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Subject = Software Engineering

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Q1: Explain why the rapid delivery and deployment of new systems is often more important to businesses than the detailed functionality of these systems.

Ans:

A conventional waterfall or specification-based process is usually prolonged and the final software is delivered to the customer long after it was originally specified. In a fast-moving business environment, this can cause real problems. By the time the software is available for use, the original reason for its procurement may have changed so radically that the software is effectively useless. Therefore, for business systems in particular, development processes that focus on rapid software development and delivery are essential.

Q.2: Explain how the principles underlying agile methods lead to the accelerated development and deployment of software.

Ans:

The principles underlying agile development are:

- a) *Individual and interactions over processes and tools.* By taking advantages of individual skills and ability and by ensuring that the development team knows what each other are doing, the overheads of formal communication and process assurance are avoided.
- b) *Working software over comprehensive documentation.* This contributes to accelerated development because time is not spent developing, checking and managing documentation.
- c) *Customer collaboration over contract negotiation.* Rather than spending time developing, analyzing and negotiating requirements to be included in a system contract, agile

developers argue that it is more effective to get feedback from customer's directly during the development about what is required.

- d) *Responding to change over following a plan.* Agile developers argue (rightly) that being responsive to change is more effective than following a plan-based process because change is inevitable whatever process is used.

Q.3: Extreme programming expresses user requirements as stories, with each story written on a card. Discuss the advantages and disadvantages of this approach to requirements description.

Ans:

- Advantages of stories:

1. they represent real situations that commonly arise so the system will support the most common user operations.

2. It is easy for users to understand and critique the stories.

3. they represent increments of functionality-implementing a story delivers some value to the user.

- disadvantages of stories

1. they are liable to be incomplete and their informal nature makes this incompleteness difficult to detect.

2. they focus on functional requirements rather than non-functional requirements.

3. Representing cross-cutting system requirements such as performance and reliability is impossible when stories are used.

4. The relationship between the system architecture and the user stories is unclear so architectural design is difficult.

Q.4: To reduce costs and the environmental impact of commuting, your company decides to close a number of offices and to provide support for staff to work from home. However, the senior management who introduce the policy are unaware that software is developed using agile methods, which rely on close team working and pair programming. Discuss the difficulties that this new policy might cause and how you might get around these problems.

Ans:

If the company decided to close down a number of offices that were specialized in using agile methods they may face a multitude of difficulties. When a company is driven by a close team and is divided they will be unable to have daily meetings, which can cause issues with communication, programming in pairs would not be possible, a communication gap would be created, productivity will slow down due to communication issues, and detecting errors would be quite difficult. These problems can be avoided by creating merging offices together so pair programming and daily communication can be established. If that is not possible, a communication platform consisting of webcams, desktop viewing software, and microphones should be created to allow better communication.

Q.5: Identify and briefly describe four types of requirement that may be defined for a computer-based system.

Ans:

Types of requirements for a computer based system: Generally, system requirements are included to communicate the functions that the system should provide. And every computer based systems consists of many requirements. They are:

1. Non-functional requirement

Constraints on the services or functions offered by the system such as timing constraints, constraints on the development process, standards, etc. often these are applied to the system as a whole rather than individual features or services

2. User requirement

The requirements are the statements in a natural language plus diagrams of the services the system provides and its operational constraints

