FCT/UNL Mestrado Integrado em Engenharia Informática

Software Engineering, 2020/2021

30th July 2021

Exemplo de teste

Name:_____**Number**:_____

Attention:
This exam has a maximum duration of **120 minutes**.

Please do not remove the staple of this group of pages. Apart from pen, pencil and eraser, no other material is allowed.

To interpret the questions is also part of the evaluation. Therefore, do not expect help from the professor to interpret them. At the end of the test, you must give back this test pages and the bubble sheet.

Please ensure that this page is correctly identified. There is no need to identify the rest of the pages as they are stapled.

When answering the questions, you can use a pencil. This way you can correct if you make some mistake.

Please read carefully before answering. Good Luck!

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1. Goals in the KAOS approach are NOT …

(A) desired system properties that have been expressed by some stakeholders.

(B) always requirements on agents interacting with the system.

(C) prescriptive statements of intent the system should satisfy through cooperation of its agents

(D) can be specified in different levels of abstraction, covering at a higher level strategic concerns and at a lower level technical issues.

2. A requirement in KAOS goal model is:

(A) a type of goal to be achieved by an agent part of the environment of the system.

(B) a low level type of goal to be achieved by a software agent.

(C) an automated component.

(D) all above.

3. Concerning completeness criteria of the KAOS goal model, which option is correct?

(A) There are no completeness criteria

(B) The model should have obstacles

(C) A goal model is said to be complete with respect to the responsibility relationship if and only if every requirement is placed under the responsibility of one and only one agent or implicitly if the requirement refines another one which has been placed under the responsibility of some agent

(D) none of the above

4. What is an obstacle?

(A) a condition on system for violation of corresponding assertion (generally a goal).

(B) a refinement of a goal.

(C) it is similar to a domain property.

(D) none of the above.

5 Complete the definition of a business process model: “It is a group of activities (actions) that are in a logical sequence with the objective of producing a good or a service…”. What is missing?

(A) “in detail”.

(B) it is complete, no need to complete the definition.

(C) “that has value for a specific group of clients”

(D) None of the above

6. Considering the BPMN model, which sentence below is wrong?

(A) A process can be initiated by a time event.

(B) The events are classified only into start and end events.

(C) A process can also start depending on a certain condition.

(D) they are all correct.

7. Requirements engineering…

(A) can be used to help deriving the architectural design

(B) is the process of establishing the services that a customer requires from a system and the constraints under which it operates and is developed

(C) can be used to help defining test cases

(D) all the above are correct

8. Choose the correct one:

(A) system requirements are more abstract than user requirements

(B) agile methods never define requirements, only code

(C) domain requirements cannot be reused

(D) all the options above are wrong

9. Choose the correct one:

(A) Security requirements are examples of organizational requirements

(B) Ethical requirements are examples of organizational requirements

(C) Legislative requirements are examples of external requirements

(D) Usability requirements are examples of external requirements

10. What is not a desirable characteristic of a model

(A) abstraction.

(B) accuracy.

(C) prediction.

(D) robustness.

11. Concerning software engineering, select the statement that is **false**.

(A) Software engineering is an engineering discipline that is concerned with all aspects of software production.

(B) Essential software product attributes are maintainability, dependability and security, efficiency and acceptability.

(C) The high-level activities of specification, development, validation and evolution are part of all software processes.

(D) For most types of system, the majority of costs are the costs of developing the software.

12. Concerning requirements, select the statement that is **false**.

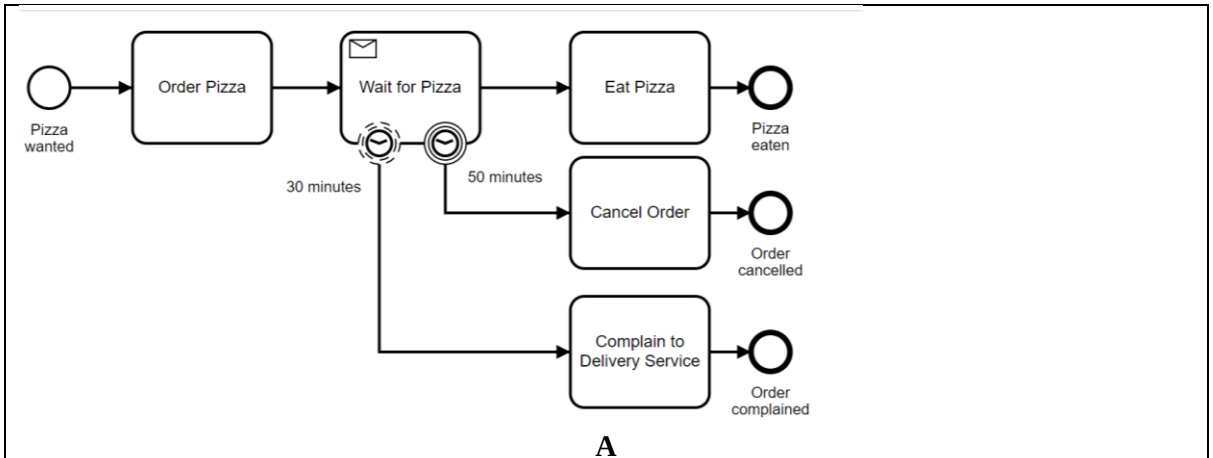
(A) User requirements are normally more abstract than system requirements.

