Fall 2018 : CSCI 271 : Project 2

There are two programming projects described below. Please choose just **one** of the two to work on for the second project. If anything is not clear in the description, please ask.

Due Date: Tuesday, Nov. 20, end of day (Late projects will have a 3 point per day late penalty.)

Student Collaboration: It's okay to share ideas but you must write your own code and submit your own work. Do not let other students copy your code. Projects that are identical except for minor details (e.g. variable names) may receive a 0.

---

1) Treasure Hunt Game: By exploring rooms in a cave in random order, the adventurer hopes to uncover treasure and avoid losing it. The adventurer starts with 0 points. The game ends either when the adventurer reaches 500 points, or loses enough points to have a negative point score.

Rules of the game:

There are 5 connecting rooms in the cave. The adventurer can move to any room from another room. They may also stay in the same room.

All room moves, uncovering of treasure, and loss of treasure, are generated by the program randomly. There is no user input.

Each room has a different chance to gain and lose treasure.

	Chance to Gain	Chance to Lose	Points Gain or Lose
Room 1:	30%	70%	30
Room 2:	80%	20%	10
Room 3:	50%	50%	25
Room 4:	20%	80%	40
Room 5:	60%	40%	15

Hint: rand() % 10 returns values in the set {0,1,2,3,4,5,6,7,8,9}. You could consider values 0,1,2 (3 out of the 10 possible values) to represent falling into a 30% chance to gain points, and any of the other values as falling into 70% to lose points.

What happens in a turn:

- Adventurer moves to a random room.
- Adventurer has a chance to gain or lose points that depends on the room.

Output:

Output messages will be used to narrate the steps of the game. See sample output below.

Fall 2018 : CSCI 271 : Project 2

Sample output

Losing game

```
…
Moving to room 5
Gained 15 points. Current score: 75
Moving to room 4
Lost 40 points. Current score: 35
Moving to room 5
Lost 15 points. Current score: 20
Moving to room 2
Lost 10 points. Current score: 10
Moving to room 3
Lost 25 points. Ending score: -15
SORRY, NOT A WINNER!
GAME OVER
```

Winning game

```
…
Moving to room 3
Gained 25 points. Current score: 430
Moving to room 2
Lost 10 points. Current score: 420
Moving to room 1
Gained 30 points. Current score: 450
Moving to room 1
Gained 30 points. Current score: 480
Moving to room 3
Gained 25 points. Ending score: 505
WINNER!
GAME OVER
```

2) Random Race

Two runners are competing in a race. Runner 1 runs at a constant pace, while runner 2's pace is random. The runners start at the same place and the first to cross the finish line wins. If they both cross the finish line in the same turn, consider the race a tie.

Rules of the game:

The race is 100 steps long. The runners start at step 0.

Runner 1 is a steady runner, going two steps at a time.

Runner 2 is a random runner, and occasionally may get turned around and run the wrong way. Runner 2’s pace and direction is determined by the roll of a 12-sided die with numbers 1 through 12 on it.

If the number rolled is even, runner 2 goes that many steps forward. If the number rolled is odd, runner 2 goes that many steps backward. However, runner 2 will never cross backwards over the start line and go to a negative step number. If the step number becomes negative, set it back to 0.

All moves are determined by the program randomly. There is no user input.

What happens in a turn:

Runner 1 moves 2 steps forward.
Runner 2 moves a random number of steps forward or backward.

Fall 2018 : CSCI 271 : Project 2

Output:

Output messages will be used to narrate the steps of the game. See sample output below.

Sample output Random Race

Runner 1 wins

```
Runner 1 is at step 94  Runner 2 is at step 41
Runner 1 runs 2 steps ahead.
Runner 2 runs 12 steps ahead.
Runner 1 is at step 96  Runner 2 is at step 53
Runner 1 runs 2 steps ahead.
Runner 2 runs 1 steps backward.
Runner 1 is at step 98  Runner 2 is at step 52
Runner 1 runs 2 steps ahead.
Runner 2 runs 4 steps ahead.
END OF RACE!!!
Runner 1 is at step 100 Runner 2 is at step 56
RUNNER 1 WINS!
```

Runner 2 wins

```
Runner 1 is at step 74  Runner 2 is at step 83
Runner 1 runs 2 steps ahead.
Runner 2 runs 8 steps ahead.
Runner 1 is at step 76  Runner 2 is at step 91
Runner 1 runs 2 steps ahead.
Runner 2 runs 8 steps ahead.
Runner 1 is at step 78  Runner 2 is at step 99
Runner 1 runs 2 steps ahead.
Runner 2 runs 8 steps ahead.
END OF RACE!!!
Runner 1 is at step 80  Runner 2 is at step 107
RUNNER 2 WINS!
```

Tie race

```
Runner 1 is at step 94  Runner 2 is at step 70
Runner 1 runs 2 steps ahead.
Runner 2 runs 8 steps ahead.
Runner 1 is at step 96  Runner 2 is at step 78
Runner 1 runs 2 steps ahead.
Runner 2 runs 12 steps ahead.
Runner 1 is at step 98  Runner 2 is at step 90
Runner 1 runs 2 steps ahead.
Runner 2 runs 10 steps ahead.
END OF RACE!!!
Runner 1 is at step 100 Runner 2 is at step 100
IT'S A TIE!!!
```