06-18158 Software Testing
Assessed Assignment 1
6 February 2012

Please return your solutions by **12:00 20th February 2012** to the School Reception. For your submission use the standard **Assignment Submission Cover Sheet** available from the student pigeonholes. Prior to the submission ensure that you have read and understand the **Guidance Notes on Plagiarism** at

http://www.cs.bham.ac.uk/internal/students/plag-policy.html

There are two problems to solve.

Problem 1

The `NextDate` program is a part of the BlackBox.exe (executable on a PC) described in the Readme.txt. All the necessary files can be downloaded from

http://www.cs.bham.ac.uk/~exc/Teaching/STesting/Exercise1.zip

1. Read the informal specification (provided below), and on its basis prepare a formal Software Requirements Specification (SRS) according to the IEEE-830-1998 standard (available from http://www.cs.bham.ac.uk/~exc/Teaching/STesting/Web_resources.html); see also a Software Requirements Specification template (which we used in the class in January) at http://www.cs.bham.ac.uk/~exc/Teaching/STesting/Requirements_Spec_template.pdf
2. Decide what testing method, or methods, you are going to use. Provide a written explanation justifying your choice of the testing method(s). Consider using relevant components of Risk Analysis as a part of the decision process. For this purpose you may briefly describe your own made-up scenario describing the use of the `NextDate` program.
3. Prepare the Test Case Specification using the IEEE template as described in the IEEE Standard 829-1998. The Test Case Specification must make explicit use of the Software Requirements Specification prepared in 1 above. For at least one case you must prepare a FULL specification; for the remaining cases you may use an abbreviated (table) format.
4. Using the Test Case Specification prepared above, test the BlackBox.exe and write-up the following Test Deliverables using the IEEE template (IEEE Standard 829-1998):
   - Test Log
   - Test Incident Report
   - Test Summary Report.
5. Answer the following questions
   a. What confidence do you have that your test(s) have uncovered all the errors in the code? On what premises do you base your confidence level?
   b. Speculate what bugs you might have missed with your test(s) and why?
   c. Was the informal specification sufficiently detailed? How much of the common knowledge did you have to use in the preparation of the Software Requirements Specification? Justify your answers.

Informal specification

NextDate is a function of three variables: month, day and year. The output of the program is the month, day, and year of the next day. (Years are limited to those between 1812 and 2012 inclusive). Non-century years are leap years if they are divisible by 4; century years are leap years if they are divisible by 400.

Problem 2

A reputable haulage company specialising in the use of Heavy Goods Vehicles needs to recruit high quality experienced drivers. The company plans to use a computer system to process job applications and to work out the salary for each successful applicant.

Assume that the input data has already been validated and therefore testing should be carried out only for valid Equivalence Classes.

Use the specification below to answer these questions:

1. How many different combinations of input values are possible if we do not consider Equivalence Classes?
2. Determine the inputs for each output.
3. Determine the number of valid Equivalence Classes for each input.
4. Draw the Dependency Islands and simplify them where possible. For each island, determine the number of test cases for:

   a) Path Coverage

   b) Code Coverage
5. Specify (write out) test cases for Path Coverage testing of the output RATE. Use the table with the general headings shown below. Under “INPUTS” and “OUTPUTS” insert as many sub-columns as necessary.
6. What parts of the specification do you think ought to be clarified with the designers / users?

NOTE: **This exercise is designed to be as realistic as possible, so you will find a few ambiguities and problems with the specification. They are not so bad as to prevent you from finding appropriate answers to all the questions above. List all the problems you have encountered and use them in answering the last question.**

Table headings:

Test code	INPUTS	OUTPUTS	Comments

Specification

Inputs

PREV	Business code of the most recent employer (0 - 500)
REFUSED	Previously turned down by our company? (Y/N)
AGE	Driver's age (1 - 80)
TYPE	Vehicle type to be driven: 1 = General Goods Truck 2 = Tanker 3 = Shipping Container Truck 4 = Oversize Trailer
GOODS	The type of goods to be transported: AG = Agricultural products and Food FG = Fuels MG = Machinery GG = General goods
WEIGHT	Weight of the heaviest vehicle previously driven (7.5 - 100) tonnes
EXPER	Years of professional experience (1 - 100)
OFFENCES	Number of driving offences in previous 5 year period (1 – 5)

Outputs

STATUS	ACCEPTED, DECLINED or PROVISIONAL
RATE	For the STATUS "ACCEPTED", RATE is the monthly salary in the format £9999.99
PREM	For the STATUS "ACCEPTED", PREM is the additional premium (a percentage)

Note: If STATUS is "DECLINED" or "PROVISIONAL", the RATE and PREM are not applicable and should be set to £0.00

Procedure

STATUS is "ACCEPTED" with the following exceptions:

1. If PREV is (S917, V11, L38 or L222), STATUS is "DECLINED", since these employers are blacklisted.

2. If PREV is not (S917, V11, L38 or L222), and if REFUSED=Y, then STATUS="PROVISIONAL".

RATE is determined by using the TYPE and GOODS parameters to index into the Rate Table to retrieve RATE.

The premium PREM is calculated by a formula using the Age Class (AC).

The Age Class is determined as follows:

AGE	**AC**
10 - 20	1
21 - 30	2
31 - 40	5
41 - 50	4
51 - 60	3
61 - 70	2
71 - 80	1

PREM is then computed as:

PREM = (AC - 1) * 1.286 * (EXPER - OFFENCES)