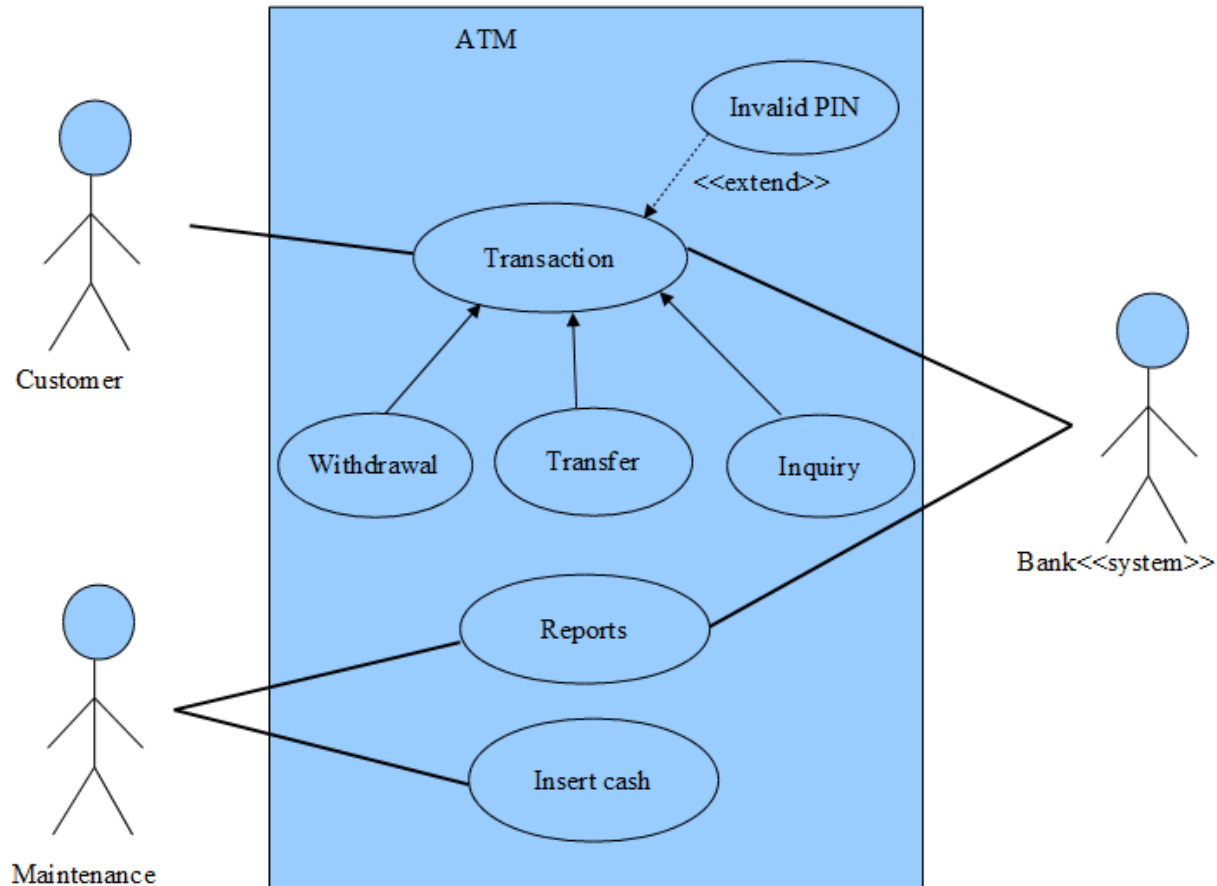
3. System requirement

A structured document setting out detailed description of the system's functions, services and operational constraints. Define what should be implemented. It may be part of a contract between client and contactor.

3. Function requirement

These are the statement of the services the system should provide, how the system should react to particular input and how the system should behave in particular situation.

Q.6: Using your knowledge of how an ATM is used, develop a set of use cases that could serve as a basis for understanding the requirements for an ATM system.



Q.7: Suggest how an engineer responsible for drawing up a system requirements specification might keep track of the relationships between functional and non-functional requirements.

Ans:

Keeping track of the relationships between functional and non-functional requirements is difficult because non-functional

requirements are some times system level requirements rather than requirements which are specific to a single function or group of functions. All system requirements that are relevant for each functional requirement should be listed. They can be related by including them in a table as shown below.

#Functional requirement:

The system shall provide an operation which allows operators to open the release valve to vent steam into the atmosphere.

Related non-functional system requirements:

Safety requirement: No release of steam shall be permitted if maintenance work is being carried out on any steam generation plant.

Non-functional requirements:

Timing requirement: The valve must open completely within 2 seconds of the operator initiating the action.