

Design Document

Optional Assignment 5 – Manavjeet Singh

The output of your program

Do you want to cheat(Y/n):

Car1 : 4

Car2 : 7

Do you want to cheat(Y/n):

Car1 : 9

Car2 : 14

Do you want to cheat(Y/n):

Car1 : 12

Car2 : 19

Do you want to cheat(Y/n):

Car1 : 18

Car2 : 21

y

Enter 1 to relocate car 1 and 2 to relocate car 2: 1

Enter the new position: 80

Do you want to cheat(Y/n):

Car1 : 80

Car2 : 22

Do you want to cheat(Y/n):

Car1 : 87

Car2 : 24

Do you want to cheat(Y/n):

Car1 : 87

Car2 : 33

y

Enter 1 to relocate car 1 and 2 to relocate car 2: 2

Enter the new position: 1

Do you want to cheat(Y/n):

Car1 : 93

Car2 : 1

Do you want to cheat(Y/n):

Car1 : 99

Car2 : 1

Do you want to cheat(Y/n):

Car1 : 105

Car2 : 3

WINNER is Car 1!

How many threads are you creating using pthread_create

Creating 4 more threads except the main thread, for, car1, car2, cheat_mode and report.

How does cheat_mode ensure that the position of a car is modified only once corresponding to a given user-input?

Cheat mode ensures this by using stacks. The cheat instruction is put into the stack of respective car after attaining the lock of the stack. When the car's thread is run the car pops the instruction out of the thread and make the changes. This way change is made only once.

Do you need to use locks for consistency? If yes, explain why they are needed

Yes, locks are used in the assignment. The locks are used to maintain the consistency of the stacks of both the cars respectively.

How does report ensure that both car1 and car2 have spent the same amount of time before printing their status?

This is ensured using the **Barrier data structure**. Once car1 and car2 both have spent one cycle only then the status is printed.