

Ollscoil na hÉireann, Gaillimh
National University of Ireland, Galway

GX 1494

Spring Examinations, 2004

Exam Code(s)	3IF1
Exam(s)	3 rd University Examination in Information Technology
Module Code(s)	CT321
Module(s)	Software Engineering II
Paper No.	1
Repeat Paper	No
External Examiner(s)	Prof. P. Nixon
Internal Examiner(s)	Professor G. Lyons Dr. O. Molloy

Instructions: Answer Question 1 (60 marks) and any other 2 questions (20 marks each).

Duration	3hrs
No. of Answer Books	

Requirements:

Handout
MCQ
Statistical Tables
Graph Paper
Log Graph Paper
Other Material

No. of Pages	4
Department(s)	Information Technology

2. (a) Draw the state diagram to represent the heating system described below.

A home heating system is normally either idle or active. After the system is switched on it is automatically in idle mode. The system is activated when the room temperature falls below a certain predefined temperature. When the system is activated it must first fire up the boiler, and then transition to the heating state. The system continues to heat until the desired temperature is reached, when it goes back to the idle state.

- (b) Write notes on the following, using examples to illustrate your answers:

- Guard Conditions
- Event triggers with parameters
- Entry and exit actions

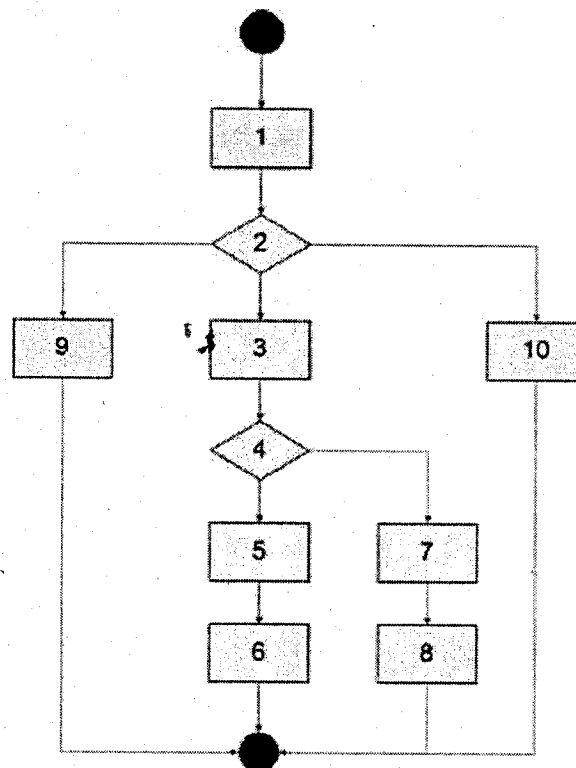
(20)

3. (a) Describe the purpose of Control Structure Testing.

- (b) For the program described by the following flow chart, derive each of the following:

- I. Cyclomatic Complexity
- II. Flow Graph
- III. Set of Basis Test Paths needed to test the program

(20)



4. Draw a UML Activity Diagram based on the system described below. The Activity Diagram should use separate swimlanes to show the activities undertaken by supervisors and mechanics. Use as many of the following constructs as possible in your activity diagram: *start state / stop state, guard expression, branch, concurrent fork, action state, concurrent join, swimlane*.

You are asked design a system to computerise the operations of a vehicle service garage. The garage has a certain number of service bays available, each of which can be occupied by just one vehicle at a time. The employees of the company are the garage supervisor and the mechanics. When a customer brings a vehicle to the garage for servicing or repair, it is booked in, taking the owner's details (name, address, contact, telephone number) and the vehicles details (registration number, make, model). The supervisor is responsible for allocating the vehicle to an available service bay when it is available. Depending on the job type (service or repair), the bay is booked for 1 hour (service) or two hours (repair). Occasionally, an emergency call is received, which requires one of the mechanics to assist in a roadside breakdown situation. In this case the mechanic is not available until he reports back for duty. Servicing or repair cannot proceed until a mechanic is available. When a job is finished, the vehicle is moved to the car park to await collection by the owner. The vehicle is not released to the owner until the bill is paid in full.

(20)