

Data Structures

For this assignment the following data structures were used: a linked list for vehicles waiting, a linked list for vehicles moving, and a vehicle object which was used as the nodes in both linked lists. When a vehicle arrived it would detect whether or not it could cross the road. If the vehicle could cross the road it would be inserted into the moving cars linked list. If the vehicle could not be inserted into the moving vehicle linked list it would instead be inserted into the waiting vehicle linked list. When the vehicle was prompted to cross the road, it would be removed from the waiting vehicle linked list and inserted into the moving vehicle linked list. After the vehicle crossed the road it would be removed from the moving vehicle linked list and it would prompt for another vehicle to take its place.

Pseudo Code

Below I describe the pseudo code for the main routine and vehicle routine as they were the only two things I coded. The data structures were described in the section above. The other functions included a few functions for updating the two linked lists and printing the contents of the linked lists. The `vehicle_arrival()` function was also provided which updates global variables to reflect a waiting car, inserts the vehicle into the vehicle waiting linked list, and print that the vehicle has arrived.

Main Routine:

- 1) The first step was to create variables needed for `main()`. This included the integer 'option' which was used to see what option the user chose for the probability distribution. Integer 'i' which was used for getting a `rand()` number. Integer 'j' which was used for the integers in loops. Float 'carprob' which was used for setting the probability of the car. Integer 'vehicle_type', 'direction', and 'vehicle_id' which was set to either 0 or 1 for the vehicles' attributes. Integer 'returnCode' which was used for error checking that the thread was successfully created. In addition, an array named 'vehicle' of size 30 was created to hold `pthread_t` objects. Finally, a thread named 'pmthread' of type `pmstr_t` was initialized.
- 2) After initializing variables, functions were also initialized. This included the initialization of the mutex lock and the conditionals for trucks in both directions and the conditionals for cars in both directions.
- 3) Global and local variables were previously initialized, however, they still needed to be set to default values. Most were set to 0, while 'option' was set to -1, and 'pw' and 'pm' were set to NULL as they were used as pointers for the two linked lists.
- 4) Once all initialization had been completed, a menu was printed and users were asked to select what schedule they would like to run.

5) A switch statement was used to detect what probability to use for vehicle selection between cars

6) The srand() function was called to set the seed for the rand() function to be the current time

7) An if statement was used to see what option the user selected and run the schedule for vehicle crossing depending on their selection. The schedules were all the same except for the car probabilities and delays varied for each option. Also, options 1-3 had 20 cars and 2 for loops for vehicle creation; while options 4-6 had 30 cars and 3 for loops for vehicle creation. The logic for each schedule is described in number 8 below as they were mostly the same besides the differences described above.

8) Before any for loop for vehicle creation, the mutex first needed to be locked as the critical section was about to be changed. In each iteration of a for loop the size of the vehicle needed to be malloced. After this rand() was used to select the 'vehicle_type' and 'direction'. For the 'vehicle_type', RAND_MAX was multiplied by the probability and if the random number selected was less then RAND_MAX the 'vehicle_type' would be a car. If not, the 'vehicle_type' would be a truck. 'Vehicle_id' was set to 'j' which was the iteration number. After the vehicle's objects attributes were set, the vehicle arrival function was called which added the vehicle to the waiting vehicle linked list. Then, a thread would be created for this vehicle with the vehicle routine function. This allowed the program to be multithreaded and have each vehicle show up to the road very quickly. If the thread could not be created the 'returnCode' variable would equal one and an error message would be printed. After each for loop the mutex was unlocked as the critical section no longer needed to be accessed. Along with this the sleep function was used to delay for subsequent for loops. This is with the exception of the last for loop for vehicle creation. After the last for loop for vehicle creation, another for loop was used to rejoin all threads created.

Vehicle Routine:

1) The first step was to determine if the vehicle was a car or truck. The description of the car routine is outlined in step 3 and the description of the truck routine is outlined in step 4. The rest of the vehicle was the same between both cars and trucks and is outlined in steps 5-8. (Note: in steps 5-8 car is often used to describe the vehicles actions and variables, however the truck does the same exact thing with different variable names).

2) No matter what 'vehicle_type' was selected the mutex would first need to be locked as the critical section was about to be changed

3) If the vehicle was a car, the following restrictions needed to be followed:

- The car could not move while a truck was waiting on either side
- The car could not move while a truck or more than three cars were on the road
- The cars that were on the same side of the vehicle that previously exited had priority over cars on the opposite side of the road

4) If the vehicle was a truck the following restrictions needed to be followed:

- The truck could not move while a truck or more than three cars were on the road
- Trucks on the opposite side of the previous moving vehicle had priority over other trucks

5) Once a car was permitted to cross it would begin the crossing process by running an if else statement to determine its 'direction'. The 'direction' would be printed and the 'currentmovingdir' variable would be updated to reflect the vehicle's 'direction' variable. The 'waitingcar' variable would be decremented and the 'movingcar' variable would be incremented. Finally, the `waitinglistdelete()` function was called to remove the vehicle from the waiting vehicle linked list. Along with this, the `movinglistinsert()` function was called to add the vehicle to the moving vehicle linked list.

6) After the if else statement the `printmoving()` and `printwaiting()` functions were called so the user could see what the current situation of the bridge crossing was. The mutex was unlocked for a short period during the drive. Then, the `sleep()` function with a two second delay was used to simulate the car driving and the mutex was relocked. Finally, the 'movingcar' variable was decremented and it was deleted from the moving vehicle linked list.

7) Once the car had completed the driving process a large number of if else statements were checked to determine which vehicle would move next. Trucks in the opposite direction of the vehicle that had just moved had top priority, so if any were available they would be signaled first. Trucks in the same direction had the second highest priority. Cars in the same direction had the third highest priority. If a car was signaled, they were signaled three at a time as the road could hold three cars without collapsing. Cars in the opposite direction had the lowest priority so they would only be signaled if none of the previous if else conditions were met.

