

University of Regina

Assignment #1

Vaibhav Sharma

200365101

CS280

Instructor: Dr. [Sergio Silva Ribeiro](#)

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Section I

1. Define the term "software engineering"

Solution - Software engineering is study of software development and it's different phases. It includes the study of Requirement Analysis, Designing the products, Developing the code, Testing every module and Maintenance of the product developed.

2. Do you think the linear model of software development is appropriate? In which cases do you think an agile approach is more appropriate?

Solution - The Linear model of Software Development is appropriate for Milestone oriented development style in large organisations which work with static team and deadline. It's also appropriate when the client can only be available in Requirement stage of the development cycle. On the other hand, Agile approach is more appropriate for small to large projects with dynamic requirements and team. In agile the client is added in every Iteration which allows developers to build the product asked by the client. It's useful when the new requirements needs to be added in later stages of the project.

3. Discuss the major differences between software engineering and some other engineering discipline, such as bridge design or house building. Would you consider state-of-the-art software engineering as a true engineering discipline?

Solution - The major difference between software Engineering and some other engineering discipline is the visual of the product. The final product in other Engineering discipline is physical as compared to software Engineering where the final product is Digital. Software Engineering is a true engineering discipline as it plays a vital role to ensure all software orientended products run safely and efficiently. For example, the software used in plane and emergencies needs to engineered with the same level of priority as the product engineered in other engineering discipline i.e Bridges because it also poses a high level of threat on users upon improper development.

4. Medical doctors have a Hippocratic oath. Could a similar ethical commitment by software engineers be instrumental in increasing the quality of software systems?

Solution - Yes, An ethical oath commitment would help in increase the quality of the software system. Most of the softwares developed these days have direct impact on users if developed incorrectly. For example, Therac-25 or a bug in a airplane software system can lead to death of so many passengers. The Ethical oath will play a vital role in helping software engineers understand the impact and consequences of the product they are developing on the users.

5. Suppose you are involved in an office automation project in the printing industry. The system to be developed is meant to support the work of journal editors. The management objective for this project is to save labour costs, the editors' objective is to improve the quality of their work. Discuss possible ramification of these opposing objectives on the project.

Solution -> The consequences of these opposing objectives will lead to the developers to choose between quality and efficiency. Increasing the efficiency will help in reducing thr labor costs but

increase the quality will help editors produce better journals which will help increasing the income. These opposing objectives help the client maximize the income and minimize the cost and its finding the right balance between these two will make our product good.

Section II (*Dr. Samira Sadaoui*)

6. Explain why do we still need Software Engineering.

Solution - Every product developed is unique in some way and needs software engineering to develop a product that client requires. Software Engineering helps developers with following certain procedures and protocols to ensure that the developed product is efficient, secure and fits client needs.

7. Identify the major activities in software management.

Solution - The major activities in software management are :

- Project Planning
- Scope management
- Project Estimation

8. What is the difference between software development and software maintenance?

Solution - Software development is the phase of the software development life cycle in which the code is written or the software is developed. This comes after Designing phase. The maintenance phase is the phase of software development life cycle which comes after testing. The code which is developed in the development phase is maintained and upcoming changes in technology and to ensure everything stays up and running.

9. Describe in detail an example of software failure but not covered in the lecture.

Solution - the example of software failure not discussed in class is Therac-25. In this case, Three patients in 1985 died because of radiation overdose. In the accident, the high current electron beam generated by the X-Ray machine was directly delivered into patients. There were total of two software failure. One where operator was able to select the x-ray while being in electron mode. This happened because the hardware interlock checks were removed from the machine and it only had software checks now which due to the race condition bug in the software could not perform task in the desired order. The second software fault was when electron beam got activated during the field-light mode. These software failure resulted in overdosing the patients with radiation which led to radiation poisoning and death of the patients.

10. Define "Legacy code".

Solution - Legacy code is referred to the old source code which is not compatible with the hardware or the technology today. It's often referred to the code which was written long ago and which is not supported anymore.

11. List the three types of products produced in the software development process.

Solution -> The three type of products produced in software development process are

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12. Using an example, describe the role of the different parties in a software process:

