

MODULE 7 - SHEET 1

```
public class CharIntro
{ public static void main(String[] args)           // Equivalent assignments:
    { char d = 'A';                                //
      System.out.println(d);                       //    d = 'A';
      System.out.println(d + d);                   //    d = '\u0041';
      System.out.println("d is " + d);             //    d = '\101'
      System.out.println("" + d + d);             //    d = 65;
      System.out.println("d is " + (int)d);
      char e = 'a';
      if (d<e)
        System.out.println(d + " comes before " + e);
    }
}
```

```
// This yields:
//
// A
// 130
// d is A
// AA
// d is 65
// A comes before a
```

```
// This program is due to Dr A.C. Norman
```

```
import java.applet.Applet;
import java.awt.Graphics;
```

```
public class Turtle extends Applet
{ private static final double SIZE = 5d;          // Try changing
  private static final double INC = 11d;          // these three
  private static final int N = 5000;              // values.

  public void paint(Graphics g)
  { double x = 200d, y = 300d, th1 = 0d, th2 = 0d, th3 = 0d;
```

```

    for (int i=0; i<N; i++)
    { th3 = th3 + INC;
      th2 = th2 + th3;
      th1 = th1 + th2;
      double x1 = x + SIZE*Math.cos(Math.PI*th1/180d);
      double y1 = y + SIZE*Math.sin(Math.PI*th1/180d);

      g.drawLine((int)x, (int)y, (int)x1, (int)y1);

      x = x1;
      y = y1;
    }
  }
}

// It would be safer to normalise each angle after each increment
// by including statements such as:
//
//      if (th3 >= 180d)
//          th3 = th3 - 360d;

```

Key this source into the file Turtle.html

```

<HTML>
  <BODY>
    <APPLET code="Turtle.class" width=400 height=400>
      Java is not available.
    </APPLET>
  </BODY>
</HTML>

```

Give the following command:

```
$ appletviewer Turtle.html &
```

The result is a sequence of straight-line segments which form a remarkably symmetrical figure given that there is no apparent attempt in the program to produce a result which has such symmetry,

MODULE 7 - SHEET 2

```
public class EightQueens
{ private static int count=0;

    public static void main(String[] args)
    { tryit(0,0,0);
      System.out.println("There are " + count + " solutions");
    }

    private static void tryit(int left, int above, int right)
    { if (above==0xFF)
      { count++;
      }
      else
      { int poss = ~(left | above | right) & 0xFF;
        while (poss != 0)
        { int place = poss & (-poss);
          tryit((left|place)<<1, above|place, (right|place)>>1);
          poss = poss & (~place);
        }
      }
      return;
    }
}
```