

# 1001ICT Introduction To Programming 1 2013-2

## Laboratory 6

School of Information and Communication Technology  
Griffith University

August 28, 2013

<i>When</i>	Teaching week 7
<i>Goals</i>	In this laboratory you will write programs with loops and/or selections.
<i>Marks</i>	4
<i>Robots</i>	Cyclops-NXT
<i>Props</i>	Bollard
<i>Tracks</i>	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.
- Browse the `console` and `nxt` environment documentation available at <http://www.ict.griffith.edu.au/arock/itp/students/mash/>.
- 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
#####
#####
#####
#####
#####
#####
#####
#####
#####
#####
$
```

#### 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.

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

### 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

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