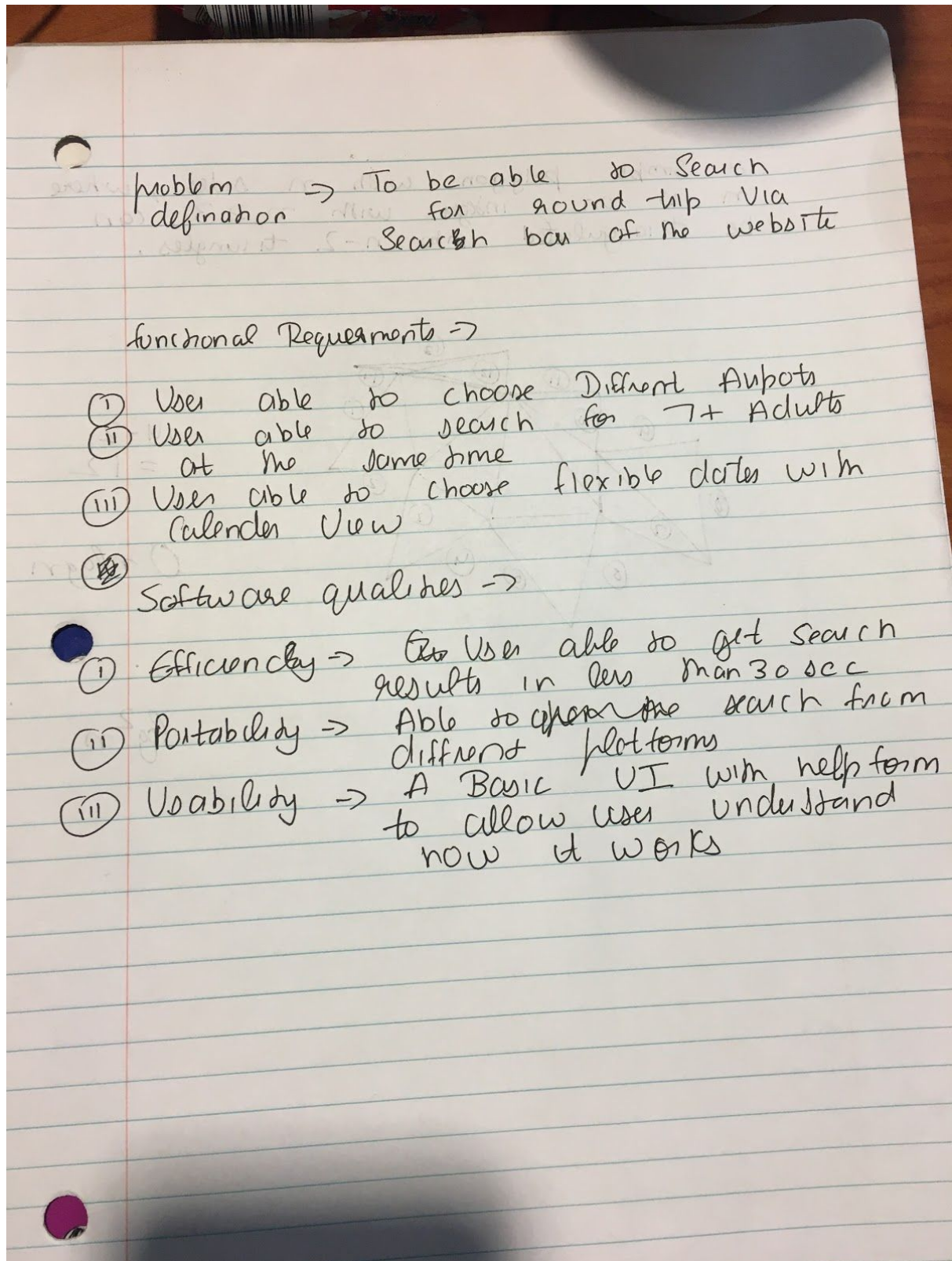
- User -> User plays an important role in providing feedback, expectations and UI design constraints. User helps finding bugs during beta testing, They set the expectation when it comes to User interface.
- Customer -> Customer provide functional requirements to the developers according to what they think will benefit the user. Customer is present in every phase of agile development working with developers to remove ambiguity in explaining the desired product.
- Developer -> Developer produces the code/product according to the functional and nonfunctional requirements and make sure it meets the expectation of the client and user.
- Manager -> Manager manages all these task and make sure everything is on time and produces efficiently and properly.

13. Why do we need the feasibility study of software systems?

Solution -> Software requirement Analysis is important for producing the same product that the client desire. In this phase of the software development life cycle, The client provide the expectations and function and non functional requirements to the developers or project manager so the develops can develop the same product. This is important as it ensure that a different product is produced.

14. Choose a problem from any application domain and produce its requirements specification document (problem definition, functional requirements and software qualities).

Solution -



15. Explain in detail the software design phase (by including its input and output artifacts).

Solution ->

The software design phase is also known as transformation phase as all the data is formed into charts and design team use these charts to determine the best way for data to move and to be

store. All the components and security pieces are decided during the design the phase. The system requirements and user manual is also produced in this phase. The customer signs off the design before the production begins to ensure the client agree with the design of the product. the input in Design phase is the End user and the output is Entity relationship diagram, Design document and data flow diagram