1001ICT Introduction To Programming 2015-2
Laboratory 6

School of Information and Communication Technology
Griffith University
August 29, 2015

When
Teaching week 7

Goals
In this laboratory you will write programs with loops and/or selections.

Marks
4

Robots
Cyclops-NXT

Props
Bollard

Tracks
Gradient Track

1 Preparation

Before your lab class:

- Print these lab notes. You need to refer to them a lot before the lab class and during it.
- Read section 16 of the lecture notes.
- You can start work before your lab class. If you can’t write the complete programs, you could at least create the program files, with header comments and imports.

2 Pre-laboratory questions (0.5 marks)

Answer the following questions in the space provided, before your laboratory class.

1. Describe, in your own words, the difference between an indefinite loop and a definite loop.

2. Which Java structured statement is a:

   (a) definite loop? _______________
   (b) pre-tested indefinite loop? _______________
   (c) post-tested indefinite loop? _______________
   (d) selection? _______________
3. Novice programmers often use the verbal expression “if loop”. What is wrong with that?

3 Activities

All programs must:

- have header comments showing the name of the file, the author’s name, and the purpose of the program;
- use constants for motor and sensor ports; and
- be neatly indented.

3.1 MaSH console program 1 (1 mark)

- Write a program that reads a number and prints a square pattern of hash characters (#), each edge consisting of that many hashes. Example:

```
$ java Square
Enter the size: 10
##########
##########
##########
##########
##########
##########
##########
##########
##########
##########

$ 
```

- (MaSH Online Judge problem-id: 0022-square)

3.2 MaSH console program 2 (1 mark)

- In lectures we developed a program to read a sequence of non-negative numbers (with a negative number to end input) and then print the greatest input number. Write a new version that prints the least non-negative number.

- (MaSH Online Judge problem-id: 0023-least)

- See the problem specification on the MaSH Online Judge for the exact format required for inputs and outputs.

3.3 MaSH nxt program 1 (1.5 marks)

- Write a program that drives the robot forward over the Gradient track until it is stopped by running into an obstacle. It should then move backwards and stop with the light sensor poised over the darkest band that the robot crossed on the forwards trip.

- Hints:
  - You can’t use the waitForPush method, as the robot needs to be observing light levels on the forwards trip.
  - This problem has some similarity to the previous one.
3.4 MaSH console program 3 (no marks, just kudos)

- Write a program that reads a number and prints a triangle pattern of hash characters (#), each edge consisting of that many hashes. Example:

```java
$ java Triangle
Enter the size: 8
#
 # 
 # # 
 # # # 
 # # # # 
 # # # # # 
 # # # # # # 
 # # # # # # # 
 # # # # # # # # 
#
```

- (MaSH Online Judge problem-id: 0024-triangle)

3.5 MaSH console program 4 (no marks, just kudos)

- Write a program that prints a pattern like this.

```
#
###
####
#####
######
#######
########
#########
#########
#########
#########
#########
#########
#########
#####
####
###
#
```

- Hint: He who is without sin will find this difficult.

4 After the Laboratory

- Organise the work you have done into folders on your network drive.

- Please answer these feedback questions.
  - What was the most difficult aspect of this laboratory?
  - Did you find an error in these lab notes?