```
//
//  main.cpp
//  HW4
//
//  Created by Benny on 2/25/15.
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//

#include <iostream>
#include <cstdlib>
#include <ctime>
#include <random>
#include <cmath>
#include <iomanip>
using namespace std;


void setupDoors(char &door1, char &door2, char &door3){
    random_device rand;
    mt19937 gen(rand());
    uniform_int_distribution<int>r(0,2);

    if(r(gen)==0||r(gen)==1){
        door1='G';
        int a=random()%2;
        if(a==0){
            door2='G';
            door3='C';
        }
        if(a==1){
            door2='C';
            door3='G';
        }
    }
    if(r(gen)==2){
        door1='C';
        door2=door3='G';
    }
}

void pickDoorChoices(char door1, char door2, char door3, int
&doorPlayer, int &doorMonty){
    random_device rand;
    mt19937 gen(rand());
    uniform_int_distribution<int>r(0,1);
    uniform_int_distribution<int>p(1,3);
    doorPlayer=p(gen);
    if(doorPlayer==1){
        if(door1=='C'){
            if(r(gen)==0){
```
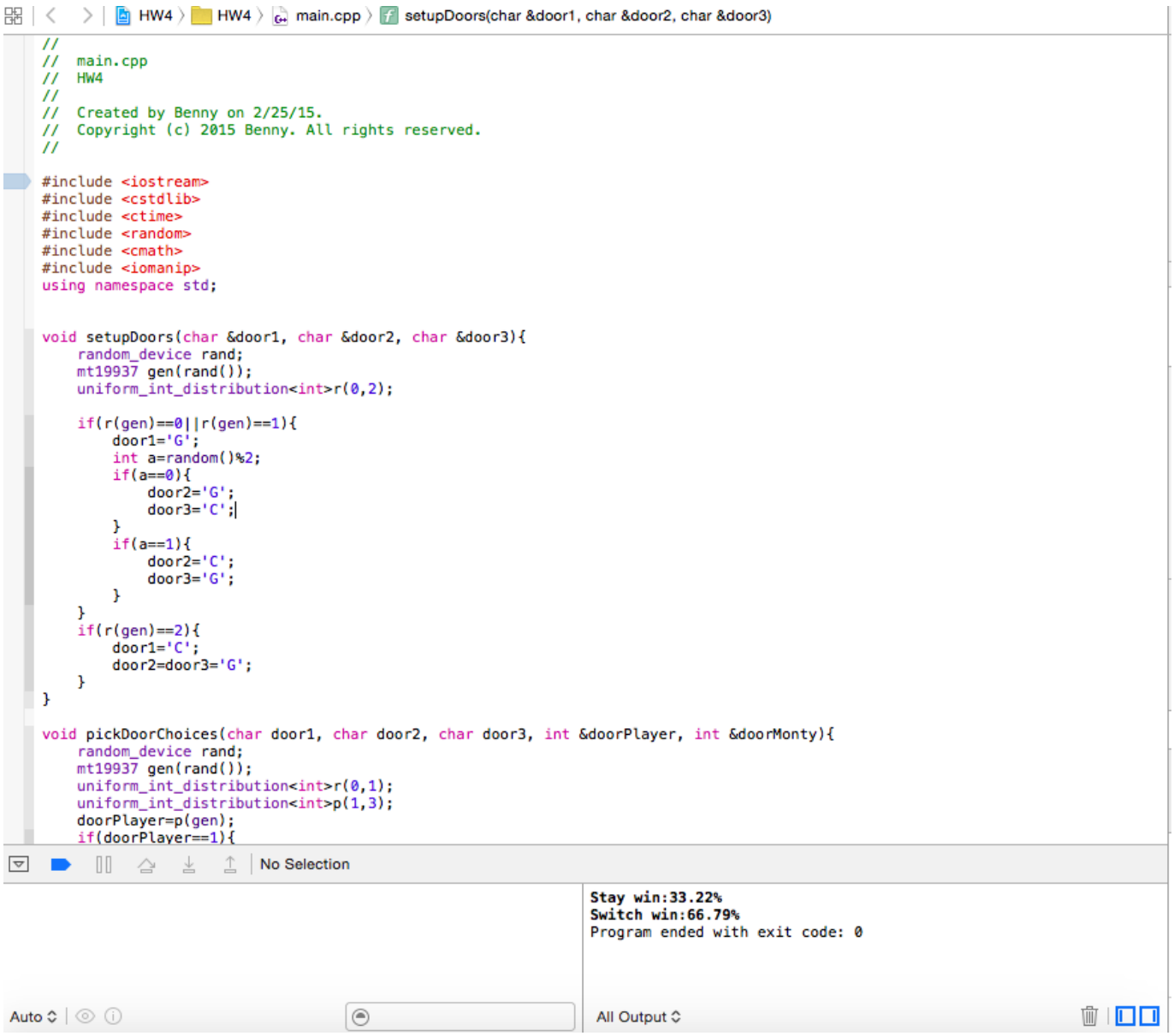

```
                doorMonty=2;
            }
            if(r(gen)==1){
                doorMonty=3;
            }
        }