8) The car would complete the process by sending a statement to the user that it had exited the bridge and unlocking the mutex.

Output

The output for each option in the program is pasted below (or if you prefer I am attaching a `output.txt` file in this folder):

```
$ ./bridge_crossing
```

```
*****
```

Please select one Schedules from the following six options:

1. 10 : DELAY(10) : 10
car/truck probability: [1.0, 0.0]
2. 10 : DELAY(10) : 10
car/truck probability: [0.0, 1.0]
3. 20

- car/truck probability: [0.65, 0.35]
4. 10 : DELAY(25) : 10 : DELAY(25) : 10
car/truck probability: [0.5, 0.5]
5. 10 : DELAY(3) : 10 : DELAY(10): 10
car/truck probability: [0.65, 0.35]
6. 20 : DELAY(15) : 10
car/truck probability: [0.75, 0.25]

Please select [1-6]:1

Car #0 (southbound) arrived.

Car #1 (southbound) arrived.

Car #2 (southbound) arrived.

Car #3 (southbound) arrived.

Car #4 (northbound) arrived.

Car #5 (northbound) arrived.

Car #6 (northbound) arrived.

Car #7 (northbound) arrived.

Car #8 (southbound) arrived.

Car #9 (southbound) arrived.

Car #0 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #0,]

Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #7,Car #6,Car #5,Car #4,]

Waiting Vehicles (Southbound): [Car #9,Car #8,Car #3,Car #2,Car #1,]

Car #1 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #1,Car #0,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #7,Car #6,Car #5,Car #4,]

Waiting Vehicles (Southbound): [Car #9,Car #8,Car #3,Car #2,]

Car #2 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Car #2,Car #1,Car #0,]
Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): [Car #7,Car #6,Car #5,Car #4,]
Waiting Vehicles (Southbound): [Car #9,Car #8,Car #3,]

Car #0 exited the bridge.

Car #3 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Car #3,Car #2,Car #1,]
Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): [Car #7,Car #6,Car #5,Car #4,]
Waiting Vehicles (Southbound): [Car #9,Car #8,]

Car #1 exited the bridge.

Car #8 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Car #8,Car #3,Car #2,]
Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): [Car #7,Car #6,Car #5,Car #4,]
Waiting Vehicles (Southbound): [Car #9,]

Car #2 exited the bridge.

Car #9 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Car #9,Car #8,Car #3,]
Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): [Car #7,Car #6,Car #5,Car #4,]
Waiting Vehicles (Southbound): []

Car #3 exited the bridge.

Car #8 exited the bridge.

Car #9 exited the bridge.

Car #5 (Northbound) is now crossing the bridge.
Vehicles on the bridge: [Car #5,]
Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #7,Car #6,Car #4,]

Waiting Vehicles (Southbound): []

Car #4 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #4,Car #5,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #7,Car #6,]

Waiting Vehicles (Southbound): []

Car #6 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #6,Car #4,Car #5,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #7,]

Waiting Vehicles (Southbound): []

Car #5 exited the bridge.

Car #7 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #7,Car #6,Car #4,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): []

Waiting Vehicles (Southbound): []

Car #4 exited the bridge.

Car #6 exited the bridge.

Car #7 exited the bridge.

Car #10 (southbound) arrived.

Car #11 (southbound) arrived.

Car #12 (northbound) arrived.

Car #13 (northbound) arrived.

Car #14 (northbound) arrived.

Car #15 (northbound) arrived.

Car #16 (northbound) arrived.

Car #17 (northbound) arrived.

Car #18 (northbound) arrived.

Car #19 (southbound) arrived.

Car #19 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #19,]

Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #18,Car #17,Car #16,Car #15,Car #14,Car #13,Car #12,]

Waiting Vehicles (Southbound): [Car #11,Car #10,]

Car #11 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #11,Car #19,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #18,Car #17,Car #16,Car #15,Car #14,Car #13,Car #12,]

Waiting Vehicles (Southbound): [Car #10,]

Car #10 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #10,Car #11,Car #19,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #18,Car #17,Car #16,Car #15,Car #14,Car #13,Car #12,]

Waiting Vehicles (Southbound): []

Car #19 exited the bridge.

Car #11 exited the bridge.

Car #10 exited the bridge.

Car #14 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #14,]

Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #18,Car #17,Car #16,Car #15,Car #13,Car #12,]

Waiting Vehicles (Southbound): []

Car #12 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #12,Car #14,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #18,Car #17,Car #16,Car #15,Car #13,]

Waiting Vehicles (Southbound): []

Car #18 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #18,Car #12,Car #14,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #17,Car #16,Car #15,Car #13,]

Waiting Vehicles (Southbound): []

Car #14 exited the bridge.

Car #16 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #16,Car #18,Car #12,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #17,Car #15,Car #13,]

Waiting Vehicles (Southbound): []

Car #18 exited the bridge.

Car #12 exited the bridge.

Car #15 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #15,Car #16,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #17,Car #13,]

Waiting Vehicles (Southbound): []

Car #17 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #17,Car #15,Car #16,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #13,]

Waiting Vehicles (Southbound): []

Car #16 exited the bridge.

Car #13 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #13,Car #17,Car #15,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): []

Waiting Vehicles (Southbound): []

Car #15 exited the bridge.

Car #17 exited the bridge.

Car #13 exited the bridge.

Finished execution.

]0;camerone@turing: ~/OS/HW3 [01;32mcamerone@turing[00m:[01;34m~/OS/HW3[00m\$
./bridge_crossing

Please select one Schedules from the following six options:

1. 10 : DELAY(10) : 10
car/truck probability: [1.0, 0.0]
2. 10 : DELAY(10) : 10
car/truck probability: [0.0, 1.0]
3. 20
car/truck probability: [0.65, 0.35]
4. 10 : DELAY(25) : 10 : DELAY(25) : 10
car/truck probability: [0.5, 0.5]
5. 10 : DELAY(3) : 10 : DELAY(10): 10
car/truck probability: [0.65, 0.35]
6. 20 : DELAY(15) : 10
car/truck probability: [0.75, 0.25]

Please select [1-6]:2

Truck #0 (northbound) arrived.

