# EEL3834 - Programming for Electrical Engineers
# Fall 2016
# Programming Assignment 3
# Assigned: 9/16/2016 Due:9/23/2016 @ 4:00PM
# To be done individually

**Programming Project 11* (Note the difference between the book assignment and the actual assignment below)** from Chapter 3 of Absolute C++ 5th ed. (Savitch), pg. 141:

The game of Pig is a simple two player dice game in which the first player to reach 100 or more points wins. Players take turns. On each turn a player rolls a six-sided die:
• If the player rolls a 2–6 then he or she can either
— ROLL AGAIN or
— HOLD.
At this point the sum of all rolls made this turn is added to the player's total score and it becomes the other player's turn.
• If the player rolls a 1 then the player loses his or her turn. The player gets no new points and it becomes the opponent's turn.
If a player reaches 100 or more points after holding then the player wins.
Write a program that plays the game of Pig, where one player is a human and the other is the computer. Allow the human to input "r" to roll again or "h" to hold.

The computer program should play according to the following rule: **Generate a random number before deciding whether to hold or roll again. If the generated number is odd, the computer rolls again. If it is even, the computer holds**. **Note that this generated number is NOT the same as the previous dice roll.** Of course, if the computer wins or rolls a 1 then the turn ends immediately. Allow the human to roll first.

Write your program using at least two functions:
```
int humanTurn( int humanTotalScore);
int computerTurn( int computerTotalScore);
```

These functions should perform the necessary logic to handle a single turn for either the computer or the human. The input parameter is the total score for the human or computer. The functions should return the turn total to be added to the total score upon completion of the turn. For example, if the human rolls a 3 and 6 and then holds, then humanTurn should return 9. However, if the human rolls a 3 and 6 and then a 1, then the function should return 0.

After every dice roll, the user should be prompted for what to do next. If it's the computer's turn, the user should be prompted to enter 'c' to continue if the computer holds or if the computer rolls a 1 (basically, at the end of the computer's turn). If it's the human's turn, the user should be prompted for 'c' to continue if their turn has ended due to rolling a 1, or for 'r' or 'h' to determine whether the human wants to roll again or hold. See the sample output on the following pages. Obviously your output will not be the same due to (pseudo)randomness, but I should be able to play the entire game and it should follow all the rules described above.

Your grade will be subject to the following condition(s):

- Submission:
  The submission deadline is **4:00PM** on **9/23/16**. You will be penalized in increments of 25% per day late (regardless of the time). A submission at 4:01PM on 9/23/16 will result in a 25% penalty, as will a submission at 4:00PM on 9/24/16. A submission at 4:01PM on 9/24/16 will result in a 50% penalty, and so on. We will go by the timestamp on Canvas, so be sure to submit early.

  Submit your code on Canvas. You just need to **upload** your .cpp file, not copy and paste your code. In addition, you will need to write in the text entry box which version of g++ you used. This can be found from the terminal by typing: **`g++ -v`**.
  Also, PLEASE check your submission to make sure the file has actually been uploaded.

Your grade will be calculated based on the following (total 10 points)

- Compilation: **3 pts**
  Your code MUST compile in a Linux environment. Since that is the environment in which it will be graded. There is no partial credit available here, either your code compiles or it doesn't.

- Execution: **4 pts**
  Your program will be played to completion. If it follows the rules and input output format you will get full credit. If there are bugs you will lose points depending on the severity of the impact on the game.

- Style: **3 pts**
  Your code will also be graded on its style. This includes things like using meaningful variable names, useful comments, proper indentation and spacing, and the use of functions. All of these things make your code easy to read and maintain. Partial credit will be available here. As a minimum, your code should have a comment at the beginning with your name, date, and a high level but still descriptive overview of what the program does.

Sample Output:

```
abrarmp@ubuntu:~/EEL3834/3$ ./pig
It's your turn!  Enter 'r' to roll.
r
You rolled 4
Your score this round is: 4
If you hold, your total score would be: 4
Press 'h' to hold or 'r' to roll again. r
You rolled 3
Your score this round is: 7
If you hold, your total score would be: 7
Press 'h' to hold or 'r' to roll again. r
You rolled 6
Your score this round is: 13
If you hold, your total score would be: 13
Press 'h' to hold or 'r' to roll again.
h
It's the computer's turn!
The computer rolled 6
The computer's score this round is: 6
If the computer holds, its total score would be: 6
The computer rolled 5
The computer's score this round is: 11
If the computer holds, its total score would be: 11
The computer rolled 1
The computer loses its turn.   Enter 'c' to continue.
c
It's your turn!  Enter 'r' to roll.
r
You rolled 4
Your score this round is: 4
If you hold, your total score would be: 17
Press 'h' to hold or 'r' to roll again.
r
You rolled 6
Your score this round is: 10
If you hold, your total score would be: 23
Press 'h' to hold or 'r' to roll again.
r
You rolled 6
Your score this round is: 16
If you hold, your total score would be: 29
Press 'h' to hold or 'r' to roll again.
r
You rolled 6
Your score this round is: 22
If you hold, your total score would be: 35
```

