TMA 01

Write no more than a total of 2500 words to answer all the questions in this TMA.

Question 1 (20 marks)

Question 1 is based on materials in Block 1 of the module.

Learning outcomes

Each part of Question 1 tests your understanding of the following:

    a. the organisational and business context of pressures for change (Unit 2)

    b. the economic and social context which influences motivation (Unit 3)

    c. the ethical considerations of public sharing of information (Unit 4)

    d. the legal implications of software for robotics (Unit 5).

    a. Give one example for each of the five kinds of pressures for organisational change that are identified in Section 2.3 of Unit 2. Your five examples need to be different from each other and from those given in the M814 text.

    (5 marks)

    b. Explain how McGregor's Theory X and Theory Y might be relevant to software engineering teams.

    (5 marks)

    c. What ethical considerations might arise from harvesting data from a social network such as Facebook?

    (5 marks)

    d. What might be the legal implications in developing and deploying artificial intelligence software for use in robots?

    (5 marks)

Question 2 (20 marks)

Question 2 is based on materials in Block 2 of the module. It assesses your ability to analyse the work of an authority in Software Engineering in order to gain a deeper understanding of the subject.

Learning outcomes

Question 2 tests your understanding of software engineering processes (Unit 7).

Over 15 years ago, Barry Boehm wrote a seminal paper on the concept of synthesising Agile and plan-driven software process models. Read Boehm (2002).

    a. Summarise the article. **Note:** write no more than 250 words.

(10 marks)

b. Evaluate the contribution of this article to the theory and practice of software engineering according to four explicit criteria of your choice. Recommended evaluation criteria are given in the Assessment Guide. **Note:** write no more than 250 words.

(10 marks)

Question 3 (25 marks)

Question 3 is based on materials in Block 1 and Block 2.

Learning outcome

Each part of Question 3 tests your understanding of the following:

a. the identification of project stakeholders and balancing their demands (Unit 8)

b. managing project objectives (Unit 8)

c. determining the scope of the work associated with a project (Unit 8)

d. the organisational, business and societal context in which software is produced (Unit 1 and Unit 2).

Questions 3 and 4 are based on the following case study. This case study will also be used as the basis for questions in subsequent TMAs.

Case study

The XXII Commonwealth Games are to be held in Birmingham from 27 July to 7 August 2022. Read carefully the following text description of a software system to be developed to handle ticket sales for the games. The system is also intended to be used in subsequent years for ticket sales for future similar major sporting events.

Ticketing system for the Commonwealth Games

New customers will register on the XXII Commonwealth Games website and provide their name and other personal details, including home address and email address, followed by choosing a password. The customer will receive confirmation of whether they have successfully registered. Following this, they should be able to log in at any time and from anywhere on the internet. After verification of their login details, possible events will be listed by broad category of sport in the games (e.g., cycling, aquatics, athletics, bowls, wrestling and so on) or by date (showing all events on a date or in a range of dates).

Customers will be able to select one of the many sporting events from the games. The system will check ticket availability and will feed back this information to the customer, suggesting alternatives if needed. Once a sporting event has been selected for ticket purchase, customers will be able to enter their requirements such as number of tickets, the preferred price range, details of concessionary tickets such as for children or students, special needs such as wheelchair access, together with payment details. Some of these requirements may be from their personal details stored in the system and others may be entered afresh for each event. A search facility will let customers find all sporting events with a shared characteristic (such as a specific sport, like running or diving, or events including contestants from a particular country).

Tickets will be added to virtual shopping baskets as customers make their choices; each basket will display the amount to be paid so far. Payments (major credit or debit cards only) will be handled by an existing system to which the website will connect.

The web system will interact with the database management system holding the real-time inventory of tickets for all events. The XXII Commonwealth Games system will run on existing high-capacity web servers and roll-out should coincide with marketing plans of launching the event in early 2021. The Games organisers plan to evolve the system by adding new features and improving functionality. The number of customers using the service is expected to grow and the web system should become a major part of the international sporting scene in the years to come.

