RMIT UNIVERSITY

COLLEGE OF VE, FUTURE TECHNOLOGIES

Course Code and Name: C2511C: Introduction to Programming

Semester 1, 2025 - Lab: 01

ALGORITHMS & FLOWCHARTS

Task 1

Write algorithms for the scenarios given below. *Algorithm only no coding!* Write in either pseudocode, a Visio flowchart, or using the attached algorithm template.

When analysing the scenarios consider:

- What do you need as inputs?
- How are these obtained and how stored?
- What are the processes – step by step?
- What are the outputs how are these displayed/printed to the user?
- Have you forgotten anything?
- Is it all in order?

Task 1 Scenarios

Scenarios Focusing on Sequence

1. Using a calculator to add four numbers. Ask for and store the four numbers as well as display a running total. Print the final total.
2. Ask five students for their names and their ages. Print out the names and ages in ascending name order.
3. Describe all the steps involved from waking up in the morning to walking out the door – hopefully fed, washed, and dressed!
4. Describe all the steps in ordering a pizza. Choose pizza type, crust type, size, quantity, extras like garlic bread and coke.
5. List all the steps in depositing and withdrawing money from an ATM. Assume enough money. Initial balance, running totals and final balance to be displayed. Account type and PIN to be requested and stored.
6. List all steps in booking a flight from a website such as flight centre.

Scenarios Focusing on Selection: (Sample on next page)

7. Describe the process of booking a movie ticket. The user must be asked for their name, mobile number and age. The user will be asked to provide a movie name and time. If the user is under 18, the movie ticket price is halved ($10). If the user is between 18 and 65, the movie ticket is normal ($20), if the user is over 65, the movie ticket is three quarters of the normal price ($15).

Scenarios Focusing on Repetition:

8. There are 12 prizes to give out to children, As each child arrives, find out their name and say “Congratulations <name>, you have won prize <price number>. Where prize number is from the initial 1st prize to 12the prize. You will need to keep track of which prize you are up to. After the 12th prize is given out, say “Sorry! There are no more prizes left!

Sample

List the steps a patient would follow to see a doctor until he leaves a medical centre. Flow chart solution is given.

