Xi'an Jiaotong-Liverpool University

西交利物浦大學

PAPER CODE	EXAMINER	DEPARTMENT	TEL
CAN301	Jianjun Chen	Computing	1897

Semester 1 2022/2023 Final EXAMINATION

Bachelor Degree – Year 4

Mobile Computing

TIME ALLOWED: 2 Hours

INSTRUCTIONS TO CANDIDATES

1、 This is a closed book examination

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

3、 Answer all questions.

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

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

6、 All the answers must be in English.

Question A (20 marks)

Answer the following questions related to the Android system.

1. Explain why density-independent pixel is a preferred measurement unit when designing UI elements in Android. (10 marks)
2. Explain why one should not use the UI thread to download resources from the Internet when designing an app. (10 marks)

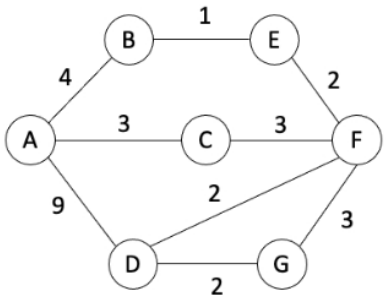
Question B (20 Marks)

Please list 5 possible context-aware functions of a book reading and note taking app with stylus (digital pen) support. Each idea worth up to 4 marks. Similar ideas will be treated as one answer. Note that "automatically adjusting screen brightness based on the ambient light level" is a system feature, thus does not count as a correct answer. If you write more than 5 answers, only the first 5 answers will be examined.

Question C (20 Marks)

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

1. Suppose we have a map network M as shown below. Complete the table network to show the distance values from A to all nodes at each iteration of the algorithm (Place your answer in the answer booklet). (8 marks)



Iteration	A	B	C	D	E	F	G
0	0	∞	∞	∞	∞	∞	∞
...							

2. Draw the shortest path tree of M. (7 marks)
3. Does Dijkstra's algorithm work when a network has negative edges? Explain why. (5 marks)

Question D (20 marks)

Four mobile phones A, B, C and D want to communicate with a base station at the same time.

1. Develop the spreading codes for each of them. (10 marks)
2. Assume the bits A, B, C and D want to transmit are 0, 0, 1 and 1. Show how your spreading codes can help to avoid interference among these mobile phones. (10 marks)

Question E (20 marks)

XJTLUDummy is an open (unencrypted) WiFi network. Suppose you are using this network to connect to HTTP websites on the Internet. Answer the following questions:

1. Can another student who is nearby eavesdrop on the payload of all the packets you send over this WiFi link? Justify your answers. (5 marks)
2. You are browsing your bank website. Assume HTTPS is used. Can a nearby student observe your bank account balance by eavesdropping on the WiFi connection? Why? (5 marks)
3. You switch from XJTLUDummy to XJTLU-S2 which uses MAC address filtering security. Can XJTLU-S2 protect you from the eavesdropping attack as above? Why? (5 marks)
4. In addition to the eavesdropping attack, please give another one example of attack in WiFi? (5 marks)

END OF FINAL EXAM