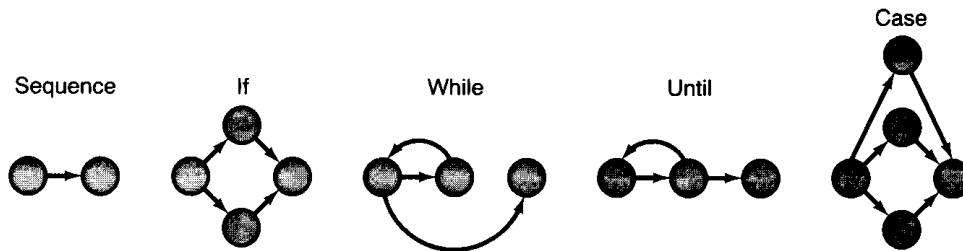


Information System Design (U08182)

Tutorial Exercise 8

1. Describe the testing that is performed within the systems development life cycle stages:
 - A) Validation
 - B) Verification
 - C) Integration
 - D) Module design
 - E) Programming.
2. Using the appropriate symbols draw a directed graph of the program segment that follows:

The structured constructs in flow graph form:



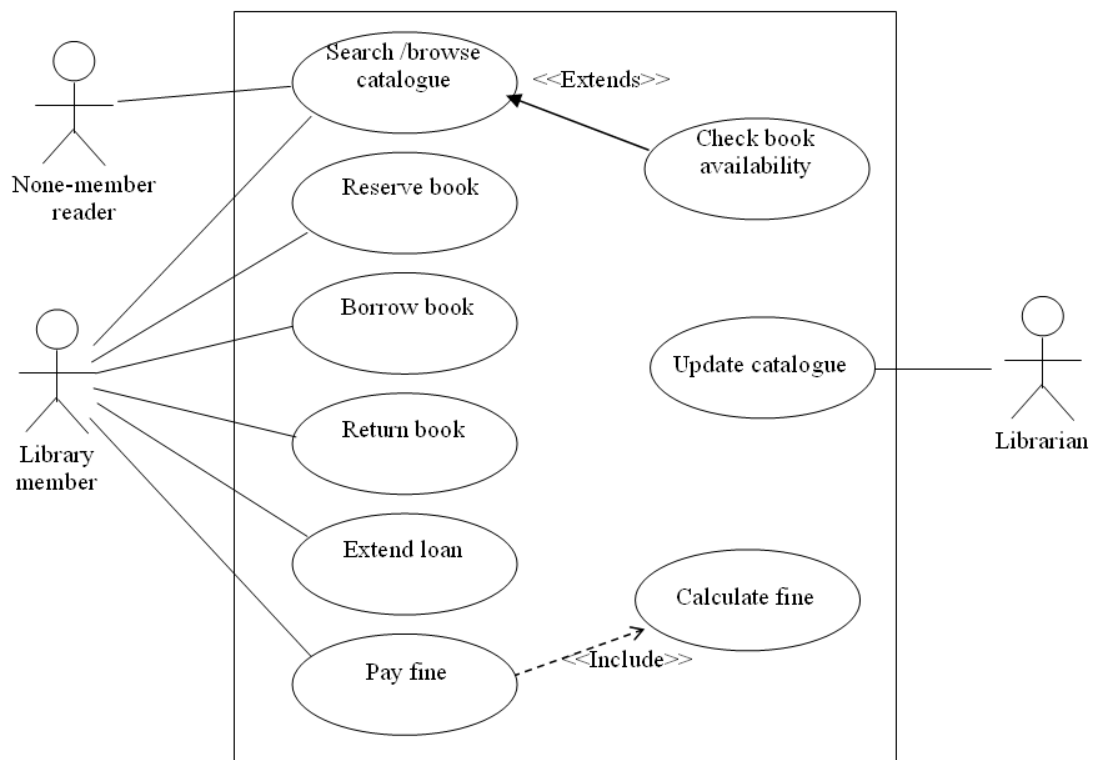
where each circle represents one or more nonbranching PDL or source code statements

```
LOOP: IF P THEN
      GO TO HERE
    ELSE
      BEGIN
        INCREMENT A
        IF Q THEN
          GO TO HERE
        ELSE
          GO TO LOOP
        ENDIF
      END
HERE:  RETURN
      ENDIF
```

Show from the directed graph why this code is not well-structured; rewrite the code, and redraw the directed graph to show how the structure can be improved

3. Write a program using a high-level language of your choice, to input a series of numbers terminated by a sentinel value. Calculate the maximum, minimum and average values of the numbers and display the results. Use this program to answer the following questions
 - A) Draw a directed graph of your program and calculate its cyclomatic complexity.
 - B) Use a trace table to confirm correct operation, including the use of boundary values.

4. Given the following use case diagram, develop a test plan.



5. Consider the following program.

```
Program Myth;  
Begin  
  Var x, y : INTEGER;  
  Input(x);  
  Input(y);  
  x := x * y + 2;  
  y := x * (x - 2);  
  IF x * x - 10 > y  
  THEN x := x - y;  
  ELSE x := x + y  
  END;  
  Output(x);  
End Myth.
```

Let the symbolic input to variable x be α , variable y be 3α . Answer the following questions:

- A) What is the result of a symbolic execution of the program when the TRUE branch in the IF statement is executed?
- B) What is the condition on the value of α such that the TRUE branch in the IF statement can be executed?
- C) What is the result of α symbolic execution of the program when the FALSE branch in the IF statement is executed?
- D) What is the condition on the value of α that the FALSE branch in the IF statement can be executed?
- E) What is the function of the program?

6. The figure illustrates a prototype for a GUI to capture personal information to be used in a survey about employment across the UK:

- A) From the point of view of an inspector, devise a number of questions about the choice and appropriateness, in the context of the application, of the chosen objects for the construction of the GUI. (The author of the GUI has devised the following event/action table as a means of illustrating the dynamic properties of the interface.)

1	Input name.	none	2
2	Select gender.	Validate choice.	3, 7
3	Input date of birth	none	4
4	Input type of work	Validate choice	5, 8
5	Input wage or salary	none	6
6	Select a button	Return to main menu	0
7	Invalid choice	Display error message	0
8	Invalid choice	Display error message	0

- B) As an inspector you need to review the event/action table with the author. Perform a walkthrough of the table, and list all the possible shortcomings that the table presents. If you can identify any additions or alternatives that the author might usefully consider, list these too

- C) Using your findings and conclusions from your experience in the role of an inspector, switch your role back to the author and construct
1. A more meaningful prototype of the GUI for the stated application, and
 2. An accurate and useful event/action table based upon your revised GUI.

Note carefully the reason for each change.