Homework 4 Report - CSE344

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1 Composition

For this project I used multiple files for readability purposes. There is main.c, parsearg.c, parsearg.h, utils.c, utils.h, types.h, queue.c and queue.h

2 Program logic

In this homeowork I implemented a producer consumer problem yet again. Producer is thread H and it is not called like that in my code but is called cheating student.
Consumer is the main thread and it is called main thread in my code. For this I used 3 semaphores. One empty sem, one full sem and one for protecting the access to the buffer.
Each student-for-hire has its own 2 semaphores for synchronization. One of them is used so that they could wait from the main thread the sign that they can do the given homework. Another semaphore just indicates if the given student-to-hire is currently busy (or to be more precise it is there so that if it is currently busy and is maybe needed it can be waited upon).
There is another semaphore also which is a semaphore that indicates if there is at least one student-to-hire available. This way main thread would wait for a student-to-hire if it is not currently available.
In the case when there is not enough money for the ideal either quality or speed, the cheapest student-to-hire will be waited upon and the assignment would be given to them.

3 Testing

I tested this program using the example file provided

- Test 1: Checking the program using the example file provided

Figure 1: Test1

Test 2: Checking the program using the example file provided with 100 000 TL now meaning it will exit because all the homeworks are finished

```
electron@electron-Lenovo-ideapad-Y700-15ISK:~/Desktop/3.2 GTU/CSE344 - Systems programming/Homeworks/Homework 4$ ./a.out homeworks students-for-hire 100000
5 students-for-hire threads have been created.
Name     Q     S     C
odtulu 5 3 900
bogazicili 4 5 1000
itulu 4 4 800
ytulu 3 4 650
sakaryali 1 2 150

odtulu is waiting for homework

bogazicili is waiting for homework

itulu is waiting for homework

ytulu is waiting for homework

sakaryali is waiting for homework
sakaryali is solving homework C for 150, H has 99850TL
bogazicili is solving homework S for 1000, H has 98850TL
odtulu is solving homework Q for 900, H has 97950TL
ytulu is solving homework C for 650, H has 97300TL
itulu is solving homework S for 800, H has 96500TL

bogazicili is waiting for homework
bogazicili is solving homework Q for 1000, H has 95500TL

ytulu is waiting for homework

itulu is waiting for homework
ytulu is solving homework C for 650, H has 94850TL

bogazicili is waiting for homework
bogazicili is solving homework S for 1000, H has 93850TL
itulu is solving homework Q for 800, H has 93050TL

odtulu is waiting for homework
odtulu is solving homework C for 900, H has 92150TL

bogazicili is waiting for homework
bogazicili is solving homework S for 1000, H has 91150TL

sakaryali is waiting for homework
sakaryali is solving homework C for 150, H has 91000TL
```

```
sakaryali is waiting for homework
sakaryali is solving homework C for 150, H has 91000TL

ytulu is waiting for homework
ytulu is solving homework Q for 650, H has 90350TL

itulu is waiting for homework

bogazicili is waiting for homework
bogazicili is solving homework S for 1000, H has 89350TL
itulu is solving homework C for 800, H has 88550TL

bogazicili is waiting for homework
bogazicili is solving homework S for 1000, H has 87550TL

odtulu is waiting for homework
odtulu is solving homework S for 900, H has 86650TL

ytulu is waiting for homework
ytulu is solving homework C for 650, H has 86000TL

itulu is waiting for homework
itulu is solving homework Q for 800, H has 85200TL

bogazicili is waiting for homework
bogazicili is solving homework S for 1000, H has 84200TL

bogazicili is waiting for homework
bogazicili is solving homework C for 1000, H has 83200TL

sakaryali is waiting for homework
sakaryali is solving homework Q for 150, H has 83050TL

ytulu is waiting for homework
ytulu is solving homework C for 650, H has 82400TL

itulu is waiting for homework
itulu is solving homework Q for 800, H has 81600TL

bogazicili is waiting for homework
bogazicili is solving homework Q for 1000, H has 80600TL

odtulu is waiting for homework
```

```
odtulu is waiting for homework
odtulu is solving homework Q for 900, H has 79700TL

bogazicili is waiting for homework
bogazicili is solving homework S for 1000, H has 78700TL

ytulu is waiting for homework
ytulu is solving homework Q for 650, H has 78050TL

itulu is waiting for homework
itulu is solving homework S for 800, H has 77250TL

bogazicili is waiting for homework
bogazicili is solving homework C for 1000, H has 76250TL

bogazicili is waiting for homework
bogazicili is solving homework S for 1000, H has 75250TL

sakaryali is waiting for homework
sakaryali is solving homework S for 150, H has 75100TL

odtulu is waiting for homework
odtulu is solving homework C for 900, H has 74200TL

ytulu is waiting for homework
ytulu is solving homework S for 650, H has 73550TL

itulu is waiting for homework
itulu is solving homework C for 800, H has 72750TL

bogazicili is waiting for homework
bogazicili is solving homework S for 1000, H has 71750TL

bogazicili is waiting for homework
bogazicili is solving homework C for 1000, H has 70750TL

ytulu is waiting for homework

itulu is waiting for homework
itulu is solving homework S for 800, H has 69300TL
ytulu is solving homework C for 650, H has 70100TL

bogazicili is waiting for homework
bogazicili is solving homework C for 1000, H has 68300TL
H has no other homeworks, terminating
```

```
ytulu is waiting for homework

itulu is waiting for homework
itulu is solving homework S for 800, H has 69300TL
ytulu is solving homework C for 650, H has 70100TL

bogazicili is waiting for homework
bogazicili is solving homework C for 1000, H has 68300TL
H has no other homeworks, terminating

Homeworks solved and money made by the students
odtulu 5 4500
bogazicili 15 15000
itulu 8 6400
ytulu 8 5200
sakaryali 4 600
Total cost for 40 homeworks 31700TL
Money left at G's account: 68300TL
```

Figure 2: Test2

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