Assignment-01;

Q1: What are the symptoms of the present software crisis What factors have contributed to the making of the present software crisis?

→ software crisis is the term in computer science for the difficulty of writing useful and efficient computer programs in the required time.

symptoms of present software crisis.

(i) The cost of owning & maintaining software is an expensive as developing the software

(ii) software quality is low and inefficient

(iii) software doesn't meet user's requirements.

(iv) software projects exceed their initial budget due to poor planning, inaccurate estimation sor unforeseen technical challenges.

(v) software complexity is harder to change.

(vi) factors contributing to the making of the present software crisis.

(i) poor project management.

(ii) Lack of adequate training in software engineering

(iii) Less skilled project members.

(iv) Low productivity improvement.

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Q.9

Explain how do the use of software engineering principles help to develop software products cost effectively and timely. Elaborate your answer by using suitable examples.

⇒ The use of software engineering principles is crucial in developing software products cost effectively & timely. These priniciple provide a structured approach to the development process, ensuring that projects are well-planned, efficiently, executed and managed. following are some of the key usage;

i) Requirements engineering

software engineering emphasizes gathering and documenting requirements accurately, clearly & well-defined requirements minimizes chances of rework and costly changes later in the development process.

ii) For instance;

Let us consider a software development project for an online ticketing system for a theater. Then, in this, they identify that the system should allow users to browse available shows, select seats, make payments & receives e-tickets.

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(ii) Design and architecture.

proper and architecture are essential for building scalable, maintainable, and efficient software systems

For instance:-

The team applies modular design principles and separate concerns. They creat a scalable and maintainable architecture with presentation layer, business logic layer, and data access layer. This design allows for easly updates & enhancements without affecting the entire system.

(3) Testing & quality assurance

software engineering principles emphasize rigorous testing & quality assurance produces. This helps prevent costly errors from reaching the ~~producting~~ production stage & reduces time spent on maintenance and debugging.

For instance;

The team conduct unit test on individual components, integration, tests to ensure proper communication betn different modules and system tests to verify end-to-end functionality. This could include though testing of ticket reservation process, payment gateway integration & ticket delivery process.

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Q.3 Assume that a software development company is already experienced in developing payroll software and has developed similar software for several customers (organisation). Assume that the software development company has received a request from a certain customer (organisation), which was still using manually processing of its pay rolls. For developing a payroll software for this organisation, which life cycle model should be used. Justify your answer.

→ For developing a payroll software for an organization that has been manually processing its pay rolls, the software development company should consider using the waterfall life cycle model.

Waterfall model is a sequential approach that consists of distinct phases, including requirements gathering, design, implementation, testing, depolyment & maintenance.

This model is suitable for projects with well-defined and stable requirements, which is often the case ~~of~~ for payroll software development.

Reasons for using waterfall model are as follows;

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i) Stable requirements;

The organization's existing manual payroll processes indicate well-defined and stable requirements that can be captured upfront.

ii) Minimal requirement changes:

With manual processes in place, the occurance of frequent requirement changes during development is reduced.

iii) Well-understood domain;

The software development company's experience in developing payroll software ensures familiarity with the domain, minimizing unknown complexities.

iv) Documentation & traceability:

The waterfall model's emphasis on documentation aligns well with the need for comprehsive documentation in payroll software development.

v) Clearly defined milestone;

The model's distinct milestones allow for easy tracking of progress & provide assurance to the organization.

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Q.4

Assume that you are the technical manager of software development organization. A client approached for a software solution. The problem stated by client have uncertainities which lead to loss if not planned and solved. " Which model do you suggest for his project? Justify. Explains that model with its proc and cons.

→ For a project as such, the agile model is well-~~defined~~ suited for projects with uncertainties and unsolving requirements as it allows for flexibility, frequent feedbacks loops, and adaptation throughout the development process.