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Press 'h' to hold or 'r' to roll again.
r
You rolled 5
Your score this round is: 27
If you hold, your total score would be: 40
Press 'h' to hold or 'r' to roll again.
h
It's the computer's turn!
The computer rolled 6
The computer's score this round is: 6
If the computer holds, its total score would be: 6
The computer rolled 6
The computer's score this round is: 12
If the computer holds, its total score would be: 12
The computer rolled 6
The computer's score this round is: 18
If the computer holds, its total score would be: 18
The computer rolled 1
The computer loses its turn.   Enter 'c' to continue.
c
It's your turn!  Enter 'r' to roll.
r
You rolled 4
Your score this round is: 4
If you hold, your total score would be: 44
Press 'h' to hold or 'r' to roll again.
r
You rolled 4
Your score this round is: 8
If you hold, your total score would be: 48
Press 'h' to hold or 'r' to roll again.
r
You rolled 5
Your score this round is: 13
If you hold, your total score would be: 53
Press 'h' to hold or 'r' to roll again.
r
You rolled 1
You lose your turn.   Enter 'c' to continue.
c
It's the computer's turn!
The computer rolled 6
The computer's score this round is: 6
If the computer holds, its total score would be: 6
The computer rolled 3
The computer's score this round is: 9
If the computer holds, its total score would be: 9
The computer rolled 2
The computer's score this round is: 11
If the computer holds, its total score would be: 11
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```
The computer rolled 4
The computer's score this round is: 15
If the computer holds, its total score would be: 15
The computer rolled 5
The computer's score this round is: 20
If the computer holds, its total score would be: 20
The computer holds.   Enter 'c' to continue.
c
It's your turn!  Enter 'r' to roll.
r
You rolled 4
Your score this round is: 4
If you hold, your total score would be: 44
Press 'h' to hold or 'r' to roll again.
r
You rolled 2
Your score this round is: 6
If you hold, your total score would be: 46
Press 'h' to hold or 'r' to roll again.
r
You rolled 4
Your score this round is: 10
If you hold, your total score would be: 50
Press 'h' to hold or 'r' to roll again.
r
You rolled 5
Your score this round is: 15
If you hold, your total score would be: 55
Press 'h' to hold or 'r' to roll again.
h
It's the computer's turn!
The computer rolled 6
The computer's score this round is: 6
If the computer holds, its total score would be: 26
The computer rolled 1
The computer loses its turn.   Enter 'c' to continue.
c
It's your turn!  Enter 'r' to roll.
r
You rolled 3
Your score this round is: 3
If you hold, your total score would be: 58
Press 'h' to hold or 'r' to roll again.
r
You rolled 3
Your score this round is: 6
If you hold, your total score would be: 61
Press 'h' to hold or 'r' to roll again.
r
You rolled 3
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Your score this round is: 9
If you hold, your total score would be: 64
Press 'h' to hold or 'r' to roll again.
r
You rolled 1
You lose your turn.   Enter 'c' to continue.
c
It's the computer's turn!
The computer rolled 2
The computer's score this round is: 2
If the computer holds, its total score would be: 22
The computer rolled 1
The computer loses its turn.   Enter 'c' to continue.
c
It's your turn!  Enter 'r' to roll.
r
You rolled 1
You lose your turn.   Enter 'c' to continue.
c
It's the computer's turn!
The computer rolled 5
The computer's score this round is: 5
If the computer holds, its total score would be: 25
The computer rolled 4
The computer's score this round is: 9
If the computer holds, its total score would be: 29
The computer rolled 1
The computer loses its turn.   Enter 'c' to continue.
c
It's your turn!  Enter 'r' to roll.
r
You rolled 5
Your score this round is: 5
If you hold, your total score would be: 60
Press 'h' to hold or 'r' to roll again.
r
You rolled 1
You lose your turn.   Enter 'c' to continue.
c
It's the computer's turn!
The computer rolled 4
The computer's score this round is: 4
If the computer holds, its total score would be: 24
The computer rolled 2
The computer's score this round is: 6
If the computer holds, its total score would be: 26
The computer rolled 4
The computer's score this round is: 10
If the computer holds, its total score would be: 30
The computer rolled 4
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```
The computer's score this round is: 14
If the computer holds, its total score would be: 34
The computer rolled 3
The computer's score this round is: 17
If the computer holds, its total score would be: 37
The computer rolled 5
The computer's score this round is: 22
If the computer holds, its total score would be: 42
The computer holds.   Enter 'c' to continue.
c
It's your turn!  Enter 'r' to roll.
r
You rolled 2
Your score this round is: 2
If you hold, your total score would be: 57
Press 'h' to hold or 'r' to roll again.
r
You rolled 3
Your score this round is: 5
If you hold, your total score would be: 60
Press 'h' to hold or 'r' to roll again.
r
You rolled 4
Your score this round is: 9
If you hold, your total score would be: 64
Press 'h' to hold or 'r' to roll again.
h
It's the computer's turn!
The computer rolled 2
The computer's score this round is: 2
If the computer holds, its total score would be: 44
The computer rolled 3
The computer's score this round is: 5
If the computer holds, its total score would be: 47
The computer rolled 2
The computer's score this round is: 7
If the computer holds, its total score would be: 49
The computer rolled 6
The computer's score this round is: 13
If the computer holds, its total score would be: 55
The computer rolled 4
The computer's score this round is: 17
If the computer holds, its total score would be: 59
The computer rolled 1
The computer loses its turn.   Enter 'c' to continue.
c
It's your turn!  Enter 'r' to roll.
r
You rolled 3
Your score this round is: 3
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```
If you hold, your total score would be: 67
Press 'h' to hold or 'r' to roll again.
r
You rolled 3
Your score this round is: 6
If you hold, your total score would be: 70
Press 'h' to hold or 'r' to roll again.
r
You rolled 6
Your score this round is: 12
If you hold, your total score would be: 76
Press 'h' to hold or 'r' to roll again.
h
It's the computer's turn!
The computer rolled 4
The computer's score this round is: 4
If the computer holds, its total score would be: 46
The computer rolled 3
The computer's score this round is: 7
If the computer holds, its total score would be: 49
The computer rolled 2
The computer's score this round is: 9
If the computer holds, its total score would be: 51
The computer rolled 4
The computer's score this round is: 13
If the computer holds, its total score would be: 55
The computer rolled 1
The computer loses its turn.   Enter 'c' to continue.
c
It's your turn!  Enter 'r' to roll.
r
You rolled 1
You lose your turn.   Enter 'c' to continue.
c
It's the computer's turn!
The computer rolled 3
The computer's score this round is: 3
If the computer holds, its total score would be: 45
The computer rolled 2
The computer's score this round is: 5
If the computer holds, its total score would be: 47
The computer rolled 4
The computer's score this round is: 9
If the computer holds, its total score would be: 51
The computer rolled 4
The computer's score this round is: 13
If the computer holds, its total score would be: 55
The computer rolled 6
The computer's score this round is: 19
If the computer holds, its total score would be: 61
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```
The computer rolled 6
The computer's score this round is: 25
If the computer holds, its total score would be: 67
The computer holds.   Enter 'c' to continue.
c
It's your turn!  Enter 'r' to roll.
r
You rolled 4
Your score this round is: 4
If you hold, your total score would be: 80
Press 'h' to hold or 'r' to roll again.
r
You rolled 1
You lose your turn.   Enter 'c' to continue.
c
It's the computer's turn!
The computer rolled 1
The computer loses its turn.   Enter 'c' to continue.
c
It's your turn!  Enter 'r' to roll.
r
You rolled 5
Your score this round is: 5
If you hold, your total score would be: 81
Press 'h' to hold or 'r' to roll again.