Truck #1 (northbound) arrived.

Truck #2 (northbound) arrived.

Truck #3 (southbound) arrived.

Truck #4 (southbound) arrived.

Truck #5 (northbound) arrived.

Truck #6 (southbound) arrived.

Truck #7 (southbound) arrived.

Truck #8 (northbound) arrived.

Truck #9 (northbound) arrived.

Truck #9 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #9,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #8,Truck #5,Truck #2,Truck #1,Truck #0,]

Waiting Vehicles (Southbound): [Truck #7,Truck #6,Truck #4,Truck #3,]

Truck #9 exited the bridge.

Truck #3 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #3,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #8,Truck #5,Truck #2,Truck #1,Truck #0,]

Waiting Vehicles (Southbound): [Truck #7,Truck #6,Truck #4,]

Truck #3 exited the bridge.

Truck #1 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #1,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #8,Truck #5,Truck #2,Truck #0,]

Waiting Vehicles (Southbound): [Truck #7,Truck #6,Truck #4,]

Truck #1 exited the bridge.

Truck #4 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #4,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #8,Truck #5,Truck #2,Truck #0,]

Waiting Vehicles (Southbound): [Truck #7,Truck #6,]

Truck #4 exited the bridge.

Truck #2 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #2,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #8,Truck #5,Truck #0,]

Waiting Vehicles (Southbound): [Truck #7,Truck #6,]

Truck #10 (northbound) arrived.

Truck #11 (southbound) arrived.

Truck #12 (southbound) arrived.

Truck #13 (southbound) arrived.

Truck #14 (northbound) arrived.

Truck #15 (southbound) arrived.

Truck #16 (northbound) arrived.

Truck #17 (northbound) arrived.

Truck #18 (northbound) arrived.

Truck #19 (northbound) arrived.

Truck #2 exited the bridge.

Truck #17 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #17,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #19,Truck #18,Truck #16,Truck #14,Truck #10,Truck #8,Truck #5,Truck #0,]

Waiting Vehicles (Southbound): [Truck #15,Truck #13,Truck #12,Truck #11,Truck #7,Truck #6,]

Truck #17 exited the bridge.

Truck #7 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #7,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #19,Truck #18,Truck #16,Truck #14,Truck #10,Truck #8,Truck #5,Truck #0,]

Waiting Vehicles (Southbound): [Truck #15,Truck #13,Truck #12,Truck #11,Truck #6,]

Truck #7 exited the bridge.

Truck #5 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #5,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #19,Truck #18,Truck #16,Truck #14,Truck #10,Truck #8,Truck #0,]

Waiting Vehicles (Southbound): [Truck #15,Truck #13,Truck #12,Truck #11,Truck #6,]

Truck #5 exited the bridge.

Truck #11 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #11,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #19,Truck #18,Truck #16,Truck #14,Truck #10,Truck #8,Truck #0,]

Waiting Vehicles (Southbound): [Truck #15,Truck #13,Truck #12,Truck #6,]

Truck #11 exited the bridge.

Truck #8 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #8,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #19,Truck #18,Truck #16,Truck #14,Truck #10,Truck #0,]

Waiting Vehicles (Southbound): [Truck #15,Truck #13,Truck #12,Truck #6,]

Truck #8 exited the bridge.

Truck #12 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #12,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #19,Truck #18,Truck #16,Truck #14,Truck #10,Truck #0,]

Waiting Vehicles (Southbound): [Truck #15,Truck #13,Truck #6,]

Truck #12 exited the bridge.

Truck #0 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #0,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #19,Truck #18,Truck #16,Truck #14,Truck #10,]

Waiting Vehicles (Southbound): [Truck #15,Truck #13,Truck #6,]

Truck #0 exited the bridge.

Truck #13 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #13,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #19,Truck #18,Truck #16,Truck #14,Truck #10,]

Waiting Vehicles (Southbound): [Truck #15,Truck #6,]

Truck #13 exited the bridge.

Truck #19 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #19,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #18,Truck #16,Truck #14,Truck #10,]

Waiting Vehicles (Southbound): [Truck #15,Truck #6,]

Truck #19 exited the bridge.

Truck #15 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #15,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #18,Truck #16,Truck #14,Truck #10,]

Waiting Vehicles (Southbound): [Truck #6,]

Truck #15 exited the bridge.

Truck #10 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #10,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #18,Truck #16,Truck #14,]

Waiting Vehicles (Southbound): [Truck #6,]

Truck #10 exited the bridge.

Truck #6 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Truck #6,]
Now 0 cars are moving.
Now 1 trucks are moving.
Waiting Vehicles (northbound): [Truck #18,Truck #16,Truck #14,]
Waiting Vehicles (Southbound): []

Truck #6 exited the bridge.

Truck #14 (Northbound) is now crossing the bridge.
Vehicles on the bridge: [Truck #14,]
Now 0 cars are moving.
Now 1 trucks are moving.
Waiting Vehicles (northbound): [Truck #18,Truck #16,]
Waiting Vehicles (Southbound): []

Truck #14 exited the bridge.

Truck #16 (Northbound) is now crossing the bridge.
Vehicles on the bridge: [Truck #16,]
Now 0 cars are moving.
Now 1 trucks are moving.
Waiting Vehicles (northbound): [Truck #18,]
Waiting Vehicles (Southbound): []

Truck #16 exited the bridge.

Truck #18 (Northbound) is now crossing the bridge.
Vehicles on the bridge: [Truck #18,]
Now 0 cars are moving.
Now 1 trucks are moving.
Waiting Vehicles (northbound): []
Waiting Vehicles (Southbound): []

Truck #18 exited the bridge.

