BASIC SYNTAX ASSIGNMENT

Marks: 20
Due:
Complete all programs and upload them to Edsby by the end of the day on the due date.

1. Get a string from the user and output a "Hollow Square" using the string. For example, given the string "four" your program would print:

```
fourf
r   o
u   u
o   r
fruof
```

Save as BasicAssign1.java (3 marks)

2. Run-length encoding (RLE) is one method that is used to compress images. If you consider a line of black and white pixels you cold represent it using a String. RLE replaces repeated pixels with a number then the type. e.g.
"BBBBWWWWWWWBBBBBBBBBB" → "4B7W10B"
Write a program that takes a string of Bs and Ws and outputs the RLE version.
Save as BasicAssign2.java (4 marks)

3. Write a program that allows the user to enter the co-ordinates of a point (x,y) and a line (x1, y1, x2, y2) and tells them is the point is on the line or not. You do not need to look up some complicated formula, instead look in the Java API. You will want to look at Line2D. (note: contains does not work because Lines have no area)
Save as BasicAssign3.java (3 marks)

4. I've been told that in the average class of 30 students that the odds of two students having the exact same birthday is better than average. Write a program that experimentally determines the average size group that has two people with the same birthday. For the sake of this experiment you may assume that there are no leap years. Conduct the experiment generating birthdays until you generate a repeat. Repeat this process 10000 times and output the average number of dates you generated for all the groups. Save as BasicAssign4.java (5 marks)

5. A common feature in product codes is to have an internal validation to ensure there is no mistake in the code. Write a program that reads in a product code and outputs whether it is valid or not based on some simple rules. You may not assume anything about the input, you simply output "valid" if it is valid, or "invalid" if it is not valid.

   The rules:
   1st part can contain only capital letters and 6 digits. 2nd part is all digits and = the product of the first 6 digits taken in groups of two from the left. The 2 parts are separated by a single space.

   eg: AX6BYU56UX6CV6BNT7NM 287430
   is valid because 65*66*67 = 287430.

   Save as BasicAssign5.java (5 marks)