h
It's the computer's turn!
The computer rolled 4
The computer's score this round is: 4
If the computer holds, its total score would be: 71
The computer rolled 3
The computer's score this round is: 7
If the computer holds, its total score would be: 74
The computer rolled 3
The computer's score this round is: 10
If the computer holds, its total score would be: 77
The computer rolled 4
The computer's score this round is: 14
If the computer holds, its total score would be: 81
The computer rolled 4
The computer's score this round is: 18
If the computer holds, its total score would be: 85
The computer rolled 1
The computer loses its turn.   Enter 'c' to continue.
c
It's your turn!  Enter 'r' to roll.
r
You rolled 5
Your score this round is: 5
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If you hold, your total score would be: 86
Press 'h' to hold or 'r' to roll again.
r
You rolled 4
Your score this round is: 9
If you hold, your total score would be: 90
Press 'h' to hold or 'r' to roll again.
h
It's the computer's turn!
The computer rolled 6
The computer's score this round is: 6
If the computer holds, its total score would be: 73
The computer rolled 5
The computer's score this round is: 11
If the computer holds, its total score would be: 78
The computer rolled 1
The computer loses its turn.   Enter 'c' to continue.
c
It's your turn!  Enter 'r' to roll.
r
You rolled 4
Your score this round is: 4
If you hold, your total score would be: 94
Press 'h' to hold or 'r' to roll again.
r
You rolled 5
Your score this round is: 9
If you hold, your total score would be: 99
Press 'h' to hold or 'r' to roll again.
h
It's the computer's turn!
The computer rolled 1
The computer loses its turn.   Enter 'c' to continue.
c
It's your turn!  Enter 'r' to roll.
r
You rolled 3
Your score this round is: 3
If you hold, your total score would be: 102
Press 'h' to hold or 'r' to roll again.
h
Congratulations, you win!
```