Finished execution.

j0;camerone@turing: ~/OS/HW3 [01;32mcamerone@turing[00m:[01;34m~/OS/HW3[00m\$
./bridge_crossing

Please select one Schedules from the following six options:

1. 10 : DELAY(10) : 10
car/truck probability: [1.0, 0.0]

2. 10 : DELAY(10) : 10
car/truck probability: [0.0, 1.0]
3. 20
car/truck probability: [0.65, 0.35]
4. 10 : DELAY(25) : 10 : DELAY(25) : 10
car/truck probability: [0.5, 0.5]
5. 10 : DELAY(3) : 10 : DELAY(10): 10
car/truck probability: [0.65, 0.35]
6. 20 : DELAY(15) : 10
car/truck probability: [0.75, 0.25]

Please select [1-6]:3

Truck #0 (southbound) arrived.

Car #1 (northbound) arrived.

Car #2 (northbound) arrived.

Truck #3 (southbound) arrived.

Car #4 (southbound) arrived.

Car #5 (northbound) arrived.

Car #6 (southbound) arrived.

Car #7 (southbound) arrived.

Car #8 (southbound) arrived.

Car #9 (southbound) arrived.

Car #10 (southbound) arrived.

Car #11 (northbound) arrived.

Truck #12 (northbound) arrived.

Truck #13 (southbound) arrived.

Car #14 (southbound) arrived.

Car #15 (southbound) arrived.

Truck #16 (northbound) arrived.

Car #17 (northbound) arrived.

Truck #18 (northbound) arrived.

Car #19 (northbound) arrived.

Truck #0 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #0,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Truck #18,Car #17,Truck #16,Truck #12,Car #11,Car #5,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #15,Car #14,Truck #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #4,Truck #3,]

Truck #0 exited the bridge.

Truck #12 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #12,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Truck #18,Car #17,Truck #16,Car #11,Car #5,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #15,Car #14,Truck #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #4,Truck #3,]

Truck #12 exited the bridge.

Truck #3 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #3,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Truck #18,Car #17,Truck #16,Car #11,Car #5,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #15,Car #14,Truck #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #4,]

Truck #3 exited the bridge.

Truck #16 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #16,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Truck #18,Car #17,Car #11,Car #5,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #15,Car #14,Truck #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #4,]

Truck #16 exited the bridge.

Truck #13 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #13,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Truck #18,Car #17,Car #11,Car #5,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #15,Car #14,Car #10,Car #9,Car #8,Car #7,Car #6,Car #4,]

Truck #13 exited the bridge.

Truck #18 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #18,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #17,Car #11,Car #5,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #15,Car #14,Car #10,Car #9,Car #8,Car #7,Car #6,Car #4,]

Truck #18 exited the bridge.

Car #5 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #5,]

Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #17,Car #11,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #15,Car #14,Car #10,Car #9,Car #8,Car #7,Car #6,Car #4,]

Car #2 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #2,Car #5,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #17,Car #11,Car #1,]

Waiting Vehicles (Southbound): [Car #15,Car #14,Car #10,Car #9,Car #8,Car #7,Car #6,Car #4,]

Car #1 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #1,Car #2,Car #5,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #17,Car #11,]

Waiting Vehicles (Southbound): [Car #15,Car #14,Car #10,Car #9,Car #8,Car #7,Car #6,Car #4,]

Car #5 exited the bridge.

Car #11 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #11,Car #1,Car #2,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #17,]

Waiting Vehicles (Southbound): [Car #15,Car #14,Car #10,Car #9,Car #8,Car #7,Car #6,Car #4,]

Car #2 exited the bridge.

Car #19 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #19,Car #11,Car #1,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #17,]

Waiting Vehicles (Southbound): [Car #15,Car #14,Car #10,Car #9,Car #8,Car #7,Car #6,Car #4,]

Car #1 exited the bridge.

Car #17 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #17,Car #19,Car #11,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): []

Waiting Vehicles (Southbound): [Car #15,Car #14,Car #10,Car #9,Car #8,Car #7,Car #6,Car #4,]

Car #11 exited the bridge.

Car #19 exited the bridge.

Car #17 exited the bridge.

Car #4 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #4,]

Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): []

Waiting Vehicles (Southbound): [Car #15,Car #14,Car #10,Car #9,Car #8,Car #7,Car #6,]

Car #14 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #14,Car #4,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): []

Waiting Vehicles (Southbound): [Car #15,Car #10,Car #9,Car #8,Car #7,Car #6,]

Car #15 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #15,Car #14,Car #4,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): []

Waiting Vehicles (Southbound): [Car #10,Car #9,Car #8,Car #7,Car #6,]

Car #4 exited the bridge.

Car #6 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #6,Car #15,Car #14,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): []

Waiting Vehicles (Southbound): [Car #10,Car #9,Car #8,Car #7,]

Car #14 exited the bridge.

Car #10 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #10,Car #6,Car #15,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): []

Waiting Vehicles (Southbound): [Car #9,Car #8,Car #7,]

Car #15 exited the bridge.

Car #9 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #9,Car #10,Car #6,]

Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): []
Waiting Vehicles (Southbound): [Car #8,Car #7,]

Car #6 exited the bridge.

Car #8 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Car #8,Car #9,Car #10,]
Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): []
Waiting Vehicles (Southbound): [Car #7,]

Car #10 exited the bridge.

Car #7 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Car #7,Car #8,Car #9,]
Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): []
Waiting Vehicles (Southbound): []

Car #9 exited the bridge.

Car #8 exited the bridge.

Car #7 exited the bridge.

Finished execution.