The Agile model is used ~~to~~ due to reasons mentioned below;

- Adaptability to uncertainties and evolving requirements
- Iterative development approach.
- Mitigation of significant losses through early & continuous delivery of working software increments.
- Active client involvment and collaboration throughout the process.
- Better risk management and issue solution.
- challenges in estimating timelines and costs accurately.
- Focus on continuous communication for successful delivery of the software solution.

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Pros of Agile Model

- Flexibility to adopt to changing requirement and uncertainties.
- Early & continuous delivery of working software increments.
- Active client involvment and collaboration throughout the project.
- Quick identification and resolutions of issues or risks.
- Better visibility and transparency into the project's progress.

Cons of Agile Model

- Requires active and continuous client engagement, which may be challenging if the client has limited availability or lacks technical expertise.
- can be more difficult to estimate timelines & costs accurately, especially if the uncertainties are substantial
- The need for constant communication and collaboration can introduce additional overhead.

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Q.5 What is requirment engineering ?. Explain its steps.

→ Requirement engineering (software specification) is the process of understanding and defining what services are required from the systems and identifying the constraint on the systems operation and development.

The steps.

Answer, Requirements engineering (software specification) is the process of understanding and defining what services are required from the system and identifying the constraint on the systems operation and development.

The steps involved in requirement engineering are;

i) Feasibility study;

An estimate is made of whether the identified user needs may be satisfied using current software and hardware technologies. The study considers wheather the proposed system will be cost-effective from a business point of view and if it can be developed within existing budgetary constraints. A feasibility study should be relatively cheap and quick. The result should inform the decision of wheather or not to go ahead with a more detailed analysis.

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2. Requirements elicitation;

This is the process of deriving the system requirements through observation of existing systems, discussing with potential users and buyer, task analysis. This may involve the development of one or more system ~~modules~~ models and prototypes.

- These help the system developer understand the system to be specified.

3. Requirements specifications;

Requirements specifications is the activity of translating the information gathered during the analysis activity into a document that defines a set of requirements. Two types of requirements may be included in this document user requirements are abstract statements of the system requirements are a more detailed description of the functionality to be provided.

4. Requirements validation.

This activity checks the requirements for realism, consistency and completness. During ~~the~~ this process, errors in the requirements document are inevitably discovered. It must then be modified to correct these problems.

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Q.6 Although the industry is moving toward component based construction, most software continues to be custom built. explain.

component-based construction;

component-based architecture refers to the framework for software development involving the design of reusable components, i.e. component based development.

component based development helps to stays up-to-date without rebuilding it from scratch. that makes component based architecture a better fit for companies with complex, monolithic codebases.

Using components turns a monolith into software building blocks. And these components can be combined, reused, & versioned.

custom software development;

- It helps to get bespoke, custom software specific to your brand's ~~name~~ needs & specification.
- cost-effective, personalized software has lower costs over time.
- custom software is flexible & scalable
- with custom software, external security threats are better handled - high security & reliability.
- The integration of Bespoke software into your company workflow is seamless.
- ROI of custom software increases over time
- You own your software - no one else has access to it.

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PLATFORMS TO LEARN CYBERSECURITY

YouTube

- Network Chuck
- Outpost Gray
- David Bombal
- John Hammond
- The XSS Rat
- Cyrill Gossi
- Cyberspatial
- Bugcrowd
- Professor Messer
- Black Hat
- Hak5
- Infosec Institute
- HackerSploit

@securitytrybe

Apps

- Learn Cybersecurity
- Learn Hacking
- Cybrary
- Ethical Hacking University
- HackerX
- Learn Kali Linux

Websites

- www.udemy.com
- www.cousera.org
- www.edx.org
- www.udacity.com
- online.stanford.edu
- www.cybrary.it
- www.sans.org
- www.w3schools.co

CyberSec Platforms

- Cybrary
- RealTryHackMe
- TCMSecurity
- OverTheWireCTF
- HackTheBox
- PentesterLab
- RootMe
- LetsDefendIO
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Due to the above mentioned reasons software continues to be custom built..

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