Two hours

Appendix A is located at the back of the exam

UNIVERSITY OF MANCHESTER
SCHOOL OF COMPUTER SCIENCE

Agile Software Engineering

Date: <some date>

Time: <some time>

There are TWO compulsory questions.
Please answer each question in a SEPARATE answer book.

For full marks your answers should be concise as well as accurate.
Marks will be awarded for reasoning and method as well as being correct.

This is a CLOSED book examination.

The use of electronic calculators is NOT permitted.

Question 1

a) The Agile Manifesto describes four "agile values" that the agile community believe underlie efficient and effective software development practices. The text of the manifesto (from agilemanifesto.org) is given below:

> *"We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value:*
>
> > *Individuals and interactions over processes and tools.*
> > *Working software over comprehensive documentation.*
> > *Customer collaboration over contract negotiation.*
> > *Responding to change over following a plan.*
>
> *That is, while there is value in the items on the right, we value the items on the left more."*

Each of the agile practices listed below are based on one or more of these values applied to a specific aspect of software development. For each practice, name one value that it is based on, and briefly explain how it promotes the item on the left of that value over the item on its right.

      i)   Task boards
      ii) "Done done"
      iii) Business-value-based release planning
      iv) On-site customer (i.e., customer as full team member)
      v) Pair programming   (10 marks)

b) You are a member of a team using agile development to build software for a major global toy manufacture and delivery company. The aim is to computerise their current manual process, which in outline is as follows. Children send letters listing their toy preferences. As the single annual delivery date approaches, specialist workers predict the location of each child on the delivery date. Using a quantum variant of the travelling salesman algorithm and a predicted model of wormholes in space-time around the delivery date, other specialist workers plan a route for the delivery. Somewhat surprisingly, the company employs only one member of delivery staff. Based on the planned route, a toy-mass-allowance is calculated for each child and a selection of toys from the initial letters is made (modified according to reports from field workers monitoring incidents of good and bad behaviour throughout the year). Manufacture of the toys can now begin.

    i)   Identify at least four different roles taking part in this manual process (optionally providing appropriate role names based on any domain knowledge you may have).   (4 marks)

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ii)   Using the Connextra story template presented in lectures, write 3 contrasting stories based on the manual process described above. At least one of the stories should be an epic, and at least one other should be small-scale enough to be suitable for implementation in a single two-week iteration. In your answer, indicate clearly which story is the epic and which the single iteration story.

(6 marks)

iii)   During agile planning, two members of the team (one senior and one junior programmer) give very different estimations regarding a given task. Choose a user story you gave in answer to sub question b) ii) and describe two possible explanations that these team members might have given. Finally, based on your explanations, propose a middle solution that can satisfy both sides giving the appropriate justification.   (5 marks)

[PTO]

Question 2

a)   You have been asked to look at some failing agile development teams, to diagnose the problems they are encountering. For each of the following scenarios, describe one potential root cause of the problem and one potential action to improve team progress.

   i)   The team consists of 3 developers, 2 testers and a customer representative. After a couple of iterations, the testers are found to be spending time writing tests for a couple of other (non-agile) teams. When questioned, they said that there was very little for them to do on the agile project and they were trying to make good use of their time.

   ii)   An organisation has decided to pilot the use of agile methods. Some developers with agile experience were employed, and a team was formed with a mixture of these new employees and some existing employees. After a few weeks, the existing employees complain to their manager that a lot of time is being wasted on writing unnecessary test code, pushing the code coverage levels up. These employees are worried that the testing team will have no work to do, when the project is passed on to them.

   iii)   A new agile team is formed to undertake a project for a customer. The team apparently gets off to a good start. A task board full of stories is created, and the team immediately begins to create lots of well-tested code. The customer representative is initially very happy, but soon starts to feel side-lined. When the team is coding, they keep their heads down and don't have much time to speak with him. When he does finally see a demo, the code that is being produced doesn't seem to match up with the vision on the post-it notes.

(6 marks)

b)   You are a member of an agile team tasked with implementing the following user story for an e-commerce site:

   As a member of marketing staff, I want to offer discounts on orders from repeat and bulk-buying customers, so that we can encourage customer loyalty.

In conversation with the customer about this story, you discover that the marketing team wishes to offer the following discounts to customers who are members of the company's loyalty scheme:

   • Free shipping on orders over £30 (not including shipping costs)
   • Cheapest item free when 3 or more items are ordered

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Write a specification for this feature as a set of Cucumber examples (scenarios) using the Given-When-Then format. The examples should clearly resolve any ambiguities in the English description of the feature given above. (8 marks)

c)   Write the step definition methods needed to enable *one* of the two discounts each of the steps in the Cucumber scenarios in your answer to part b) of this question, sketch out the Java step definitions that would be needed to make the scenarios executable. You should assume that no production code exists at this stage, so all production classes should be designed by programming-by-wishful thinking. Minor deviations from correct Java syntax will not be penalised provided the intention of the code is clear.

(8 marks)

d)   You have just joined an agile team as a developer. On your first day, you find the team embarking on a new high-profile project and in the middle of an intense debate as to whether the team should adopt TDD for the new project or not. Some of the existing developers have experience with TDD and some do not. Those in the anti-TDD camp say that the project is too important to risk experimenting with a difficult agile practice like TDD for the first time. Those in the pro-TDD camp say that the importance of the project is the reason for adopting TDD – it will help the team get the difficult business logic implemented correctly and avoid embarrassing bugs later.

Choose a side in the debate and give the argument you would make to your team, in support of this view. You may specify additional details about the project or the team to backup your argument, should you wish. (For example, you might specify more details about the urgency of the project, the size and make-up of the team, etc.)

(3 marks)

END OF EXAMINATION