[0;camerone@turing: ~/OS/HW3 [01;32mcamerone@turing[00m:[01;34m~/OS/HW3[00m\$
./bridge_crossing

Please select one Schedules from the following six options:

1. 10 : DELAY(10) : 10
car/truck probability: [1.0, 0.0]
2. 10 : DELAY(10) : 10
car/truck probability: [0.0, 1.0]
3. 20
car/truck probability: [0.65, 0.35]
4. 10 : DELAY(25) : 10 : DELAY(25) : 10
car/truck probability: [0.5, 0.5]
5. 10 : DELAY(3) : 10 : DELAY(10): 10
car/truck probability: [0.65, 0.35]

6. 20 : DELAY(15) : 10
car/truck probability: [0.75, 0.25]

Please select [1-6]:4

Truck #0 (southbound) arrived.

Car #1 (southbound) arrived.

Car #2 (southbound) arrived.

Truck #3 (southbound) arrived.

Car #4 (northbound) arrived.

Car #5 (northbound) arrived.

Truck #6 (northbound) arrived.

Truck #7 (southbound) arrived.

Truck #8 (northbound) arrived.

Truck #9 (southbound) arrived.

Truck #9 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #9,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #8,Truck #6,Car #5,Car #4,]

Waiting Vehicles (Southbound): [Truck #7,Truck #3,Car #2,Car #1,Truck #0,]

Truck #9 exited the bridge.

Truck #6 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #6,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #8,Car #5,Car #4,]

Waiting Vehicles (Southbound): [Truck #7,Truck #3,Car #2,Car #1,Truck #0,]

Truck #6 exited the bridge.

Truck #0 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Truck #0,]
Now 0 cars are moving.
Now 1 trucks are moving.
Waiting Vehicles (northbound): [Truck #8,Car #5,Car #4,]
Waiting Vehicles (Southbound): [Truck #7,Truck #3,Car #2,Car #1,]

Truck #0 exited the bridge.

Truck #8 (Northbound) is now crossing the bridge.
Vehicles on the bridge: [Truck #8,]
Now 0 cars are moving.
Now 1 trucks are moving.
Waiting Vehicles (northbound): [Car #5,Car #4,]
Waiting Vehicles (Southbound): [Truck #7,Truck #3,Car #2,Car #1,]

Truck #8 exited the bridge.

Truck #3 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Truck #3,]
Now 0 cars are moving.
Now 1 trucks are moving.
Waiting Vehicles (northbound): [Car #5,Car #4,]
Waiting Vehicles (Southbound): [Truck #7,Car #2,Car #1,]

Truck #3 exited the bridge.

Truck #7 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Truck #7,]
Now 0 cars are moving.
Now 1 trucks are moving.
Waiting Vehicles (northbound): [Car #5,Car #4,]
Waiting Vehicles (Southbound): [Car #2,Car #1,]

Truck #7 exited the bridge.

Car #2 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Car #2,]
Now 1 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): [Car #5,Car #4,]
Waiting Vehicles (Southbound): [Car #1,]

Car #1 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #1,Car #2,]
Now 2 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): [Car #5,Car #4,]
Waiting Vehicles (Southbound): []

Car #2 exited the bridge.

Car #1 exited the bridge.

Car #5 (Northbound) is now crossing the bridge.
Vehicles on the bridge: [Car #5,]
Now 1 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): [Car #4,]
Waiting Vehicles (Southbound): []

Car #4 (Northbound) is now crossing the bridge.
Vehicles on the bridge: [Car #4,Car #5,]
Now 2 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): []
Waiting Vehicles (Southbound): []

Car #5 exited the bridge.

Car #4 exited the bridge.

Truck #10 (southbound) arrived.

Truck #11 (northbound) arrived.

Car #12 (southbound) arrived.

Truck #13 (northbound) arrived.

Car #14 (southbound) arrived.

Car #15 (northbound) arrived.

Car #16 (southbound) arrived.

Truck #17 (northbound) arrived.

Truck #18 (southbound) arrived.

Car #19 (northbound) arrived.

Truck #10 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #10,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Truck #17,Car #15,Truck #13,Truck #11,]

Waiting Vehicles (Southbound): [Truck #18,Car #16,Car #14,Car #12,]

Truck #10 exited the bridge.

Truck #11 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #11,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Truck #17,Car #15,Truck #13,]

Waiting Vehicles (Southbound): [Truck #18,Car #16,Car #14,Car #12,]

Truck #11 exited the bridge.

Truck #18 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #18,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Truck #17,Car #15,Truck #13,]

Waiting Vehicles (Southbound): [Car #16,Car #14,Car #12,]

Truck #18 exited the bridge.

Truck #13 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #13,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Truck #17,Car #15,]

Waiting Vehicles (Southbound): [Car #16,Car #14,Car #12,]

Truck #13 exited the bridge.

Truck #17 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #17,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #15,]
Waiting Vehicles (Southbound): [Car #16,Car #14,Car #12,]

Truck #17 exited the bridge.

Car #15 (Northbound) is now crossing the bridge.
Vehicles on the bridge: [Car #15,]
Now 1 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): [Car #19,]
Waiting Vehicles (Southbound): [Car #16,Car #14,Car #12,]

Car #19 (Northbound) is now crossing the bridge.
Vehicles on the bridge: [Car #19,Car #15,]
Now 2 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): []
Waiting Vehicles (Southbound): [Car #16,Car #14,Car #12,]

Car #15 exited the bridge.

Car #19 exited the bridge.

Car #12 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Car #12,]
Now 1 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): []
Waiting Vehicles (Southbound): [Car #16,Car #14,]

Car #14 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Car #14,Car #12,]
Now 2 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): []
Waiting Vehicles (Southbound): [Car #16,]

Car #16 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Car #16,Car #14,Car #12,]
Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): []
Waiting Vehicles (Southbound): []

Car #12 exited the bridge.

Car #14 exited the bridge.

Car #16 exited the bridge.

Truck #20 (southbound) arrived.

Truck #21 (southbound) arrived.

Truck #22 (northbound) arrived.

Truck #23 (southbound) arrived.

Car #24 (southbound) arrived.

Car #25 (southbound) arrived.

Car #26 (northbound) arrived.

Car #27 (southbound) arrived.