        if(door2=='C'){
            doorMonty=3;
        }
        if(door3=='C'){
            doorMonty=2;
        }
    }
    if(doorPlayer==2){
        if(door2=='C'){
            if(r(gen)==0){
                doorMonty=1;
            }
            if(r(gen)==1){
                doorMonty=3;
            }
        }
        if(door3=='C'){
            doorMonty=1;
        }
        if(door1=='C'){
            doorMonty=3;
        }
    }
    if(doorPlayer==3){
        if(door3=='C'){
            if(r(gen)==0){
                doorMonty=1;
            }
            if(r(gen)==1){
                doorMonty=2;
            }
        }
        if(door2=='C'){
            doorMonty=1;
        }
        if(door1=='C'){
            doorMonty=2;
        }
    }
}

int main(){
    char door1,door2,door3;
    int doorPlayer,doorMonty,temp=0;
```

```
    double switch_win=0,stay_win=0;
    for(int i=0;i<=10000;i++){
        setupDoors(door1, door2, door3);
        if(door1=='C'){
            temp=1;
        }
        if(door2=='C'){
            temp=2;
        }
        if(door3=='C'){
            temp=3;
        }
        pickDoorChoices(door1, door2, door3, doorPlayer, doorMonty);
        if(doorMonty==1){
            if(doorPlayer==temp){
                stay_win++;
            }
            else{
                switch_win++;
            }
        }
        if(doorMonty==2){
            if(doorPlayer==temp){
                stay_win++;
            }
            else{
                switch_win++;
            }
        }
        if(doorMonty==3){
            if(doorPlayer==temp){
                stay_win++;
            }
            else{
                switch_win++;
            }
        }
    }
    cout << "Stay win:"<<stay_win/10000*100<<"%"<<endl;
    cout << "Switch win:" <<switch_win/10000*100<<"%"<<endl;
}
```


HW4 〉 HW4 〉 main.cpp 〉 setupDoors(char &door1, char &door2, char &door3)
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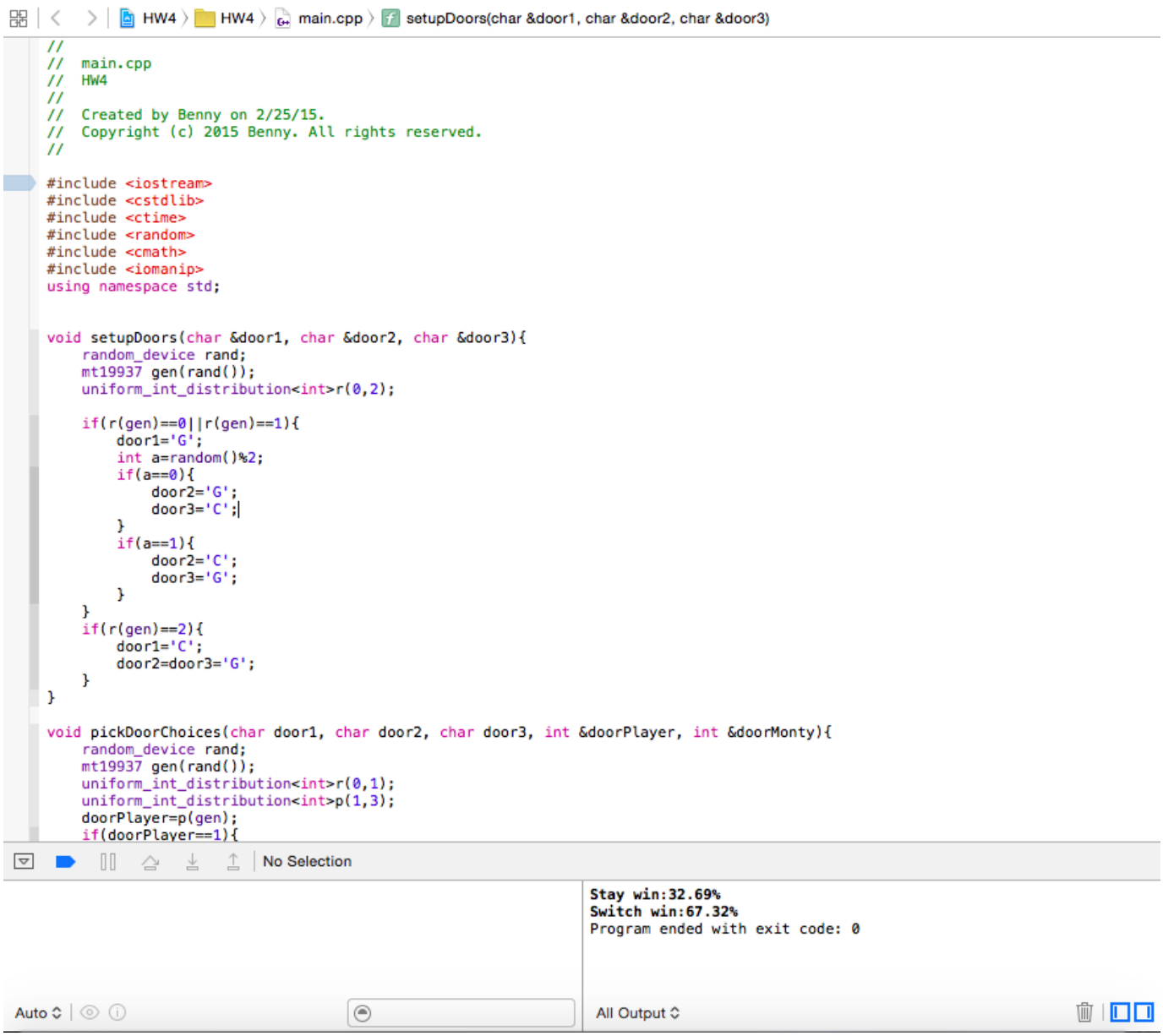
random_device rand;
mt19937 gen(rand());
uniform_int_distribution<int>r(0,1);
uniform_int_distribution<int>p(1,3);
doorPlayer=p(gen);
if(doorPlayer==1){
No Selection
Stay win:33.22%
Switch win:66.79%
Program ended with exit code: 0
Auto
All Output


HW4 〉 HW4 〉 main.cpp 〉 setupDoors(char &door1, char &door2, char &door3)
