CU–FCI–SEII–Midterm–2015-1:15 min (10 marks/20 pts + 2 marks/4 pts bonus)

12

Name:..... الرباعى ID: .....

Grp..... Email: ..... Phone: .....

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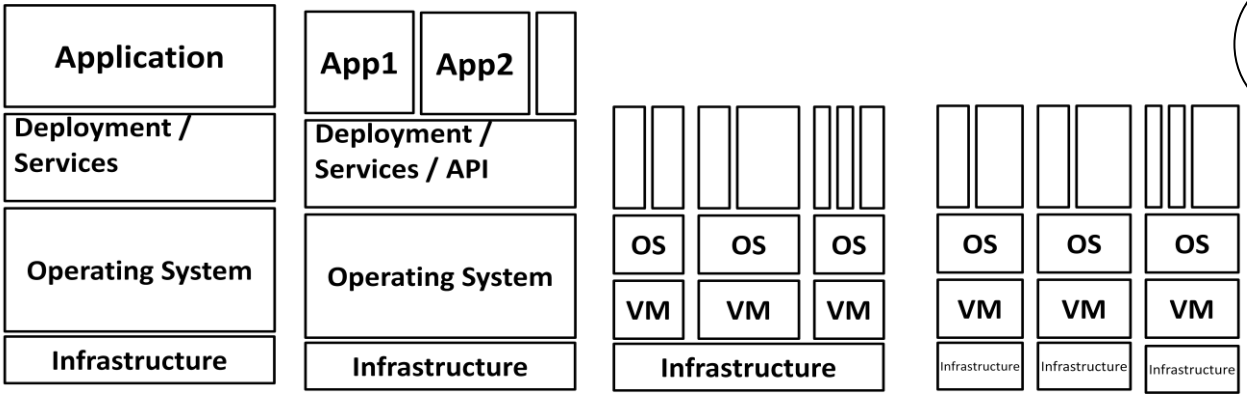
Question 1: Mark by TA: .....

Choose the MOST CORRECT and MOST GENEAL answer. 5 pts

5



(a) (b) (c) (d)

1. Which of the diagrams above best describes Google App Engine platform ? (a) (b) (c) (d)
2. Which of the diagrams above best describes Software as a Service (SaaS) platforms ? (a) (b) (c) (d)
3. Which of the diagrams above best describes Infrastructure as a Service (IaaS) platforms ? (a) (b) (c) (d)

Assume that 0 for development/pre-alpha, 1 for alpha, 2 for beta, 3 for release candidate (RC) and 4 for final/production release.

4. Then the first production release of version 1.9 is
   (a) 4.1.9.0 (b) 1.9.1.4 (c) 1.1.9.4 (d) 1.9.4.0
5. 1.2.3.4 is (a) The first beta release of version 3.4 (b) The fourth RC release of v 1.2
   (c) The third production release of v 1.2 (d) The second alpha release of v 3.4

Question 2:

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Explain three practices that eXtreme Programming (XP) uses to ensure that the code produced is of good quality. **Explain how each one** of them helps achieve this goal. 3 pts

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Question 3:

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You were hired by Aboudi Soft to design a robot controller system that controls a small robot which navigates through a room. (1) The robot has two types of sensors: ultrasonic sensor and infrared sensor. (2) The ultrasonic sensor uses sound waves to measure distance between the sensor and any objects that exists in front of the sensor. (3) Infrared sensor senses the objects that omit heat like human and animal bodies. (4) The robot is required to navigate through the room without collision تصادم with any object or human/animal beings. (5) Therefore the robot controller has to watch the sensors output. (6) If the robot detects an obstacle, robot controller will perform the following actions to avoid the obstacle: first, it will to turn left and then check (detect) that the way is clear and then move on, if it does not work, it will turn right (from the original position) and then check (detect) that the way is clear and then move on. Finally, if this does not work either (right and left have obstacles), it turn back to its previous position and try again the same steps. (7) The robot will start navigation from a given point **A** and navigate until reaching point **B**. After achieving the point B the robot will do a mission and then it will undo/reverse all its moves to return back to point **A**.

Using what you have learned in design patterns, it is required to design a draft class diagram that could be used as start point for developing the robot controller system.

(1) **Suggest 2 design patterns** that can be used for developing a good design. 2 pt

(2) **Explain in details the role of each pattern** and why it will be used. 2 pts

(3) **Draw the class diagram** for the solution using the design patterns you choose? 8 pts
Show the important methods for each pattern that make the pattern do its task and write a comment on what these methods do or which other methods they call.

(4) **Assume now that we want to change the** design to allow the user to choose from different algorithms to use when collision is detected. For example, instead of left-right-back algorithm described, the user may want to use instead an algorithm that picks a random move and try it every time there is a collision. **Suggest a design pattern** to add this change and explain how to use it **and modify the class diagram** to show how it changes with the use of this pattern. 4 pts

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