Truck #28 (southbound) arrived.

Truck #29 (southbound) arrived.

Truck #29 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #29,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #26,Truck #22,]

Waiting Vehicles (Southbound): [Truck #28,Car #27,Car #25,Car #24,Truck #23,Truck #21,Truck #20,]

Truck #29 exited the bridge.

Truck #22 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #22,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #26,]

Waiting Vehicles (Southbound): [Truck #28,Car #27,Car #25,Car #24,Truck #23,Truck #21,Truck #20,]

Truck #22 exited the bridge.

Truck #21 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #21,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #26,]

Waiting Vehicles (Southbound): [Truck #28, Car #27, Car #25, Car #24, Truck #23, Truck #20,]

Truck #21 exited the bridge.

Truck #23 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #23,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #26,]

Waiting Vehicles (Southbound): [Truck #28, Car #27, Car #25, Car #24, Truck #20,]

Truck #23 exited the bridge.

Truck #28 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #28,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #26,]

Waiting Vehicles (Southbound): [Car #27, Car #25, Car #24, Truck #20,]

Truck #28 exited the bridge.

Truck #20 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #20,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #26,]

Waiting Vehicles (Southbound): [Car #27, Car #25, Car #24,]

Truck #20 exited the bridge.

Car #25 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #25,]

Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #26,]

Waiting Vehicles (Southbound): [Car #27, Car #24,]

Car #24 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #24,Car #25,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #26,]

Waiting Vehicles (Southbound): [Car #27,]

Car #27 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #27,Car #24,Car #25,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #26,]

Waiting Vehicles (Southbound): []

Car #25 exited the bridge.

Car #24 exited the bridge.

Car #27 exited the bridge.

Car #26 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #26,]

Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): []

Waiting Vehicles (Southbound): []

Car #26 exited the bridge.

Finished execution.

]0;camerone@turing: ~/OS/HW3 [01;32mcamerone@turing[00m:[01;34m~/OS/HW3[00m\$
./bridge_crossing

Please select one Schedules from the following six options:

1. 10 : DELAY(10) : 10
car/truck probability: [1.0, 0.0]
2. 10 : DELAY(10) : 10
car/truck probability: [0.0, 1.0]
3. 20
car/truck probability: [0.65, 0.35]
4. 10 : DELAY(25) : 10 : DELAY(25) : 10
car/truck probability: [0.5, 0.5]
5. 10 : DELAY(3) : 10 : DELAY(10): 10

car/truck probability: [0.65, 0.35]
6. 20 : DELAY(15) : 10
car/truck probability: [0.75, 0.25]

Please select [1-6]:5

Truck #0 (northbound) arrived.

Car #1 (northbound) arrived.

Car #2 (northbound) arrived.

Truck #3 (southbound) arrived.

Truck #4 (northbound) arrived.

Car #5 (southbound) arrived.

Car #6 (northbound) arrived.

Car #7 (northbound) arrived.

Car #8 (northbound) arrived.

Car #9 (northbound) arrived.

Truck #0 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #0,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #9,Car #8,Car #7,Car #6,Truck #4,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #5,Truck #3,]

Truck #0 exited the bridge.

Truck #3 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #3,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #9,Car #8,Car #7,Car #6,Truck #4,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #5,]

Car #10 (northbound) arrived.

Truck #11 (southbound) arrived.

Car #12 (southbound) arrived.

Car #13 (northbound) arrived.

Car #14 (northbound) arrived.

Car #15 (northbound) arrived.

Truck #16 (northbound) arrived.

Car #17 (southbound) arrived.

Car #18 (southbound) arrived.

Truck #19 (southbound) arrived.

Truck #3 exited the bridge.

Truck #4 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #4,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #16, Car #15, Car #14, Car #13, Car #10, Car #9, Car #8, Car #7, Car #6, Car #2, Car #1,]

Waiting Vehicles (Southbound): [Truck #19, Car #18, Car #17, Car #12, Truck #11, Car #5,]

Truck #4 exited the bridge.

Truck #19 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #19,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #16, Car #15, Car #14, Car #13, Car #10, Car #9, Car #8, Car #7, Car #6, Car #2, Car #1,]

Waiting Vehicles (Southbound): [Car #18, Car #17, Car #12, Truck #11, Car #5,]

Truck #19 exited the bridge.

Truck #16 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #16,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #15,Car #14,Car #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #18,Car #17,Car #12,Truck #11,Car #5,]

Truck #16 exited the bridge.

Truck #11 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #11,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #15,Car #14,Car #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #18,Car #17,Car #12,Car #5,]

Truck #11 exited the bridge.

Car #5 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #5,]

Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #15,Car #14,Car #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #18,Car #17,Car #12,]

Car #12 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #12,Car #5,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #15,Car #14,Car #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #18,Car #17,]

Car #17 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #17,Car #12,Car #5,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #15,Car #14,Car #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #18,]

Truck #20 (northbound) arrived.

Truck #21 (southbound) arrived.

Truck #22 (southbound) arrived.

Truck #23 (southbound) arrived.

Car #24 (northbound) arrived.

Car #25 (southbound) arrived.

Car #26 (southbound) arrived.

Truck #27 (northbound) arrived.

Car #28 (northbound) arrived.

Truck #29 (northbound) arrived.

Car #5 exited the bridge.

Car #12 exited the bridge.

Car #17 exited the bridge.

Truck #27 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #27,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #29,Car #28,Car #24,Truck #20,Car #15,Car #14,Car #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #26,Car #25,Truck #23,Truck #22,Truck #21,Car #18,]

Truck #27 exited the bridge.

Truck #21 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #21,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Truck #29,Car #28,Car #24,Truck #20,Car #15,Car #14,Car #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #26,Car #25,Truck #23,Truck #22,Car #18,]

Truck #21 exited the bridge.

Truck #29 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #29,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #24,Truck #20,Car #15,Car #14,Car #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #26,Car #25,Truck #23,Truck #22,Car #18,]

Truck #29 exited the bridge.

