

Operating System Project Report

Project Title: Intelligent traffic light system

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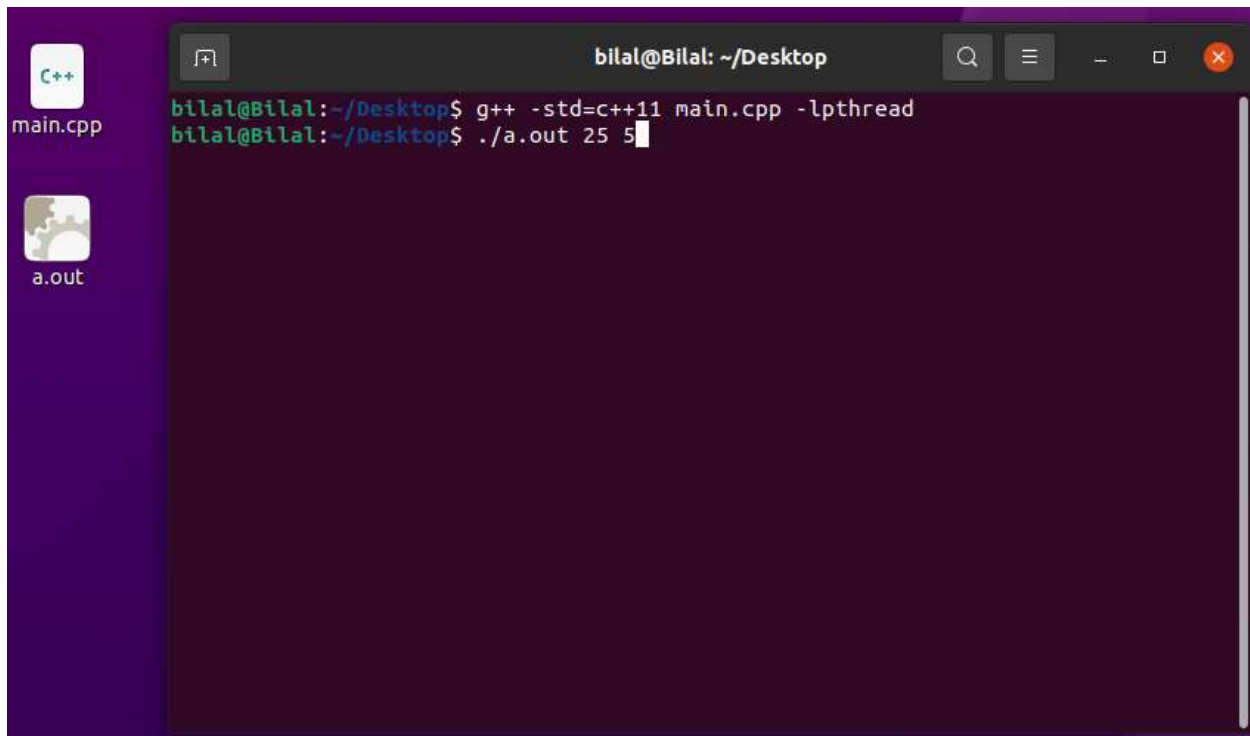
Section: V2

In this Project, I implement Intelligent traffic light system by using c++ language. where cars arrive at a "one-way only" tunnel. Only at most "N" cars in one direction can go through the tunnel at a time. Lights can be RED or GREEN only. If the light turns RED, no car should attempt to enter the tunnel. Otherwise, N cars should be allowed to enter and leave the tunnel. I implement one thread per car. N threads need to be woken up when the light turns GREEN. I use sleep(2) function. We pass M total car as from terminal and pass N how many cars we pass when signal is GREEN.

First of all,

I Compile code by using command “ g++ -std=c++11 main.cpp -lpthread ”

Then exec file will generate then we simply execute it by using command “ ./a.out M N”



Here you see that we are pass M N from terminal

Lets discuss about code.

```
11 }
12 void NorthDir(int m,int n){
13     int z = 0; int half = m/2;
14     int secondHalf=m-half;
15     int c=0;
16     for(int i = 0;i<=m/2;i++){
17         if(z==n){
18             c=c+z;
19             z=0;
20             NorthSideThread(m,n);
21             SouthDir(m,n);
22         }else if(i == half&&half==secondHalf){
23             NorthSideThread(m,z);
24             SouthDir(m,z);
25         }if(i == half&&half!=secondHalf){
26             if(c!=i){
27                 c=i-c;
28                 NorthSideThread(m,c);
29             }
30             SouthDir(m,z+1);
31         }
32         z++;
33     }
34 }
```

I pass M N in to northDir function we divide m into two side firsthalf goes northside and 2nd half southside in this fig I run loop half size of m and create

thread when z is equal to N we call NorthsideThread function it create N thread after sleep(2). When I call NorthsideThread function it turn North side into GREEN and South Side RED after execution of NorthsideThread then it call SouthsideThread function it also create N thread after sleep(2) and it also turn Southside into GREEN and NorthSide RED. And if Remaining thread is not N then I use else if or if statement solve this problem. This is a basic which I Used to create intelligent Traffic Light System.

Now, I show you Some results on different combination of (M, N).

If I pass M=25 and N=5

```
llal@llal:~/Desktop$ g++ -std=c++11 main.cpp -pthread
llal@llal:~/Desktop$ ./a.out 25 5
#####
Intelligent Traffic Light System.
#####

North Signal is 'Green' .... South Signal is 'Red'
=====
Car is Coming from North side to South side
Car is Coming from North side to South side
Car is Coming from North side to South side
Car is Coming from North side to South side
Car is Coming from North side to South side
=====
North Signal is 'Red' .... South Signal is 'Green'
=====
Car is Coming from South side to North side
Car is Coming from South side to North side
Car is Coming from South side to North side
Car is Coming from South side to North side
Car is Coming from South side to North side
=====
North Signal is 'Green' .... South Signal is 'Red'
=====
Car is Coming from North side to South side
Car is Coming from North side to South side
Car is Coming from North side to South side
Car is Coming from North side to South side
Car is Coming from North side to South side
=====
North Signal is 'Red' .... South Signal is 'Green'
=====
Car is Coming from South side to North side
Car is Coming from South side to North side
Car is Coming from South side to North side
Car is Coming from South side to North side
Car is Coming from South side to North side
=====
North Signal is 'Green' .... South Signal is 'Red'
=====
Car is Coming from North side to South side
Car is Coming from North side to South side
=====
North Signal is 'Red' .... South Signal is 'Green'
=====
Car is Coming from South side to North side
Car is Coming from South side to North side
Car is Coming from South side to North side
```

If I pass M=10 and N=2

```
bilal@Bilal:~/Desktop$ ./a.out 10 2
#####
Intelligent Traffic Light System.
#####
=====
North Signal is 'Green' .... South Signal is 'Red'
=====
Car is Coming from North side to South side
Car is Coming from North side to South side
=====
North Signal is 'Red' .... South Signal is 'Green'
=====
Car is Coming from South side to North side
Car is Coming from South side to North side
=====
North Signal is 'Green' .... South Signal is 'Red'
=====
Car is Coming from North side to South side
Car is Coming from North side to South side
=====
North Signal is 'Red' .... South Signal is 'Green'
=====
Car is Coming from South side to North side
Car is Coming from South side to North side
=====
North Signal is 'Green' .... South Signal is 'Red'
=====
Car is Coming from North side to South side
=====
North Signal is 'Red' .... South Signal is 'Green'
=====
Car is Coming from South side to North side
bilal@Bilal:~/Desktop$
```