Software Engineering and Project Management - Final Exam

2017-10-27. **Duration:** 8:00 - 11:00

Start by reading all the questions, to see if anything is unclear. One of the teachers will visit the exam around 8:30 to clarify questions.

Answers must be written in English. Dictionaries may be used.

Start each answer on a new page. Please hand in the pages in the correct order.

For each question, I give its maximum points of the answer.

The format and extension of your answer should adapt to the type of questions:

- **Specific questions:** a concept, a list… the *optimal* answer is usually around a single paragraph (This does not include drawing).

- **Short questions:** explanations, reviews, comparisons… the *optimal* answer is usually a few (2 or 3) paragraphs (This does not include drawing).

- **Questions for reasoning:** your arguments are presented in a concise, well-reasoned way,… and written with your own words. The *optimal* answer is usually less than 2 pages. (This does not include drawing).

A checklist of common mistakes that cost points:

- Answer all **9** questions. A bad answer never gives less points than no answer.

- Read the question again after you have written the answer. Verify that you have actually answered the question. Verify that you answered *all* parts. Verify that you have *not* hidden the answer between many other irrelevant comments about the topic. *Cursives are added to highlight the key elements of the questions.*

- In particular, don't forget to give an example if that is requested, and make it a concrete one.

- When a question asks you to compare two things A and B, make sure to highlight the contrasts: their differences. I do *not* want a full description of A and a full description of B, leaving it to me to find the differences. It is better to use tables than paragraphs of text to compare.

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Specific questions.

Question 1. [2 points].
Compare the life-cycle of the Waterfall model, V-model and Agile models: Indicate ome (1) *differences* or one (1) *similarity* between each pair. Three (3) in total.

Question 2. [2 points].
Define the following concepts in the context of risk assessment: accident, failure and fault.

Short questions.

Question 3. [5 points].
The diagram 1 (page 4) is a partial *class diagram* of a Tournament manager for boardgames. It also includes the code for the function setClassifications of the Tournament class and the updateClassification function for the AIPlayer class.

3.a (2/5 points) *Indicate* four (4) design patterns from the diagram.

3.b (3/5 points) For each one of them, *identify* the class/es involved and *explain* how the pattern is used in the context of the example.

Question 4. [4 points].
4.a (2/4 points) In Agile processes, compare release planning and iteration planning: Indicate at least two (2) *differences* between them.

4.b (2/4 points) *Describe* with an *example* one (1) *disadvantage* of agile planning.

Question 5. [4 points].
5.a (2/4 points) *What* are code reviews? or *Why* are they useful? *List* four (4) different processes for code review.

5.b (2/4 points) *Choose* two (2) of the processes mentioned and *explain* them. Indicate at least one (1) *advantage* when compared with the other two (2) process you have listed in 5.a.

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Question 6. [4 points].
6.a (2/4 points) *Describe* the 3-tier physical architecture.

6.b (2/4 points) *Give* an *example* where it would be reasonable to implement a Model-View-Controller logical architecture on top of a 3-tier physical architecture. *Explain* your answer.

Question 7. [4 points].
You are a software engineer and have been asked to asses a legacy system with low business value. After careful evaluation, you concluded that it has a high quality.

7 (4/4 points) *Describe* with a diagram *what* would be the process to follow to reengineer the system.

Questions for reasoning.

Question 8. [9 points].
8.a (3/9 points) *Explain step by step* the process of requirements engineering, with special emphasis on *which* actors and/or stakeholders are responsible of each step of the process and *what* are their responsibilities.

8.b (3/9 points) *Compare* functional and non-functional requirements. Indicate at least two (2) *differences* between them.

8.c (3/9 points) Consider the construction of a software for managing flight reservations on an airline operating at national scale. *Describe* one (1) product requirement *and* one (1) external requirement for the software.

Question 9. [6 points].
9.a (2/6 points) *Define* inspection in the context of software validation and verification, and *why* is it useful?.

9.b (4/6 points) Your company owns a medical management system deployed on the 74 hospitals in Sweden. A new version will be deployed in more than 400 hospitals spread in 23 countries. *Describe* four (4) different test methods relevant for the new system with an *example*.

