Student Name:.............

Mobile Commerce

April 23 , 2004

FINAL EXAM

Vrije Universiteit Amsterdam

IMPORTANT NOTICE: This is a **closed book** exam. You are supposed to answer the questions on your own, i.e. without the use of a computer, books or any other material and without discussing the exam with anyone else. Cheating will not be tolerated and will be handled according to strict University policies.

This exam has been designed to test your overall knowledge and understanding of the material covered in the course so far. It consists of **a total of 6 questions for a total of 100 points**. Please make sure to answer in the space provided under each question. Answers will be evaluated based on content rather than length. In other words, there are no extra points for providing long answers.

This exam is not meant to be stressful and should not take you more than an hour to complete. You are however given a total of 1.5 hours to answer the questions. **Please make sure that your handwriting is legible and that you have printed your name at the top of each page. Good luck!**

Student Name:....................
Student ID Number:....................

Score:

1	____ / 15
2	____ / 15
3	____ / 20
4	____ / 15
5	____ / 25
6	____ / 10
	____/100

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Question 1: Transition to 2.5G and 3G (15 points):

The transition to 2.5G and eventually 3G technologies is viewed as critical to the broad adoption of mobile commerce. Identify 3 key characteristics of these technologies that should help in this regard. Limit your answer to 2 or 3 sentences per characteristic, including an explanation of why/how it is expected to help.

1.

2.

3.

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Question 2: WiFi (15 points):
WiFi is now widely viewed as part of the emerging Mobile Internet landscape. We can expect to see mobile phones that support Internet access through both WiFi and wide area cellular networks.

Question 2a (6 points): Identify 3 factors that make WiFi a particularly competitive technology in comparison to 3G standards. Limit your answers to 1-2 sentences per factor

1.

2.

3.

Question 2b (9 points): Identify 3 sources of concern about WiFi that will have to be addressed (or are in the process of being addressed) by industry.

1.

2.

3.

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Question 3 (20 points): WAP Security

Question 3a (6 points): Why do people say that the WAP legacy protocol stack does not provide for end-to-end security? Limit your answer to 3 or 4 sentences. Feel free to draw a diagram.

Question 3b (4 points): What does this mean for small content providers (say a startup with 5 or 6 employees) who want to authenticate users? Limit your answer to 2 or 3 sentences.

Question 3c (5 points): What is the security element introduced in WAP to support client authentication? (one sentence is enough)

Question 3d (5 points): Identify two ways in which this security element can be implemented. Explain how these two possible implementations could impact the mobile commerce value chain and, in particular, the role played by mobile operators. Limit your answer to 3 or 4 sentences.

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Question 4: OSA and LIF (15 points):

Question 4a (10 points): In no more than 5 or 6 sentences, explain why architectures such as the Open Service Access (OSA) architecture developed by 3GPP are critical to the development of Mobile Commerce.

Question 4b(5 points): In no more than 4 or 5 sentences, explain how open standards such as OSA and LIF (the Location Interoperability Forum standard – now being refined by the LocationWorking Group as part of the Open Mobile Alliance) simplify the development of location-sensitive applications and services. Feel free to use a diagram.

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Question 5: WAP and i-Mode (25 points):

In the Fall of 2000, the Nielsen Norman group conducted a usability study involving 20 users accessing mobile Internet services from WAP phones over GSM networks in the London area. The results of the study came as a real blow to WAP. A sample of the results from the study is provided in the table below, comparing the time it took users to access 4 different services (a) on the first day of the study and (b) after a week of daily usage.

	Day 0 (Mean number of minutes)	Day 7 (Mean number of minutes)
Read World Headlines – built-in portal	1.3	1.1
Retrieve Guardian Headlines	0.9	0.8
Check Local Weather Forecast	2.7	1.9
Read TV Listing Program	2.6	1.6

Question 5a (4 points): Identify 4 sources of frustration among early WAP users such as those studied by the Nielsen Norman Group (one sentence each).

1.

2.

3.

4.

Question 5b (4 points): Some people claim that the introduction of 2.5G and 3G networks should take care of the problems identified in the Nielsen Norman study.

1. Give one reason why this view is partly correct (2 points) – limit your answer to 2-3 sentences:

2. Give one reason why this view is partly incorrect (2 points) – limit your answer to 2-3 sentences:

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Question 5c (8 points): By early 2001, i-Mode, which had been launched two years earlier (in February 1999), had already managed to attract 20 million users in Japan. Identify 4 aspects of i-Mode that made it more appealing to users than its counterpart WAP services in Europe. Limit your answer to one or 2 sentences per bullet.

1.

2.

3.

4.

Question 5 d (9 points): List 3 innovations introduced in WAP and WML to enhance usability. Limit your answers to 2 sentences per innovation.

1.

2.

3.

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Question 6: GSM Security (10 points):

In no more than 10 lines, explain how GSM networks authenticate their users. You will not be penalized if you do not remember the exact terminology (e.g. algorithm names). If necessary, feel free to draw a diagram.

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Feedback (optional):

- If you feel that a question was unclear, please indicate below the number of the question and provide a brief explanation.

- Was preparation for this exam a good way to get you to go over the class material again? Would you have reviewed the material otherwise?

- Do you feel that this test was fair and properly complements the class presentation and project you are to deliver as part of this course? If not, what would you have done differently?

- How long did it take you to finish this exam?