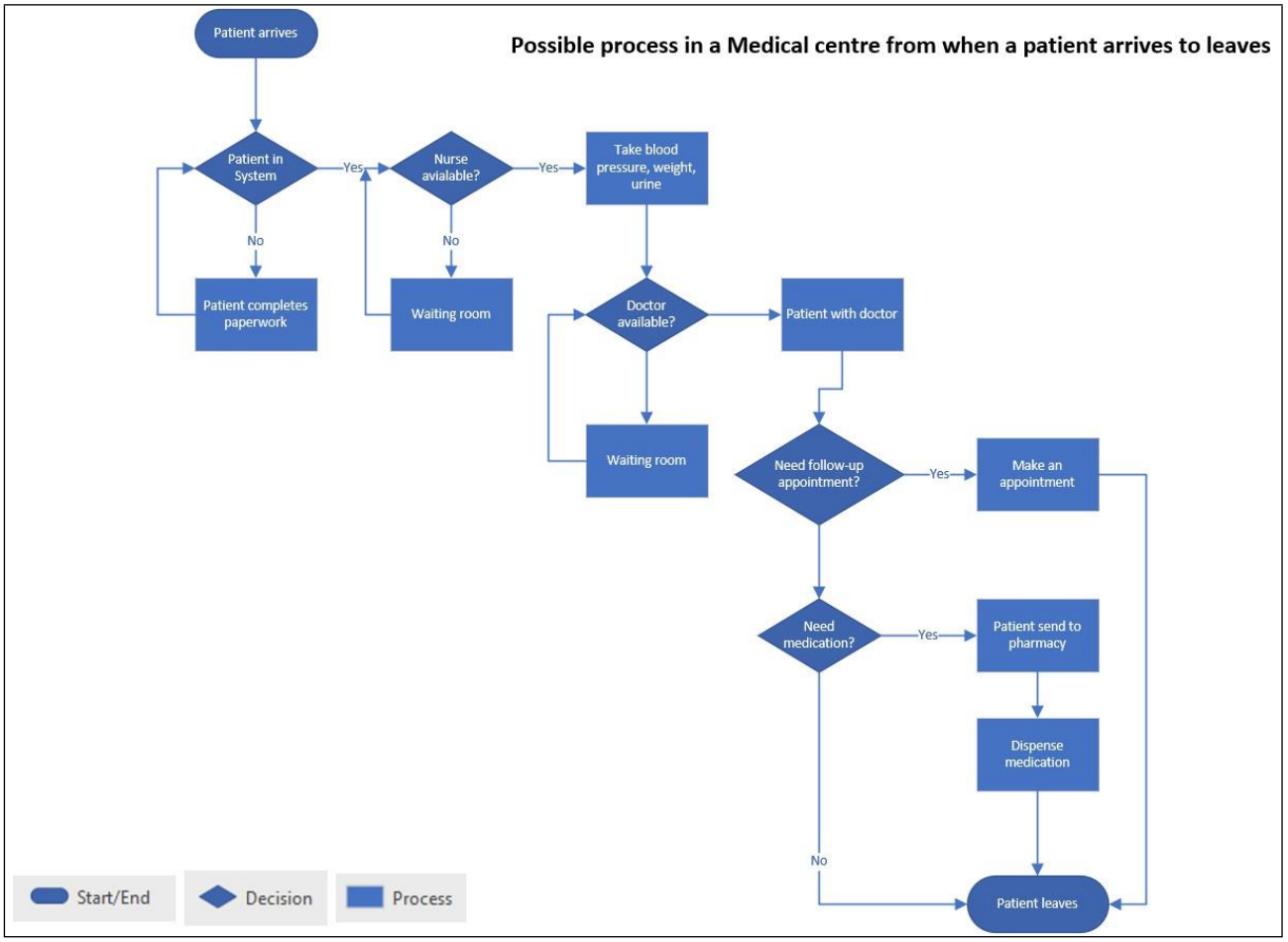
Scenario

When the patient enters the medical centre, he is checked to see if their details are in the centre's system. If they are not, details are requested before they can see a nurse. The nurse takes the patients blood pressure, weight etc before they can see the doctor. After consulting and checking with the doctor the patient could make another appointment with the doctor or get medication from the pharmacy and then leave.

Possible algorithmic solution:

1. Patient enters the clinic
2. IF patient is in system THEN
3. IF nurse is avilable THEN
   Nurse takes blood pressure, take weight etc THEN
4. IF Doctor is avilable THEN
   Patient sees Doctor
5. IF patient needs follow-up THEN
   Patient makes an appointment and LEAVES
   ELSE If patient needs medication THEN
   Patient send to pharmacy to get medication and then LEAVES
   ELSE wait in room until Doctor is available
   ELSE wait in room until nurse is available
   ELSE wait in room until paper work is completed

Flow- Chart:



Task 2 – Software – Download and Install

You need software (IDE's) to run your java programs.

Please download the **Task 2 - Setup Java and Install an IDE** file from Canvas to get everything ready to commence coding!

Task 3 – Exercise 1.11 from book "Think Java"

Exercise 3.1 Computer scientists have the annoying habit of using common English words to mean something other than their common English meanings. For example, in English, statements and comments are the same thing, but in programs they are different.

1. In computer jargon, what's the difference between a statement and a comment?
2. What does it mean to say that a program is portable?
3. In common English, what does the word compile mean?
4. What is an executable? Why is that word used as a noun?

The vocabulary section at the end of each chapter is intended to highlight words and phrases that have special meanings in computer science. When you see familiar words, don't assume that you know what they mean!

Exercise 3.2 Before you do anything else, find out how to compile and run a Java program. Some environments provide sample programs similar to the example in Section 3.3.

1. Type in the Hello World program; then compile and run it.
2. Add a print statement that displays a second message after the Hello, World! Say something witty like, How are you? Compile and run the program again.
3. Add a comment to the program (anywhere), recompile, and run it again. The new comment should not affect the result.

This exercise may seem trivial, but it is the starting place for many of the programs we will work with. To debug with confidence, you will need to have confidence in your programming environment.

In some environments, it is easy to lose track of which program is executing. You might find yourself trying to debug one program while you are accidentally running another. Adding (and changing) print statements is a simple way to be sure that the program you are looking at is the program you are running.

Exercise 3.3 It is a good idea to commit as many errors as you can think of, so that you see what error messages the compiler produces. Sometimes the compiler tells you exactly what is wrong, and all you have to do is fix it. But sometimes the error messages are misleading. Over time you will develop a sense for when you can trust the compiler and when you have to figure things out yourself.

Starting with the Hello World program, try out each of the following errors. After you make each change, compile the program, read the error message (if there is one), and then fix the error.

1. Remove one of the opening curly braces.
2. Remove one of the closing curly braces.
3. Instead of `main`, write `mian`.
4. Remove the word `static`.
5. Remove the word `public`.
6. Remove the word `System`.
7. Replace `println` with `Println`.
8. Replace `println` with `print`.
9. Delete one parenthesis.
10. Add an extra parenthesis.

Task 4 – Complete Online Reflection Quiz

Complete the multi-choice online reflection quiz on canvas. This quiz can be taken as many times as you like and should be used to assist you with your studies. This quiz will mark itself.

This quiz is not part of your overall grade for the subject.