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Ans 1 a) Software Engineering

Software engineering is the application of systematic, disciplined, quantifiable approach to the development, operation and maintenance of software i.e., the application of engineering to software. It is the application of science and mathematics by which the capabilities of computer equipment are made useful to man via computer programs, procedures and associated documentation.

Ans 1 b) Techniques used to reduce problem complexity in software engineering are:

i) Decomposition: In this technique, a complex problem is divided into several smaller problems and then the smaller problems are solved one by one. A good decomposition of a problem should minimize interactions among various components.

ii) Abstraction: In this a problem can be simplified by omitting irrelevant details. The main purpose of abstraction is to consider only those aspects of the problem that are relevant for certain purpose and suppress other aspects that are not relevant for the given purpose.

Ans 1 c) Software Crisis: It is characterized by an inability to develop software on time, on budget and within requirements. The software crisis has been with since 1970s. When software is developing then during development many problems are raised up that set of problem is known as software crisis.

Ans 1 d) LOC: Line of code is a software metric used to measure the size of a computer program by counting the number of lines in the text of the program's source code. It is used to predict the amount of effort that will be required to develop a program.

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Ans 1 e) 4P's in Software Project Management

4P's: People, Product, Process and Project

i) People: It is the most ~~imfor~~ important factor of software project management.

Software Engineering Institute has developed a people management capability maturity model. i.e., PM-CMM. The people management maturity model defines the following key practice areas for software people: recruiting, selection, performance management, training, compensation, career development, organisation and work design and team development.

ii) Product: Before project can be planned, product should be established, alternative solutions should be considered and technical and management constraints should be identified.

iii) Process : It provides the framework from which a comprehensive plan for software development can be established. A small number of framework, activities are applicable to all software projects regardless of the size or complexity.

iv) Project : In order to avoid project failure, a software project manager and the software engineers who build the product must avoid a set of common warning signs, understand the critical success factors that lead to good project management and develop a commonsense approach for planning and controlling the project.

Ans 2a) Software Engineering

It is the application of systematic, disciplined, quantifiable approach to the development, operation and maintenance of software i.e., the application of engineering to software.

Software Engineering is needed because of higher rate of change in uses requirements and environment on which the software is working.

- Cost: As hardware industry has shown its skills and huge manufacturing has lower down the price of computer. But the cost of software remains high if proper process is not adopted.
- Quality Management: Better process of software development provides better quality software product.
- Dynamic Nature: The always growing and adopting nature of software hugely depends upon the environment in which the user works.

If the nature of software is always changing, new enhancement need to be done in the existing one. In this software engineering play a role.

- Large Software: It is easier to build a wall than a house, likewise as the size of software becoming large engineering has to step to give it a scientific process.
- Scalability: If the software process were not based on scientific and engineering concepts, it would be easier to re-create new software than to scale an existing one.

Ans 2b) Characteristics of good software are as follows:

- Operational: It helps to understand how well software works in the operations which can be measured one budget, efficiency, usability, correctness, dependability, safety, security, functionality, etc.

- Transitional : This is an essential aspect when the software is moved from one platform to another. Interoperability, portability, adaptability, reusability are the operation on which it can be measured.

- Maintenance : Maintenance tell us about how well software has the capabilities to adapt itself in the quickly changing environment. Flexibility, maintainability, modularity, scalability are the operation on which it can be measured.

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Ans 3a) Design strategies used while developing the software are:

Design strategy is to organize the program modules in such a way that are easy to develop and change later according to user requirements.

- Function Oriented Design Strategy

It is an approach to software design where the design is decomposed into a set of interacting units where each unit has a clearly defined function. Thus, system is designed using this strategy.

In this, the design can be represented graphically or mathematically by the following software design; i.e.; data dictionaries, data flow diagram, structure charts and psudocode.

Function are built in layers, additional notation is used to specify details.

Level 0

- Function name
- Relationship to another system components.
- Author, date.

Level 1

- Function parameters i.e., problem types, variables, etc
- Routines called by the function.
- Input or output assertions.

