Data Structure Assignment [3]

Programming homework 1

Queueing in campus cafeteria

There is a campus cafeteria which offers regular and vegetarian food. When a customer enters the cafeteria, he/she has to pick up a plate and get in line to order food. Each plate was indexed by a random number. Cafeteria staff refill the plate stack from time to time.
There are two lines in the campus cafeteria, one for regular food and the other for vegetarian food. A customer can choose a line, as he/she prefers and joins at the end of it. After finishing ordering, he/she will leave the line from the front to check out.
In this assignment, please write a program with the data structure stack to stimulate the plate stack and the data structure queue to stimulate the lines.

Input:
A file containing several rows of the following operations:
PUSH N indicates the staff refills a plate index N into the plate stack.
POP indicates the customer takes a plate from the top of the plate stake.
ENQUEUE X indicates a customer joins the end of the line X.
DEQUEUE X indicates a customer at the front of the line X leaves the line to checkout.
Input stops when EOF (ctrl+z on windows) is read.

Output:
Print out the plate index of the customer who left after each DEQUEUE operation in separate lines.

Note:
- You will get zero point if you don't use "linked list" to implement this program.
- Please write your own implementation of stack and queue and its operations.

Execution:
In Windows: `Get-Content .\p1_input.txt | .\hw3_1.exe > .\p1_output.txt`
In Unix: `./hw3_1.out < p1_input.txt > p1_output.txt`

Input

```
PUSH 30
PUSH 98
PUSH 54
POP
ENQUEUE A
POP
ENQUEUE B
PUSH 1
PUSH 3
POP
ENQUEUE A
DEQUEUE A
DEQUEUE B
POP
ENQUEUE B
POP
ENQUEUE B
DEQUEUE A
DEQUEUE B
DEQUEUE B
^Z (EOF)
```

Output

```
54
98
3
1
30
```

Programming homework 2

Solitaire

There is a set of cards from {K,Q,J,10,9,8,7,6,5,4,3,2,A} in random order(No repetition) and put it into a linked list, then start to draw them out **from K to A**(You can only draw out a card from the front of the linked list), if the card at the front of the linked list is not the one to draw out, put it at the end of the linked list. Stop until all the cards have been drawn out.

Print out the state of your cards every time you draw out a card or you put a card to the end of the linked list.

Note:
You will get zero point if you don't use "linked list" to implement this program.

Execution:
In Windows: `Get-Content .\ p2_input.txt | .\hw3_2.exe > .\ p2_output.txt`
In Unix: `./hw3_2.out < p2_input.txt > p2_output.txt`

Input

```
K
3
5
9
A
10
2
8
4
Q
6
7
J
```

Output

K 3 5 9 A 10 2 8 4 Q 6 7 J *(K will be drawn out)*
3 5 9 A 10 2 8 4 Q 6 7 J
5 9 A 10 2 8 4 Q 6 7 J 3
9 A 10 2 8 4 Q 6 7 J 3 5
A 10 2 8 4 Q 6 7 J 3 5 9
10 2 8 4 Q 6 7 J 3 5 9 A
2 8 4 Q 6 7 J 3 5 9 A 10
8 4 Q 6 7 J 3 5 9 A 10 2
4 Q 6 7 J 3 5 9 A 10 2 8
Q 6 7 J 3 5 9 A 10 2 8 4 *(Q will be drawn out)*
6 7 J 3 5 9 A 10 2 8 4
…
…
2 A *(2 will be drawn out)*
A *(A will be drawn out)*

General information:

- Deadline: 2020/10/22 12:00.
- Submit your programming assignment to Moodle system.
- Submitted file format: student-ID_Name.zip, e.g. F12345678_王曉明.zip
- Following the bellow submitted directory structure, otherwise, **5 points will be deducted.**

```
| -- F12345678_王曉明
    | -- F12345678_王曉明.pdf
    | -- code_1
        | -- xxxxx.c
        | -- xxxxx.c
    | -- code_2
        | -- xxxxx.c
        | -- xxxxx.c
```

- Your submitted file must contain **Source Code** & **Readme file** (Program description)
- Late homework will not be accepted
- There is a “zero tolerance” for plagiarism. You will receive a score of zero if you get caught plagiarizing.

Course Provisions

1. Program execution environment : Windows、Linux
2. Programming language : C (standard: C11) (**Languages other than C are not accepted**)
3. Submitted programming homework must include **source code** in .c data type, and **readme document** in .pdf data type. You are required to address the **(1) result screenshot, (2) program architecture, (3) program functions and (4) how you design your program** in readme file. Do not just write the pseudo code or even just copy and paste your code!
4. **There is a "zero tolerance" for plagiarism. You will receive a score of zero if you get caught plagiarizing.**
5. Please submit your programing homework to moodle.
6. Late homework is not accepted.
7. Programming homework grade is divided into two parts: 80% for the code and 20% for the readme file. **Partial points will still be awarded if the output results of your program are partly correct**. The remaining grading standards are decided by the TAs.
8. **Please name the filename of your submitted compressed file (e.g. F12345678_王曉明.zip) after your student ID number. 20 points will be deducted otherwise.**

TA time of the course:

Mon. 15:00 - 17:00

Wed. 11:00 – 12:00

Lab location: CSIE Bldg. Room 65302

If you have any question, please make an appointment in advance.

You can also mail us about your questions.

TA e-mail: ta_@dblab.csie.ncku.edu.tw