

Homework 2.

- The file name of your homework (in PDF) should be in the format: “學號-作業編號.pdf”. For example: 00457999-hw2.pdf
- Please submit your homework to Tronclass before **2022/10/31 23:59**. (and later the solution will be uploaded to Tronclass ASAP for your preparation for MidTerm)

1. (20%) Given a stack of size 4, what is the stack in each step when we do the following commands:

push a, push b, pop, push c, pop, push d, push e, push f, pop, pop

top	Q[0]	Q[1]	Q[2]	Q[3]	Comments
-1					stack is empty
0	a				a is pushed
1	a	b			b is pushed
0	a				b is popped
1	a	c			c is pushed
0	a				c is popped
1	a	d			d is pushed
2	a	d	e		e is pushed
3	a	d	e	f	f is pushed
2	a	d	e		f is popped
1	a	d			e is popped

(表格列數不夠請自行增加)

2. (20%) Given a queue of size 5, what is the queue in each step when we do the following commands:

add a, add b, add c, delete, add d, add e, add f

front	rear	Q[0]	Q[1]	Q[2]	Q[3]	Q[4]	Comments
-1	-1						queue is empty
-1	0	a					a is added
-1	1	a	b				b is added
-1	2	a	b	c			c is added
0	2		b	c			a is deleted
0	3		b	c	d		d is added
0	4		b	c	d	e	e is added
0	4		b	c	d	e	queue is full

(表格列數不夠請自行增加)

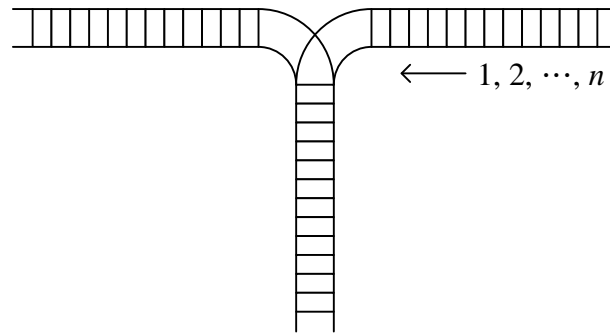
3. (20%) Given a circular queue of size 4, what is the queue in each step when we do the following commands:

add a, add b, add c, delete, add d, add e, delete, delete, delete, delete

front	rear	Q[0]	Q[1]	Q[2]	Q[3]	Comments
0	0					queue is empty
0	1		a			a is added
0	2		a	b		b is added
0	3		a	b	c	c is added
1	3			b	c	a is deleted
1	0	d		b	c	d is added
1	0	d		b	c	queue is full
2	0	d			c	b is deleted
3	0	d				c is deleted
0	0					d is deleted
0	0					queue is empty

(表格列數不夠請自行增加)

4. (10%) Consider the railroad switching network. Railroad cars numbered $1, 2, \dots, n$ are at the right. Each car is brought into the stack and removed at any time. For instance, if $n = 3$, we could move in 1, move in 2, move in 3, and then take the cars out, producing the new order 3, 2, 1. **Find all possible permutations for $n = 4$.**



Ans:

1234, 1243, 1324, 1342, 1432, 2134, 2143, 2314, 2341, 2431, 3214
3241, 3421, 4321

5. (20%) Write the postfix form of the following infix expressions:

(a) $(A * B) / C + D * E / ((F - G) \% H)$

(b) $(A \parallel (B \&\& C)) \parallel !(E < F)$

Ans:

(a) $AB * C / DE * FG - H \% / +$

(b) $A BC \&\& \parallel EF < ! \parallel$

6. (10%) Write the infix form of the following postfix expression:

$A B C > C D < \parallel ! \&\& ! C E > \parallel$

Ans: $!(A \&\& !(B > C \parallel C < D)) \parallel (C > E)$