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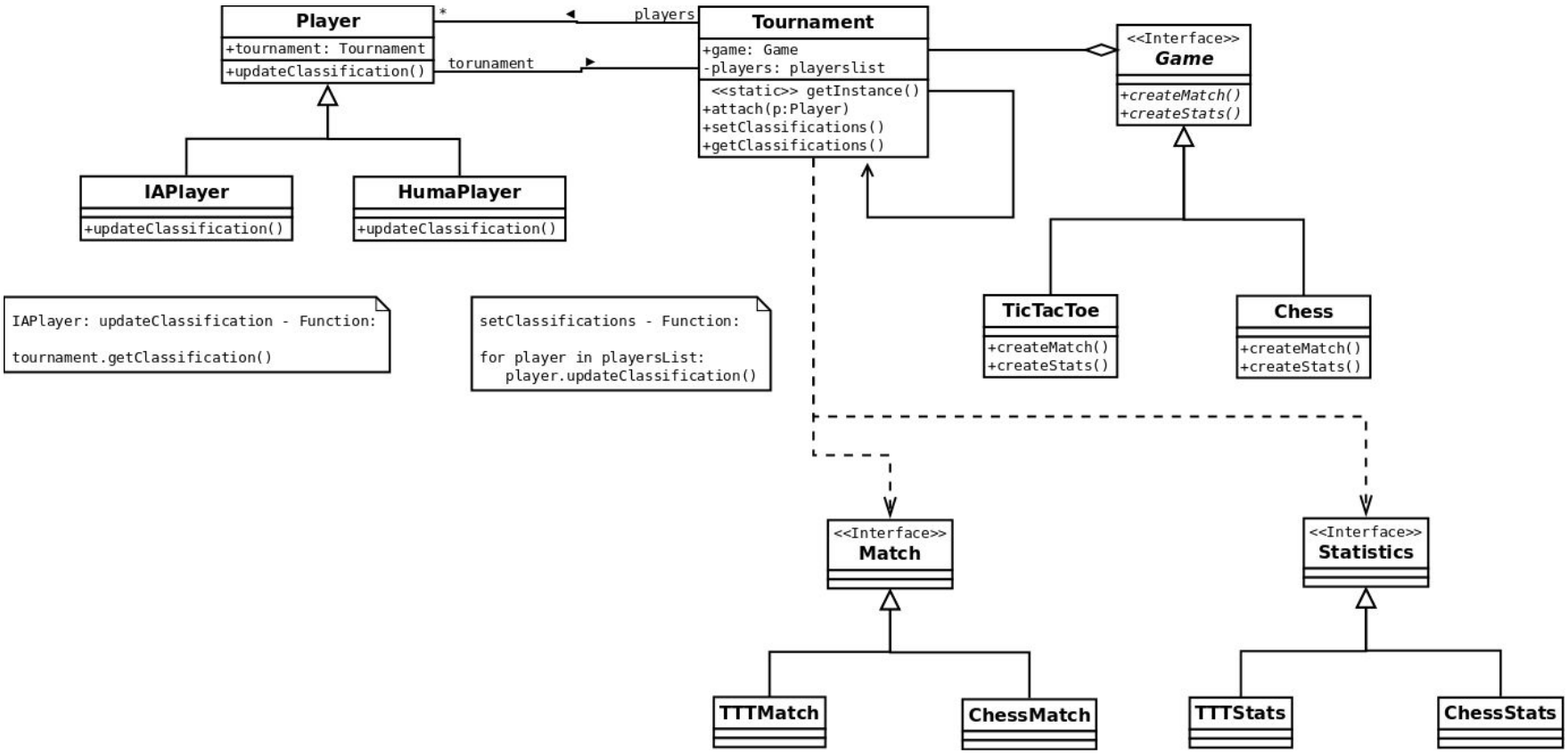
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+game: Game
-players: playerslist
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+getClassifications()
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Game
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+createStats()
IAPlayer
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HumaPlayer
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tournament.getClassification()
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for player in playersList:
player.updateClassification()
TicTacToe
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Chess
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