Current situation

Software Masters, a leading software house based in Milton Keynes, was invited to bid by the organisers of the XXII Commonwealth Games, to design, implement, integrate and test a software system for booking tickets for sporting events at the Games. Software Masters had considerable experience in developing ticketing systems for theatres around the world, including on Broadway and in the West End, and had built an enviable reputation for the quality of its products and services. Its bid was very well received by the Games evaluation team and was successful. One of the features of Software Masters' proposal, which played a decisive role in its success, was an innovative algorithm that assured fair allocation of tickets since this had proved to be a concern at similar recent events, including the Olympic Games.

Software Masters is now in the early stages of setting up a project to develop this software. It has decided to name both the project and the resultant software product *JustTheTicket*. Software Masters expects a fairly high degree of its theatre ticketing software to be reused in *JustTheTicket* and this expectation was built into the aggressive price that was bid.

You have been appointed as *JustTheTicket* project manager and recently visited Birmingham to meet the Games Organising Committee. Committee members impressed on you the need for *JustTheTicket* to be able to handle the high levels of demand for tickets anticipated without any significant degradation in responsiveness of the system.

a. Identify the stakeholders in this case study and, in a single sentence for each stakeholder or group of stakeholders, describe their roles in relation to the proposed product.

   (5 marks)

b. Write down a project purpose for *JustTheTicket*, describe its business benefits and suggest how these benefits could be measured.

   (5 marks)

c. Suggest the scope of the work to be supported by the proposed product. Your answer should be consistent with the product purpose you wrote for part (b).

   (5 marks)

d. How does the *JustTheTicket* project relate to the material in Units 1 and 2? Your answer should include aspects of agreement or disagreement. We suggest you work through the summary points at the end of each unit and address five points in total.

   (10 marks)

Question 4 (35 marks)

Question 4 is based on materials in Block 2 of the module. It also assesses your ability to incorporate research and practice from leading software engineers to gain a deep understanding of the subject.

Learning outcome

Question 4 tests your understanding of the following:

    a. software engineering processes (Unit 7)

    b. managing the risks of software projects (Unit 9)

    c. managing the quality of software projects (Unit 10)

    d. managing the quality of the software process (Unit 10).

a. Consider the appropriateness of the following software process models for the *JustTheTicket* project. Recommend and justify your preferred approach. Your answer should include an explanation of the differences between the approaches. Your answer may draw on Boehm (2002) as well as the module material. **Note:** write no more than 250 words.

    i. sequential and incremental

    ii. <u>iterative</u> and incremental

    iii. architecture-driven

    iv. Agile.

(10 marks)

b. Describe five risks associated with the *JustTheTicket* project. Propose an approach for analysing and managing these risks. Your answer should provide justification for your choice of approach. Your answer may draw on Boehm (2002) as well as the module material. **(Note: you might find it helpful to present your risks in a table.)**

(10 marks)

c. Outline the key points of a quality plan for the *JustTheTicket* project, briefly justifying your choice of approach. Again, your answer may draw on Boehm (2002) as well as the module material.

(5 marks)

d. Software Masters had been considering whether to seek ISO 9001 certification but has been advised that CMMI appraisal might be more appropriate for a software house. The award of the Commonwealth Games project has again brought the issue to the attention of the senior management of Software Masters. Write an executive summary of no more than 300 words for the Board of Software Masters that provides:

    i. an outline of the issues involved

    ii. a recommendation whether to seek:

        (a) ISO 9001 certification

        (b) CMMI appraisal

        (c) both ISO 9001 certification and CMMI appraisal

        (d) neither ISO 9001 certification nor CMMI appraisal

   iii. a justification of the recommendation.

(10 marks)

References

Boehm, B. (2002) 'Get Ready for Agile Methods, with Care', *IEEE Computer*, vol. 35, no. 1, pp. 64-69 [Online]. DOI: 10.1109/2.976920 (Accessed: 10 September 2018)