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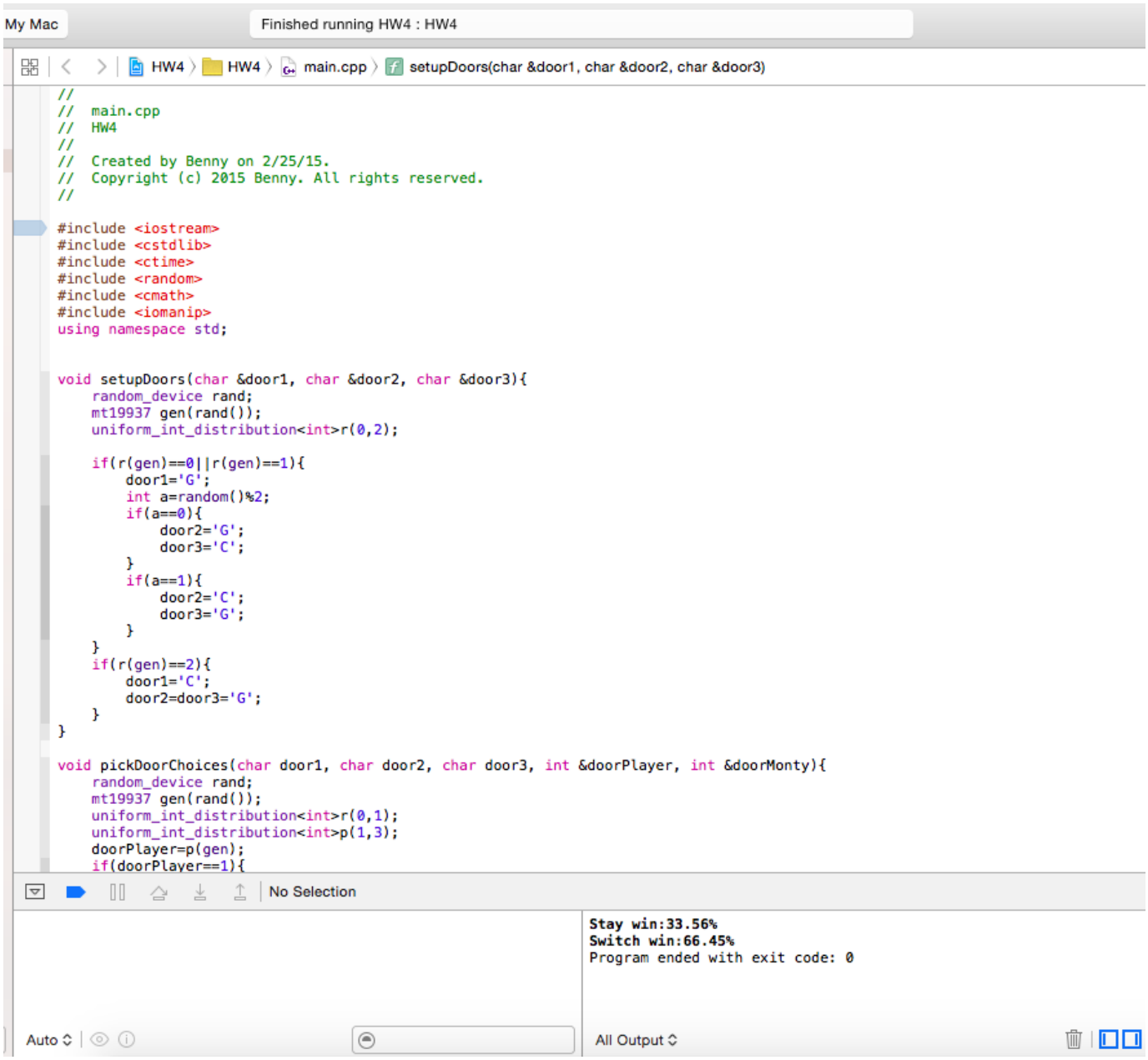
random_device rand;
mt19937 gen(rand());
uniform_int_distribution<int>r(0,1);
uniform_int_distribution<int>p(1,3);
doorPlayer=p(gen);
if(doorPlayer==1){
No Selection
Stay win:32.69%
Switch win:67.32%
Program ended with exit code: 0
Auto
All Output


My Mac
Finished running HW4 : HW4
HW4 〉 HW4 〉 main.cpp 〉 setupDoors(char &door1, char &door2, char &door3)
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random_device rand;
mt19937 gen(rand());
uniform_int_distribution<int>r(0,1);
uniform_int_distribution<int>p(1,3);
doorPlayer=p(gen);
if(doorPlayer==1){
No Selection
Stay win:33.56%
Switch win:66.45%
Program ended with exit code: 0
Auto
All Output

Time runs	Result
1	Stay win: 33.22% Switch win: 66.79%
2	Stay win: 32.69% Switch win: 67.32%
3	Stay win: 33.56% Switch win: 66.45%
4	Stay win: 33.78% Switch win: 66.23%
5	Stay win: 33.02% Switch win: 66.99%

Base on the experimental data, the player who switch their choice has more chance to win the car after Monty shows the goat. The player who always stays at the origin choice has 1/3 chance to win the car. After Monty shows one of the door is goat, the chance changes to 2/3.