PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Final Examination: Semester 2   **Academic Year**: 2008

Date: 26 February 2009   **Time**: 09.00-11.00 (2 hours)

Subject Number: 241-500   **Room**: A 201

Subject Title: Research and Development Methodologies

Exam Duration: 2 hours

This paper has 6 pages, 5 questions 20 marks (20%).

Authorised Materials:

- Writing instruments (e.g. pens, pencils).
- Textbooks, a notebook, handouts, and dictionaries are permitted.

Instructions to Students:

- Scan all the questions before answering so that you can manage your time better.
- Write your answers in **English**.
- Write your name and ID on every page.
- Any unreadable parts will be considered wrong.

When drawing diagrams or coding, use good layout, and short comments; marks will not be deducted for minor syntax errors.

Cheating in this examination

Lowest punishment: Failed in this subject and courses dropped for next semester.

Highest punishment: Expelled.

NO	Time (Min)	Marks	Collected	NO	Time (Min)	Marks	Collected
1	10	3		4	60	3	
2	10	2		5	10	10	
3	10	2		Total	120	20	

Question 1 (3 Marks)

a) Why do two calculators give different results after repeating the calculation process?

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b) Why are we not able to forecast the weather in a log run?

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c) Why does chaos happen in mathematics or physics or a system that seems to have fixed patterns?

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Question 2 (2 Marks)

Give reasons why statistic results sometimes are not reliable.

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Question 3

Explain why the Reliability of Series systems is worse than that of Parallel systems. (2 Marks)

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Question 4 (3 Marks)

Explain the followings.

a) What are the differences between proving a hypothesis using one-tailed test and two-tailed test?

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b) What are the differences between F-test and T-Test?

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c)   What information can we get from r_{xy} in Correlation?

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Question 5

From the following sentences, categorize whether they are Motivations or Problem statements, Objectives, and Contributions.   (10 Marks)

a)   Dead reckoning techniques, networking techniques and game-specific optimizations are introduced to improve the response time of the game play.

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b)   Client/server 3D mobile game like First Person Shooter (FPS) action game needs good response time for player interaction.

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c)   Vary the network characteristics at server side to increase latency and decrease reliability seeing how above techniques help maintain good response time.

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d)   Study different kinds of dead reckoning techniques, application-level networking techniques and game specific techniques (e.g. avatar fading) for maintain good response time in the game.

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e) Performance findings for the HLA-based simulation running on a non-dedicated test-bed network.

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f) Our performance measures of the simulation show that RTI is reliable on a non-dedicated network.

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g) This work aims to facilitate the interoperability and reusability for Scilab simulation models.

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h) Although many studies have been conducted, few reports on HLA federation performance in terms of networking and infrastructure have been published due to the complexity involved in real situations. In other words, it is rather difficult to analyze the speed and reliability of HLA federations, especially in public networks.

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i) Our results show that the HLA extension on ns can adequately be used as a tool for studying the HLA RTI framework in simulated network environments.

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j) Integrating HLA with the engineering and scientific software package will enable users to apply simulation techniques to larger and more complex interactive and independent simulation models using networked computers, including virtual environments.

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k)   An HLA module has been developed to enable Scilab to carry out distributed interactive simulations. Basic RTI library services for distributed interactive simulation have been implemented and tested. Scilab federates can participate in distributed interactive simulations using HLA.

l)   The Intensity-based Stereo Matching (ISM) technique can detect objects in with featureless surface but it takes longer time to process and cannot be used in real time.

m)   The results show that parallel computing using Message Passing Interface (MPI) significantly reduces the response time and it is possible to use the ISM technique in real time.

n)   Our solution employs local web service interfaces in a cluster, which Taverna accesses with the aid of Soaplab analysis tools. The cluster enables the modified workflow to rapidly process the large amount of sequenced data required by phylogenetic trees, and is highly reliable.

o)   Taverna version 1.7.0 (and later) has a workflow existence plug-in which can check responsiveness of web service endpoints. However, it cannot detect upgrade changes to web services, which produce empty result lists, even though the endpoints are correct. This problem also impacts the search for processor query fields and output fields which may simply be out-of-date. The more complex the workflow, the more time will be lost in running and debugging the workflow.

----End of Examination----
Pichaya Tandayya, Lecturer

Name_____ID_____