CIS 260 – Introduction to Programming
Spring 2017
Instructor: Dr. Nigamanth Sridhar

Programming Assignment 1
Due at 11.59pm on Tuesday, Feb 21, 2017
Please submit your answers on Blackboard

The Problem
For this assignment, you will write a program with three parts, each of which you will solve using loops.

Part 1: Double or nothing
You are currently `totalDebt` dollars in debt to your bookie, but currently have only `inHand` dollars in your hand. Write code to calculate the minimum number of times you would have to go double-or-nothing at the roulette table to pay your debt. Your program should take two numbers as input `totalDebt` and `inHand`. `totalDebt` and `inHand` are floating-point numbers representing the amounts in dollars and cents (e.g. 2345.32). Assume you go "all-in" on every bet, you win every bet, and the casino allows bets of any value. Assume `totalDebt > 0` and `inHand > 0`. Here some example runs:

```
Part 1: Double or nothing
How much is your total debt?
1000
How much do you have on hand now?
100
After 1 bet(s), total in hand is 200.0
After 2 bet(s), total in hand is 400.0
After 3 bet(s), total in hand is 800.0
After 4 bet(s), total in hand is 1600.0
Total number of bets: 4
Total amount in hand: 1600.0

Part 1: Double or nothing
How much is your total debt?
122345.5
How much do you have on hand now?
345.6
After 1 bet(s), total in hand is 691.2
After 2 bet(s), total in hand is 1382.4
After 3 bet(s), total in hand is 2764.8
```

```
After 4 bet(s), total in hand is 5529.6
After 5 bet(s), total in hand is 11059.2
After 6 bet(s), total in hand is 22118.4
After 7 bet(s), total in hand is 44236.8
After 8 bet(s), total in hand is 88473.6
After 9 bet(s), total in hand is 176947.2
Total number of bets: 9
Total amount in hand: 176947.2

Part 1: Double or nothing
How much is your total debt?
.99
How much do you have on hand now?
.25
After 1 bet(s), total in hand is 0.5
After 2 bet(s), total in hand is 1.0
Total number of bets: 2
Total amount in hand: 1.0

Part 1: Double or nothing
How much is your total debt?
100
How much do you have on hand now?
1000
Total number of bets: 0
Total amount in hand: 1000.0
```

Do I really need to worry about strange cases like the last three? Yes. While these cases may seem silly in our imaginary problem, you should always pay attention to such things when developing software. Failure to handle such tricky cases can result in all sorts of bugs such as your program crashing or going into an infinite loop. You might find this entertaining/terrifying: History's Worst Software Bugs.

Do I need to use `Math.random()` or anything? No. You can assume you win every bet placed so there is no randomness in this program.

My program crashes if one or both of the inputs isn't a number. Is that okay? Yes. We'll eventually learn how to handle such cases, but not for awhile.

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Part 2: Pattern

Take two integers N and M as input. You program should print an N by M "checkerboard" pattern of asterisks and periods. Each row should have 2N characters (alternating between asterisks and periods). There should be M rows of output. The first row should start with an asterisk, the second row should start with a period, and so on. If either N or M is an integer less than or equal to zero, nothing should be output. Here some example runs:

```
Part 2: Pattern
Enter the value for N
4
Enter the value for M
4
*.*.*.*.
.*.*.*.*
*.*.*.*.
.*.*.*.*
```

```
Part 2: Pattern
Enter the value for N
5
Enter the value for M
2
*.*.*.*.*.
.*.*.*.*.*
```

```
Part 2: Pattern
Enter the value for N
2
Enter the value for M
5
*.*.
.*.*
*.*.
.*.*
*.*.
```

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```
Part 2: Pattern
Enter the value for N
8
Enter the value for M
4
*.*.*.*.*.*.*.*.
.*.*.*.*.*.*.*.*
*.*.*.*.*.*.*.*.
.*.*.*.*.*.*.*.*
```

Part 3: Baby simulator
A couple beginning a family decides to keep having children until they have at least one of each sex.

Write code that simulates repeatedly having a child until there is at least one of each sex. Output how many children it took to achieve this goal. Assume there is an equal probability of having either a boy or a girl. Use a `while` loop to compute the number of children the couple has until getting at least one of each gender. For example:

```
Part 3: Baby Simulator
Congratulations! You have 1 boy(s) and 1 girl(s).

Part 3: Baby Simulator
Congratulations! You have 1 boy(s) and 3 girl(s).

Part 3: Baby Simulator
Congratulations! You have 1 boy(s) and 2 girl(s).

Part 3: Baby Simulator
Congratulations! You have 5 boy(s) and 1 girl(s).

Part 3: Baby Simulator
Congratulations! You have 2 boy(s) and 1 girl(s).
```

Submission Instructions

- You will write code for all three parts in a single Java file. Please name the class `Assignment1_LastName`.
- Please document your code with comments. Please explain each major action you are performing in your program.
- Please make your code *readable*. Please use the pointers I've given you in class. For example,

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CIS 260 – Spring 2017 – Nigamanth Sridhar

- o do not use single letter variable names, instead, name the variables meaningfully
  - o use braces and parentheses liberally
  - o use proper indentation
- Submit the java program on Blackboard.

Grading
- The program must compile for you to get a non-zero grade.
- The readability of your code is an important contributor to your final grade.
- Please DO NOT CHEAT! I want to see YOUR WORK, not your Google search skills. I take cheating very seriously, and will deal with cheating harshly. Do not risk it!
- This assignment is worth 5% of your final grade.