Comp 304 Project 2 Report

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**Part - I**

Simulation lasts for simulation time and it runs until the current time + simulation time.

void roadHandler(int );

void carToTheRoad(int );

void \*makeRoad(void \*);

char\* adjustTime(time\_t);

char\* timeToString(int);

void northSpecific();

Functions above are used for handling the road operations, creating the roads, putting a car into the road, rearrange time, converting the time into a string, and handling the north road respectively.

Mutex locks are used to avoid deadlocks and undesirable incidents.

Thread data and car structures are implemented with the necessary properties.

In the traffic only one direction flows by keeping the other roads wait.

Cars can turn to North, East, West, or South directions without having any effect on the entire simulation.

Sleeping the thread for one second is satisfied by the given pthread\_sleep file. It sleeps the thread for one second for arranging the intersection passing time of a car.

Arrival probability of South, East, and West roads are determined as p whereas North road is 1-p.

If there are no arriving cars in the North road for 20 seconds, a car must arrive and then it returns to normal probability.

For the operations of the police. void \*police(void\*) function is implemented.

A road flows if the road is empty or there are more than 5 cars stacked on a different road.

Passing priority starts from the road with the highest number of cars. If there are equal amount of cars in different roads at the same time, priority applies as North > East > South > West.

At time zero, there is a car in every road.

Simulation time can be set with the -s flag, frequency can be set with the -t flag, and probability can be set with the -p flag.

**Part – II**

Now police officer checks for 3 conditions which are the road is empty, there is more than 5 cars on a different road, or there is a car waiting for 20 seconds on a different road. If the last two conditions are satisfied, police officer gives priority to the last condition to prevent starvation.

**Part – III**

Police officer has a delay of 3 seconds if there are no cars on the road and he is warned by the honk of a car while he is looking at his phone. A condition variable is used to handle this situation.

**Keeping Logs**

Log files are saved as car.log and police.log. In the car.log, id of the car, direction, arrival time, cross time, and wait time details are provided. In the police.log, time and events are provided.

For every t, t+1, t+2 seconds current position of the cars on the roads is printed on the command line.

Github Repo: <https://github.com/degthecoder/Comp304-Project2>