

PRINCE OF SONGKLA UNIVERSITY
FACULTY OF ENGINEERING

Midterm Examination: Semester 1

Academic Year: 2003-2004

Date: 8 October 2003

Time: 9.00-12.00 (3 hours)

Subject Number: 240-572

Room: R300

Subject Title: Introduction to High Level Architecture and Creating Computer Simulation Systems

Exam Duration: 3 hours

This paper has 5 pages and 5 questions. (Total marks: 100 marks, 30 %)

Authorised Materials:

- Writing instruments (e.g. pens, pencils).
- Books and other types of documents.

Instructions to Students:

- Attempt all questions.
- Write your answers in an answer book.
- Start your answer to each question on a new page
- Clearly number your answers.
- Any unreadable parts will be considered wrong.

When drawing diagrams or graphs, use good layout, and short comments.

Question 1

(50 marks; 90 minutes)

Considering a pizza company, in which multiple depots (ร้าน/ศูนย์บริการ) are available, and each customer can set a time window to be served without violating the vehicle capacity constraint and the time window constraint for serving at each customer.

Let $V = \{v_1, v_2, \dots, v_m\}$ be a set of vehicles,
 $C = \{c_1, c_2, \dots, c_n\}$ be a set of customers and
 $D = \{d_1, d_2, \dots, d_k\}$ be a set of depots.

Each customer c_i demands delivery of load dm_i . The demand is met by a vehicle servicing it once per order. Each customer c_i has a time window $[et(i), lt(i)]$ such that a vehicle can visit and serve c_i after the time $et(i)$ and is required completion of the service before $lt(i)$. Each vehicle v_i can load up to the maximum capacity $cap(i)$ and starts and ends at the same depot.

Design a distributed simulation of the above system using HLA. Use diagrams to help in the design explanation. Try to cover the 6 areas of HLA framework as shown below as much as possible.

- federation management
- declaration management
- object management
- ownership management
- time management
- data distribution management

Question 2

(10 marks; 10 minutes)

Explain the following object class structure table (SOM).

Object Class Structure Table					
Customer (PS)					
Bill (PS)					
Order (PS)					
Employee (S)	Greeter (PS)				
	Waiter (PS)				
	Cashier (PS)				
	Dishwasher (PS)				
	Cook (PS)				
Food (S)	Main_Course (PS)				
	Drink (S)	Water (PS)			
		Coffee (PS)			
		Soda (PS)			
	Appetizer (S)	Soup (S)	Clam_Chowder (S)	Manhattan (PS)	
				New_England (PS)	
			Beef_Barley (PS)		
		Nachos (PS)			
	Entrée (S)	Beef (PS)			
		Chicken (PS)			
		Seafood (S)	Fish (PS)		
			Shrimp (PS)		
			Lobster (PS)		
		Pasta (PS)			
	Side_Dish (S)	Corn (PS)			
		Broccoli (PS)			
		Baked_Potato (PS)			
	Dessert (S)	Cake (S)			
		Ice_Cream (S)	Chocolate (PS)		
			Vanilla (PS)		

Question 3

(10 marks; 10 minutes)

Explain the following interaction class structure table (SOM).

Interaction Class Structure Table		
Customer_ Employee_ Transactions (I)	Customer_Seated (IS)	
	Order_Taken (I)	Order_Taken_ From_Kids_Menu (I)
		Order_Taken_ From_Adult_Menu (I)
	Food_Served (I)	Drink_Served (I)
		Appetizer_Served (I)
		Main_Course_Served (I)
		Dessert_Served (I)
	Customer_Pays (I)	Pay_Bill_by_ Credit_Card (I)
		Pay_Bill_by_ Cash (I)
	Customer_Leaves (IS)	

Question 4

(15 marks; 10 minutes)

Explain the lifetime of a HLA federate by drawing one or more diagrams demonstrating related RTI functions and describing the diagrams.

Question 5

(15 marks; 10 minutes)

Explain the temporal (time) state of an HLA federate by drawing one or more graphs demonstrating related HLA temporal keywords.

--- End of Examination ---