Truck #22 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #22,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #24,Truck #20,Car #15,Car #14,Car #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #26,Car #25,Truck #23,Car #18,]

Truck #22 exited the bridge.

Truck #20 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #20,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #24,Car #15,Car #14,Car #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #26,Car #25,Truck #23,Car #18,]

Truck #20 exited the bridge.

Truck #23 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #23,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #24,Car #15,Car #14,Car #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #26,Car #25,Car #18,]

Truck #23 exited the bridge.

Car #25 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #25,]

Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #24,Car #15,Car #14,Car #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #26,Car #18,]

Car #26 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #26,Car #25,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #24,Car #15,Car #14,Car #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): [Car #18,]

Car #18 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #18,Car #26,Car #25,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #24,Car #15,Car #14,Car #13,Car #10,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): []

Car #25 exited the bridge.

Car #26 exited the bridge.

Car #18 exited the bridge.

Car #10 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #10,]

Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #24,Car #15,Car #14,Car #13,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): []

Car #14 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #14,Car #10,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #24,Car #15,Car #13,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): []

Car #13 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #13,Car #14,Car #10,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #24,Car #15,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): []

Car #10 exited the bridge.

Car #15 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #15,Car #13,Car #14,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #24,Car #9,Car #8,Car #7,Car #6,Car #2,Car #1,]

Waiting Vehicles (Southbound): []

Car #14 exited the bridge.

Car #1 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #1,Car #15,Car #13,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #24,Car #9,Car #8,Car #7,Car #6,Car #2,]

Waiting Vehicles (Southbound): []

Car #13 exited the bridge.

Car #9 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #9,Car #1,Car #15,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #24,Car #8,Car #7,Car #6,Car #2,]

Waiting Vehicles (Southbound): []

Car #15 exited the bridge.

Car #6 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #6,Car #9,Car #1,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #24,Car #8,Car #7,Car #2,]

Waiting Vehicles (Southbound): []

Car #1 exited the bridge.

Car #8 (Northbound) is now crossing the bridge.
Vehicles on the bridge: [Car #8,Car #6,Car #9,]
Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): [Car #28,Car #24,Car #7,Car #2,]
Waiting Vehicles (Southbound): []

Car #9 exited the bridge.

Car #28 (Northbound) is now crossing the bridge.
Vehicles on the bridge: [Car #28,Car #8,Car #6,]
Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): [Car #24,Car #7,Car #2,]
Waiting Vehicles (Southbound): []

Car #6 exited the bridge.

Car #2 (Northbound) is now crossing the bridge.
Vehicles on the bridge: [Car #2,Car #28,Car #8,]
Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): [Car #24,Car #7,]
Waiting Vehicles (Southbound): []

Car #8 exited the bridge.

Car #24 (Northbound) is now crossing the bridge.
Vehicles on the bridge: [Car #24,Car #2,Car #28,]
Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): [Car #7,]
Waiting Vehicles (Southbound): []

Car #28 exited the bridge.

Car #7 (Northbound) is now crossing the bridge.
Vehicles on the bridge: [Car #7,Car #24,Car #2,]
Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): []
Waiting Vehicles (Southbound): []

Car #2 exited the bridge.

Car #24 exited the bridge.

Car #7 exited the bridge.

Finished execution.

```
]0;camerone@turing: ~/OS/HW3 [01;32mcamerone@turing[00m:[01;34m~/OS/HW3[00m$  
./bridge_crossing
```

Please select one Schedules from the following six options:

1. 10 : DELAY(10) : 10
car/truck probability: [1.0, 0.0]
2. 10 : DELAY(10) : 10
car/truck probability: [0.0, 1.0]
3. 20
car/truck probability: [0.65, 0.35]
4. 10 : DELAY(25) : 10 : DELAY(25) : 10
car/truck probability: [0.5, 0.5]
5. 10 : DELAY(3) : 10 : DELAY(10): 10
car/truck probability: [0.65, 0.35]
6. 20 : DELAY(15) : 10
car/truck probability: [0.75, 0.25]

Please select [1-6]:6

Car #0 (northbound) arrived.

Truck #1 (southbound) arrived.

Car #2 (southbound) arrived.

Car #3 (southbound) arrived.

Truck #4 (southbound) arrived.

Car #5 (southbound) arrived.

Car #6 (northbound) arrived.

Car #7 (southbound) arrived.

Car #8 (northbound) arrived.

Truck #9 (northbound) arrived.

Car #10 (northbound) arrived.

Truck #11 (southbound) arrived.

Car #12 (northbound) arrived.

Truck #13 (southbound) arrived.

Car #14 (northbound) arrived.

Car #15 (southbound) arrived.

Car #16 (southbound) arrived.

Car #17 (northbound) arrived.

Car #18 (northbound) arrived.

Car #19 (northbound) arrived.

Truck #1 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #1,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #18,Car #17,Car #14,Car #12,Car #10,Truck #9,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): [Car #16,Car #15,Truck #13,Truck #11,Car #7,Car #5,Truck #4,Car #3,Car #2,]

Truck #1 exited the bridge.

Truck #9 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #9,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #18,Car #17,Car #14,Car #12,Car #10,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): [Car #16,Car #15,Truck #13,Truck #11,Car #7,Car #5,Truck #4,Car #3,Car #2,]

Truck #9 exited the bridge.

Truck #4 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #4,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #18,Car #17,Car #14,Car #12,Car #10,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): [Car #16,Car #15,Truck #13,Truck #11,Car #7,Car #5,Car #3,Car #2,]

Truck #4 exited the bridge.

Truck #11 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #11,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #18,Car #17,Car #14,Car #12,Car #10,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): [Car #16,Car #15,Truck #13,Car #7,Car #5,Car #3,Car #2,]

Truck #11 exited the bridge.