(B) An example of a testable usability requirement is “The system should be easy to use by users and user errors are minimized”.

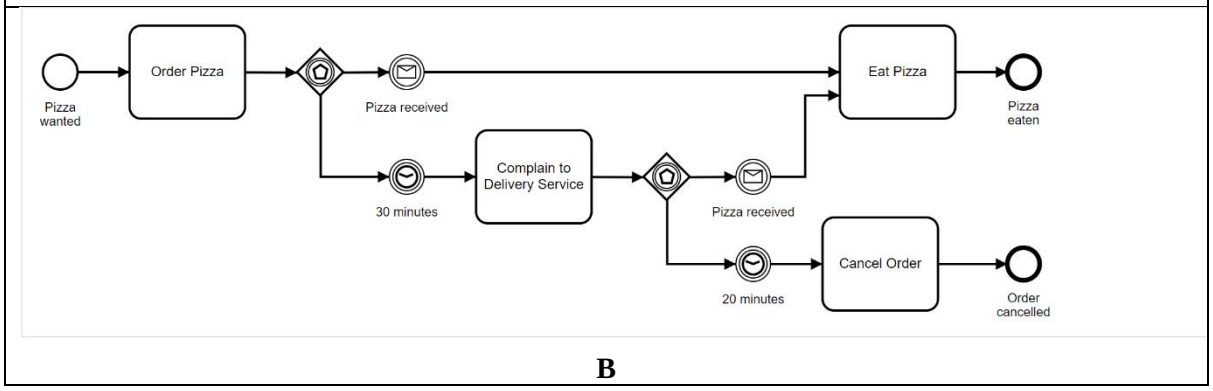
(C) Domain requirements can be functional or non-functional.

(D) In practice, it is very difficult to produce a complete and consistent requirements document.

13. Considere the BPMN diagrams below and choose the **false** alternative:



A



B

(A) The models in A and B can produce similar results.

(B) In A and B, if the pizza does not arrive in 50 minutes, the order is cancelled.

(C) A is more flexible than B, e.g. we may want to complain every 5 min until 50 min are over.

(D) In A, the process can end when there is an order complaint.

14. Concerning Systems Engineering which one is wrong?

(A) Socio-technical systems include computer hardware, software and people and are designed to meet some business goal.

(B) Human and organizational factors, such as the organizational structure, have a significant effect on the operation of socio-technical systems.

(C) Emergent properties are properties that are characteristic of each of the system component parts.

(D) The fundamental stages of systems engineering are procurement, development and operation.

15. Build a partial metamodel for KAOS that considers goals, requirements, expectations, environment and system agents.

PART 2: A Hotel Management System.

You are in charge of specifying a hotel management system, whose characteristics are depicted as follows. Firstly, a customer should be able to book a hotel, based on availability on the desired date, through the system website. The client can choose his preferences, e.g., type of room, inclusion or not of breakfast, transfer from/to the airport. Check-ins and check-outs of guests should be done by the reception staff. During check-in, the receptionist should create a guest account and allocate a room for him (just consider individual rooms). All guest spending is recorded in the system (e.g., dinner, drinks, lunches). The guest can consult the balance and transactions on his account during the hotel stay. The system should also allow the recording of complaints to be sent to the hotel management. The hotel manager must analyse the complaint and reply to the guest.

During check-out, when the payment is being processed, if a late departure (after noon) is detected, a penalty must be calculated and applied. Payment can be done by credit card, debit card or cash, where all expenses must be included. After payment, a receipt is issued. The system must also support room maintenance activities. Maintenance personnel should record the beginning and end of the intervention in a particular room (not occupied by any guest), which becomes unavailable. Therefore, when new guests arrive the staff cannot allocate a room that is in maintenance.

The system also controls when the employees arrive and leave the hotel (they use a card reader to have their employee cards read and type a PIN number). In case of fire, detected by sensors, the system should open all the exit doors automatically and trigger an alarm.

Based on the description above, build the models required by questions below:

1. Build a KAOS goal model which must include goals (identifying requirements and expectations), agents (identifying system and environment agents). Also, specify the main entities and specify operationalizations for the non-functional goals security and safety. Use stereotypes <<req>>, <<exp>>, <<sysAg>>, <<envAg>> to distinguish the model elements requirements, expectations, system and environment agents, respectively.

2. Use BPMN to model the Hotel Management process. Identify the appropriate pools.

Answers:

1. B
2. B
3. C
4. A
5. C
6. B
7. D
8. D
9. C
10. D
11. D
12. B
13. D
14. C