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First name:

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The test lasts 40 minutes.

Write the answers to questions into the table if the question itself does not prescribe a different way of answering.

In multiple-choice questions (a–e) only one choice is correct.

In case of making corrections, mark clearly which answer is valid. Each correct answer has the value as indicated in the question. An answer that is incorrect, ambiguous, or incomplete will be marked with 0 points. The procedure is not considered. Only an undamaged paper will be accepted.

1. (1 b) Draw the use case diagram implied by the part of a use case model introduced in Fig. 1. Do not show actors.

**UC Send an Excess Transaction for Approval**

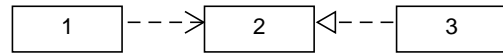
... Flow: *Send an Excess Transaction for Approval*

When a transaction whose value exceeds the limit value is to be realized in the *Create Transaction* use case:

1. System postpones the realization of the transaction and stores the data about it into a list of transactions that require management approval.
2. System informs Clerk that the realization of the transaction has to be approved by the management.
3. Clerk confirms the announcement about the postponing the realization of the transaction.
4. System informs the management about the waiting transaction by a message.

Obr. 1: A part of a use case model.

2. (1 b) Classes and interfaces define types, and so this notion is sometimes used as the common name for both. If it is known that type A realizes type B, and type C uses type B, assign these references to numeric references in this diagram:



so that it would correspond to the presented description. Use this form:

1:\_ 2:\_ 3:\_

in which you would introduce one of the letters A, B, or C at each number.

3. (1 b) To represent a use case realization in UML without explicitly stating the participating roles, one can use:

- (a) an activity diagram
- (b) a class
- (c) a sequence diagram
- (d) a component
- (e) a collaboration

4. (1 b) Can a component depend on another component?

- (a) yes, but only via a port
- (b) yes
- (c) yes, but only via a part
- (d) no
- (e) yes, but only via a collaboration

5. (1 b) In order to be correct, in the use case in Fig. 1:

- (a) a step to be realized by Clerk between steps 1 and 2 is missing
- (b) the extension points this use case refers to are missing
- (c) nothing is missing
- (d) extension points which can be referred to within it are missing
- (e) a formal beginning and end are missing

6. (1 b) If operation P::m() is called in operation X::f(), then

- (a) package X depends on package P
- (b) package P depends on package X
- (c) package X realizes package P
- (d) package P is equal to package X
- (e) package P realizes package X

7. (1 b) The use case flow in Fig. 1 has the nature of:

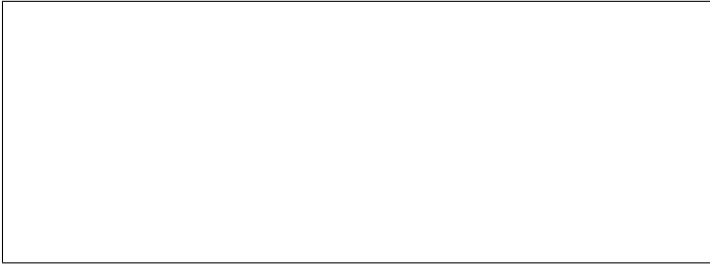
- (a) a main flow
- (b) a decision flow
- (c) an alternative flow
- (d) a specialization flow
- (e) an auxiliary flow

8. (1 b) In order to unambiguously designate the transitions in a UML state machine diagram, it is essential to introduce:

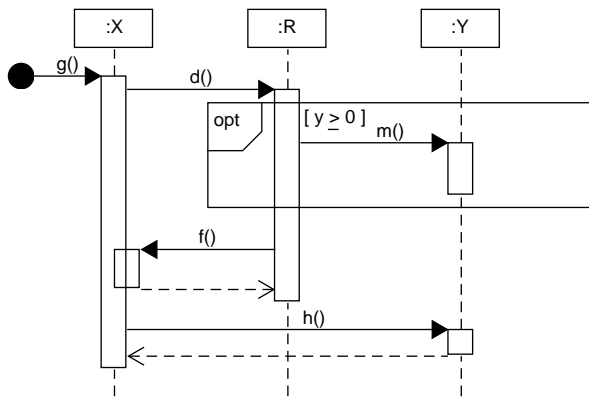
1. preconditions
2. postconditions
3. triggers
4. guards
5. ports
6. actions

Write the numeric references of all correct possibilities.

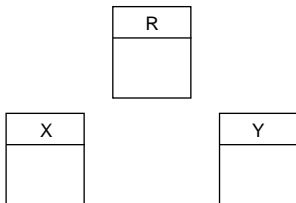
9. (1 b) After action *A* or the reception of signal *S*, action *C* follows. Draw the corresponding activity diagram fragment.



10. (1 b) Exclusively according to this sequence diagram:

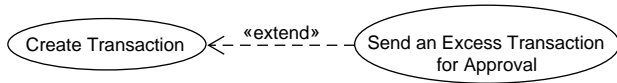


add the relationships in the form of undirected associations and operations to the following class diagram:



Write the solution directly into the diagram.

10 b



1

2 1:C 2:B 3:A

3 e

4 b

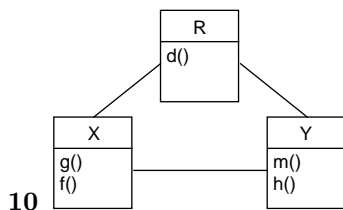
5 c

6 a

7 c

8 3, 4

9



10