Queen Mary
University of London

BSc /MSc Examination

Friday 8th May 2014 14:30 - 17:00

ECS637 / ECS757P - Digital Media and Social Networks ***Duration: 2 hours 30 minutes***

YOU ARE NOT PERMITTED TO READ THE CONTENTS OF THIS QUESTION PAPER UNTIL INSTRUCTED TO DO SO BY AN INVIGILATOR

Answer FOUR questions

If you answer more questions than specified, only the first answers (up to the specified number) will be marked. Cross out any answers that you do not wish to be marked

Calculators are permitted in this examination.

Complete all rough workings in the answer book and cross through any work that is not to be assessed.

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EXAM PAPERS MUST NOT BE REMOVED FROM THE EXAM ROOM

Examiners: Hamed Haddadi, Raul Mondragon

Question 1

A) Referring to the Figure 1 Below, briefly discuss the concepts of nodes, links, paths, and connected component. **[8 marks]**

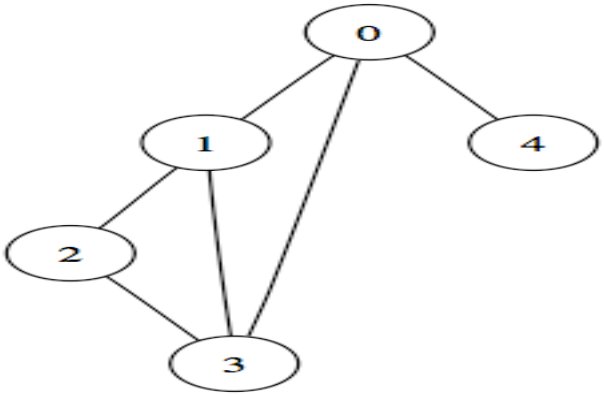

Figure 1

B) State briefly the way random graphs are different from real world social networks.

[4 marks]

C) Briefly describe the characteristics of small-world networks and the concept of clustering coefficient. **[6 marks]**

D) i) Calculate the degree distribution for the nodes in Figure 1. Which node(s) have the highest degree? **[6 marks]**

ii) Is the graph directed? **[1 mark]**

Question 2

A) State briefly importance of centrality in networks.

[6 marks]

B) Briefly name and explain two centrality measures.

[6 marks]

C) Briefly state the importance of cluster or community detection with an example.

[7 marks]

D) What is the meaning of preferential attachment and how does it effect networks?

[6 marks]

Question 3

A) Name the players in the online advertising ecosystem and briefly describe their functions.

[10 marks]

B) **i**) Explain the reasons why mobile phones are suitable for targeted advertising

[5 marks]

ii) Explain the basic requirements of a privacy-preserving mobile advertising system

[5 marks]

iii) Explain the way the use of a third party can help protect individual's privacy in online advertising

[5 marks]

Question 4

A) What node weak ties play in spreading information in networks?

[5 marks]

B) With the aid of a Figure 2, describe the anatomy of a tweet.

Figure 2

[3 marks]

C) What are the differences between cascades and epidemic spreading?

[6 marks]

D) Name three different epidemic spreading models. Can scale-free networks be immunised by uniform immunization process

[6 marks]

E) Briefly describe the concet of personal data and privacy implications associated with it.

[5 marks]

End of Paper