Notes on Intelligent Robotics Assignment 1
Using Java with the MATE desktop under Centos Linux

These notes are intended to give you sufficient information to Edit, Print, Compile and Execute the Java program, `robot.java`, using the command line interface of Centos Linux with the **MATE** desktop.

Once you have logged in you will find a menu bar running across the top of your screen from which you can gain access to many utilities. When you are ready to logout select **System** from the menu bar and then **Log Out** from the menu which appears.

In order to use the Centos Linux command line interface you will need to open a Terminal Window on the Desktop. To open a Terminal Window, from the menu bar running across the top of your screen, select either the screen icon –

>_

or select **Applications** then **System Tools** and then **MATE Terminal**. A window into which you can type linux commands will appear on your screen.

To view the files in your home directory type **`ls`** into the terminal window. You should now download the following file into your file space from the Assessments section of Vision

```
robot.java
```

You would be well-advised to make a copy of the `robot.java` program before you start to edit it. You can do this with the copy command –

```
cp robot.java <your_chosen_backup_filename>
```

Java programs require the main class of a program to have the same name as the java file so make sure that you work with the `robot.java` file from this point on rather than any backup file which will inevitably have a different name. If you need to restore the backup at some stage you can delete the `robot.java` program with the command –

```
rm robot.java
```

and then copy your backup to a new `robot.java` file with –

```
cp <your_chosen_backup_filename> robot.java
```

To edit the `robot.java` program go to the menu bar running across the top of the screen and select **Applications** and then Programming to select you preferred development environment or **Accessories** to choose your preferred **Editor**.

I have annotated the program with various comments to help you identify key sections. My comments are identified as “Note from Nick Taylor”. The most important such annotation indicates that the method ***`calcThetas()`*** is where you are expected to enter your control equations to calculate the four theta angles from the *x*, *y* and *z* co-ordinates and orientation angle, *alpha*, supplied by the user.

To compile your program from the command line use the command –

```
javac robot.java
```

This will create a file in your home directory called `robot.class` and this is the file which you should execute to run the program. You can run it with the command –

```
java robot
```

To print a file named `<filename>` you can use the command -

```
lpr <filename>
```

Don’t try to print non-ASCII files, such as `.class` files, and please don’t waste paper printing the whole `robot.java` program. Use copy and paste to create a file which contains the section of the program which you have written and then print that out.

The code which you are required to write should only differ from C++ (or, indeed, C) in the names given to the mathematical functions. The Java definitions of some mathematical functions which you may require are –

```
Math.cos(x)         Returns the cosine of x radians
Math.sin(x)         Returns the sine of x radians
Math.atan2(x,y)     Returns the arctangent of x/y
Math.sqrt(x)        Returns the square root of x
```

Note that the parameters and results of these functions are all of type `double`.
Doubles can be converted to floats in the same way as in C and C++

```
myFloatVariable = (float) myDoubleVariableOrValue;
```

The program also defines a function to square a `float` passed as its parameter –

```
sqr(x)
```

If you wish to work with this program on a computer other than those in the MACS Linux Lab then you will need to ensure that the following Java 3D libraries are available and searched –

```
j3dcore.jar
j3dutils.jar
vecmath.jar
```