and proceed with no worry of any other thing. Having project management helps to achieve greater productivity of any project.

Establish Relevance and Make Sense and Meaning :-

Find Real Life Contexts :-

Almost all of the companies follow project management whether it be software or any other business process, thus having a clear idea about the resources, cost and technical requirements and helping in the completion of the project within the stipulated time limit.

Interdisciplinary connections:

Management, economics, finance, etc.

Engage in critical thinking:-

Different processes require different management methods thus providing a different scenario as per the needs of the project. If efficiently managed, then the project would definitely be a success and would add to the productivity of the company.

Technology, Tools and Techniques:-

Github, Harvest, Bitrix24, Trello are some of the tools used for the software management.