Truck #13 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #13,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #18,Car #17,Car #14,Car #12,Car #10,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): [Car #16,Car #15,Car #7,Car #5,Car #3,Car #2,]

Truck #13 exited the bridge.

Car #2 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #2,]

Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #18,Car #17,Car #14,Car #12,Car #10,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): [Car #16,Car #15,Car #7,Car #5,Car #3,]

Car #3 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #3,Car #2,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #18,Car #17,Car #14,Car #12,Car #10,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): [Car #16,Car #15,Car #7,Car #5,]

Car #5 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #5,Car #3,Car #2,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #18,Car #17,Car #14,Car #12,Car #10,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): [Car #16,Car #15,Car #7,]

Car #2 exited the bridge.

Car #15 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #15,Car #5,Car #3,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #18,Car #17,Car #14,Car #12,Car #10,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): [Car #16,Car #7,]

Car #3 exited the bridge.

Car #16 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #16,Car #15,Car #5,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #18,Car #17,Car #14,Car #12,Car #10,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): [Car #7,]

Car #5 exited the bridge.

Car #7 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #7,Car #16,Car #15,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #18,Car #17,Car #14,Car #12,Car #10,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): []

Car #15 exited the bridge.

Car #16 exited the bridge.

Car #7 exited the bridge.

Car #12 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #12,]

Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #18,Car #17,Car #14,Car #10,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): []

Car #14 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #14,Car #12,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #18,Car #17,Car #10,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): []

Car #17 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #17,Car #14,Car #12,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #19,Car #18,Car #10,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): []

Car #20 (southbound) arrived.

Car #21 (southbound) arrived.

Car #22 (northbound) arrived.

Car #23 (northbound) arrived.

Car #24 (southbound) arrived.

Car #25 (southbound) arrived.

Car #26 (southbound) arrived.

Car #27 (southbound) arrived.

Car #28 (northbound) arrived.

Truck #29 (northbound) arrived.

Car #12 exited the bridge.

Car #14 exited the bridge.

Car #17 exited the bridge.

Truck #29 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Truck #29,]

Now 0 cars are moving.

Now 1 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #23,Car #22,Car #19,Car #18,Car #10,Car #8,Car #6,Car #0,]

Waiting Vehicles (Southbound): [Car #27,Car #26,Car #25,Car #24,Car #21,Car #20,]

Truck #29 exited the bridge.

Car #0 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #0,]

Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #23,Car #22,Car #19,Car #18,Car #10,Car #8,Car #6,]

Waiting Vehicles (Southbound): [Car #27,Car #26,Car #25,Car #24,Car #21,Car #20,]

Car #19 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #19,Car #0,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #23,Car #22,Car #18,Car #10,Car #8,Car #6,]

Waiting Vehicles (Southbound): [Car #27,Car #26,Car #25,Car #24,Car #21,Car #20,]

Car #18 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #18,Car #19,Car #0,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #23,Car #22,Car #10,Car #8,Car #6,]

Waiting Vehicles (Southbound): [Car #27,Car #26,Car #25,Car #24,Car #21,Car #20,]

Car #0 exited the bridge.

Car #10 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #10,Car #18,Car #19,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #23,Car #22,Car #8,Car #6,]

Waiting Vehicles (Southbound): [Car #27,Car #26,Car #25,Car #24,Car #21,Car #20,]

Car #18 exited the bridge.

Car #22 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #22,Car #10,Car #19,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #23,Car #8,Car #6,]

Waiting Vehicles (Southbound): [Car #27,Car #26,Car #25,Car #24,Car #21,Car #20,]

Car #19 exited the bridge.

Car #8 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #8,Car #22,Car #10,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #23,Car #6,]

Waiting Vehicles (Southbound): [Car #27,Car #26,Car #25,Car #24,Car #21,Car #20,]

Car #10 exited the bridge.

Car #6 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #6,Car #8,Car #22,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #28,Car #23,]

Waiting Vehicles (Southbound): [Car #27,Car #26,Car #25,Car #24,Car #21,Car #20,]

Car #22 exited the bridge.

Car #28 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #28,Car #6,Car #8,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): [Car #23,]

Waiting Vehicles (Southbound): [Car #27,Car #26,Car #25,Car #24,Car #21,Car #20,]

Car #8 exited the bridge.

Car #23 (Northbound) is now crossing the bridge.

Vehicles on the bridge: [Car #23,Car #28,Car #6,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): []

Waiting Vehicles (Southbound): [Car #27,Car #26,Car #25,Car #24,Car #21,Car #20,]

Car #6 exited the bridge.

Car #28 exited the bridge.

Car #23 exited the bridge.

Car #20 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #20,]

Now 1 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): []

Waiting Vehicles (Southbound): [Car #27,Car #26,Car #25,Car #24,Car #21,]

Car #24 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #24,Car #20,]

Now 2 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): []

Waiting Vehicles (Southbound): [Car #27,Car #26,Car #25,Car #21,]

Car #21 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #21,Car #24,Car #20,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): []

Waiting Vehicles (Southbound): [Car #27,Car #26,Car #25,]

Car #20 exited the bridge.

Car #26 (Southbound) is now crossing the bridge.

Vehicles on the bridge: [Car #26,Car #21,Car #24,]

Now 3 cars are moving.

Now 0 trucks are moving.

Waiting Vehicles (northbound): []

Waiting Vehicles (Southbound): [Car #27,Car #25,]

Car #21 exited the bridge.

Car #25 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Car #25,Car #26,Car #24,]
Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): []
Waiting Vehicles (Southbound): [Car #27,]

Car #24 exited the bridge.

Car #27 (Southbound) is now crossing the bridge.
Vehicles on the bridge: [Car #27,Car #25,Car #26,]
Now 3 cars are moving.
Now 0 trucks are moving.
Waiting Vehicles (northbound): []
Waiting Vehicles (Southbound): []

Car #26 exited the bridge.

Car #25 exited the bridge.

Car #27 exited the bridge.

Finished execution.