Xi'an Jiaotong-Liverpool University

西交利物浦大学

PAPER CODE	EXAMINER	DEPARTMENT	TEL
CSE311		Computer Science and Software Engineering	

Semester 1 2019 Final EXAMINATION

Bachelor Degree – Year 4

Mobile Computing

TIME ALLOWED: 2 Hours

INSTRUCTIONS TO CANDIDATES

1、 **Total marks available are 100. This will count for 40% in the final assessment.**

2、 **Answer all questions.**

3、 **Answer should be written in the answer booklet(s) provided.**

4、 **The university approved calculator - Casio FS82ES/83ES can be used.**

5、 **All the answers must be in English.**

Question A

Nowadays, many tablet designs and phone designs have dropped mechanical buttons (such as mechanical home button and back button, mechanical keyboard) and changed to in favour of gesture-based UI control. Give one advantage of using the new method and one disadvantage.

(8 marks)

Question B

Compare the traditional password-based authentication method and facial recognition-based methods (such as FaceID from Apple). Please give one advantage of using passwords over facial recognition and one advantage of using facial recognition over passwords.

(8 marks)

Question C

Please list up to 10 possible or existing context-aware functions of a map/navigation app that allow the app to adapt to different environments/situations. For each one, identify any potential related issues?

(20 marks)

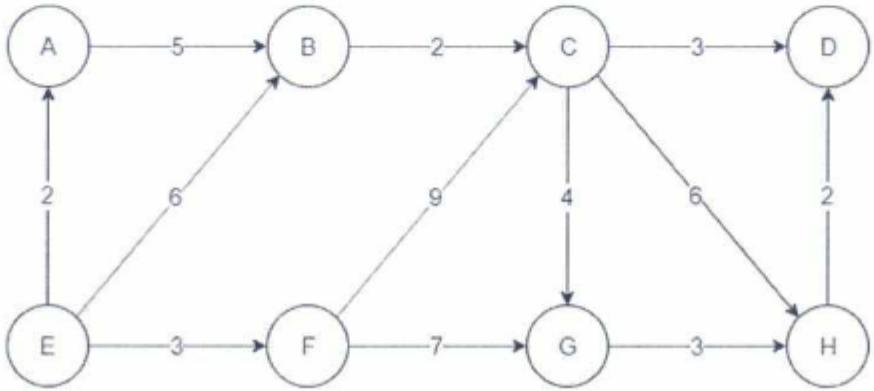
Write down as many ideas as possible. Each idea, along with its potential issues, worth up to 4 marks. Very similar ideas will not be counted as separate ones. Having irrelevant ideas will not cause mark deduction. Keep your answer short and precise.

Question D

Dijkstra's algorithm is commonly used to solve the shortest path problem in map navigation. Answer the following on Dijkstra's algorithm.

(14 marks)

1. Suppose we have a map M as shown below. Write down the steps of finding the distances from E to all nodes at each iteration of the algorithm. Place your answer in the answer sheet. (10 marks)
2. Draw the shortest path tree of M. (4 marks)



Question E

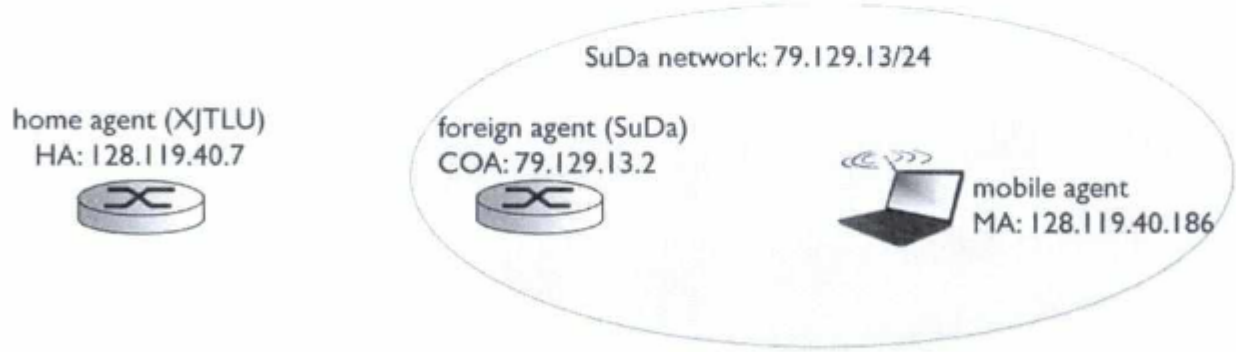
Three mobile phones A, B, C want to communicate with a base station at the same time. (20 marks)

1. Develop a spreading code for each of them. (8 marks)
2. Show how your spreading codes can help to avoid interference among these mobile phones. (12 marks)

Question F

Suppose you are visiting the neighbouring SuDa campus. Your laptop will be connected to the SuDa WiFi via mobile IP. Describe the process of mobile IP registration for your laptop. Assign each step the necessary IP address. You can make use of the figure below for your description (put all your answer in the answer booklet).

(15 marks)



Question G

Suppose there are two mobile nodes, a source and a destination, in an 802.11b WLAN. Answer

the following questions on CSMA/CA.

(15 marks)

1. Describe the CSMA/CA algorithm for both the source and the destination, assuming that Request to Send (RTS)/ Clear to Send (CTS) is not used. (5 marks)
2. When using RTS/CTS, explain what would prevent a hidden terminal from interfering with a source node? (5 marks)
3. When using RTS/CTS, explain how an exposed terminal decides it is safe to send to another destination? (5 marks)

END OF FINAL EXAM