Level 2

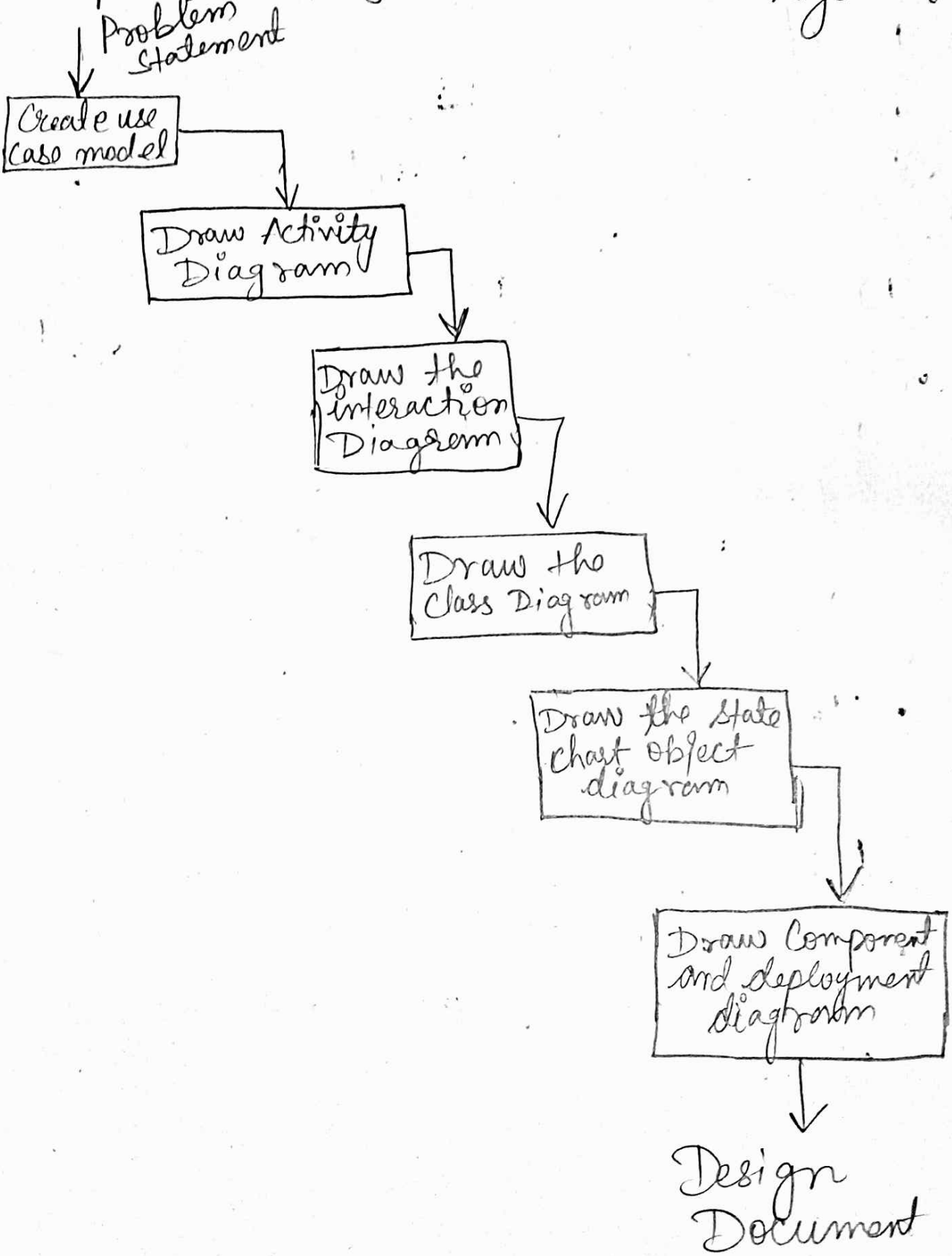
- Local data structures
- Time Constraints.
- Exception Handling.

Level 3

- Body i.e, structured chart, pseudo code, flow charts, decision table, etc.

- Object Oriented Design Strategy.

Steps for analysis and design of object oriented system.



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Ans 3 b) Software metric : It is used to provide quantitative checks on software design is also a well established area: The continuous application of measurement based techniques to the software development process and its products to supply management information, together with the use of those techniques to improve that process and its products.

Need of software metrics are:

- It is used to improve the quality of products and services this helps in achieving customer satisfaction.
- Different metrics helps the teams to monitor the efficiency of the process and control them.
- It provides the scope of improvement for current process.
- It focus on the features of the program