W12-assignment

- Use pointer to pointer to implement memory allocation
- Use bitwise operation to manage your memory
- Two types of data (big and small)
- For big data, find two continuous spaces for that data
  - If no continuous spaces, response not found

- Only one “malloc” is allowed

```
tQueue* createQueue(void){
    tQueue *queue;
    queue=(tQueue *) malloc (sizeof(tQueue));
```

```
ryanpan@Ryan-Mac-mini-M2 2023-w12 % ./run

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
1
  Enter id:10
      byte_buf_mask: 0 0 0 0 0 0 0 1
      queue content: 10(1)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
1
  Enter id:11
      byte_buf_mask: 0 0 0 0 0 0 1 1
      queue content: 10(1) 11(1)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
1
  Enter id:12
      byte_buf_mask: 0 0 0 0 0 1 1 1
      queue content: 10(1) 11(1) 12(1)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
2
  Enter id:21
      byte_buf_mask: 0 0 0 1 1 1 1 1
      queue content: 10(1) 11(1) 12(1) 21(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
2
  Enter id:22
      byte_buf_mask: 0 1 1 1 1 1 1 1
      queue content: 10(1) 11(1) 12(1) 21(2) 22(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
2
  Enter id:23
    Enqueue False!!!
    Cannot enter to the queue
      byte_buf_mask: 0 1 1 1 1 1 1 1
      queue content: 10(1) 11(1) 12(1) 21(2) 22(2)
```

```
Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
3
  Enter an ID to remove 11
      byte_buf_mask: 0 1 1 1 1 1 0 1
      queue content: 10(1) 12(1) 21(2) 22(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
2
  Enter id:23
    Enqueue False!!!
    Cannot enter to the queue
      byte_buf_mask: 0 1 1 1 1 1 0 1
      queue content: 10(1) 12(1) 21(2) 22(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
3
  Enter an ID to remove 12
      byte_buf_mask: 0 1 1 1 1 0 0 1
      queue content: 10(1) 21(2) 22(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
2
  Enter id:23
      byte_buf_mask: 0 1 1 1 1 1 1 1
      queue content: 10(1) 21(2) 22(2) 23(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
4
  Enter an ID to remove 4
    Cannot find the target node
      byte_buf_mask: 0 1 1 1 1 1 1 1
      queue content: 10(1) 21(2) 22(2) 23(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
21
    No such operation
      queue content: 10(1) 21(2) 22(2) 23(2)
```

```
Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
4
  Enter an ID to remove 21
      byte_buf_mask: 0 1 1 0 0 1 1 1
      queue content: 10(1) 22(2) 23(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
4
  Enter an ID to remove 23
      byte_buf_mask: 0 1 1 0 0 0 0 1
      queue content: 10(1) 22(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
1
  Enter id:11
      byte_buf_mask: 0 1 1 0 0 0 1 1
      queue content: 10(1) 22(2) 11(1)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
2
  Enter id:23
      byte_buf_mask: 0 1 1 0 1 1 1 1
      queue content: 10(1) 22(2) 11(1) 23(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
2
  Enter id:24
    Enqueue False!!!
    Cannot enter to the queue
      byte_buf_mask: 0 1 1 0 1 1 1 1
      queue content: 10(1) 22(2) 11(1) 23(2)

Which type you are going to operate?
```

```
Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
3
  Enter an ID to remove 11
      byte_buf_mask: 0 1 1 0 1 1 0 1
      queue content: 10(1) 22(2) 23(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
2
  Enter id:24
    Enqueue False!!!
    Cannot enter to the queue
      byte_buf_mask: 0 1 1 0 1 1 0 1
      queue content: 10(1) 22(2) 23(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
3
  Enter an ID to remove 10
      byte_buf_mask: 0 1 1 0 1 1 0 0
      queue content: 22(2) 23(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
2
  Enter id:24
      byte_buf_mask: 0 1 1 0 1 1 1 1
      queue content: 22(2) 23(2) 24(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
1
  Enter id:10
      byte_buf_mask: 0 1 1 1 1 1 1 1
      queue content: 22(2) 23(2) 24(2) 10(1)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
1
  Enter id:11
      byte_buf_mask: 1 1 1 1 1 1 1 1
      queue content: 22(2) 23(2) 24(2) 10(1) 11(1)
```

```
Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
1
  Enter id:12
    Enqueue False!!!
    Cannot enter to the queue
      byte_buf_mask: 1 1 1 1 1 1 1 1
      queue content: 22(2) 23(2) 24(2) 10(1) 11(1)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
1
  Enter id:22
    Enqueue False!!!
    Cannot enter to the queue
      byte_buf_mask: 1 1 1 1 1 1 1 1
      queue content: 22(2) 23(2) 24(2) 10(1) 11(1)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
3
  Enter an ID to remove 19
    Cannot find the target node
      byte_buf_mask: 1 1 1 1 1 1 1 1
      queue content: 22(2) 23(2) 24(2) 10(1) 11(1)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
2
  Enter id:22
    Enqueue False!!!
    Cannot enter to the queue
      byte_buf_mask: 1 1 1 1 1 1 1 1
      queue content: 22(2) 23(2) 24(2) 10(1) 11(1)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
4
  Enter an ID to remove 22
      byte_buf_mask: 1 0 0 1 1 1 1 1
      queue content: 23(2) 24(2) 10(1) 11(1)
```

```
Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
4
  Enter an ID to remove 23
      byte_buf_mask: 1 0 0 1 0 0 1 1
      queue content: 24(2) 10(1) 11(1)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
4
  Enter an ID to remove 24
      byte_buf_mask: 1 0 0 1 0 0 0 0
      queue content: 10(1) 11(1)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
3
  Enter an ID to remove 10
      byte_buf_mask: 1 0 0 0 0 0 0 0
      queue content: 11(1)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
3
  Enter an ID to remove 11
      byte_buf_mask: 0 0 0 0 0 0 0 0
      queue content:

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
1
  Enter id:19
      byte_buf_mask: 0 0 0 0 0 0 0 1
      queue content: 19(1)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
2
  Enter id:21
      byte_buf_mask: 0 0 0 0 0 1 1 1
      queue content: 19(1) 21(2)
```

```
Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
2
  Enter id:22
      byte_buf_mask: 0 0 0 1 1 1 1 1
      queue content: 19(1) 21(2) 22(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
2
  Enter id:23
      byte_buf_mask: 0 1 1 1 1 1 1 1
      queue content: 19(1) 21(2) 22(2) 23(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
2
  Enter id:24
    Enqueue False!!!
    Cannot enter to the queue
      byte_buf_mask: 0 1 1 1 1 1 1 1
      queue content: 19(1) 21(2) 22(2) 23(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
3
  Enter an ID to remove 19
      byte_buf_mask: 0 1 1 1 1 1 1 0
      queue content: 21(2) 22(2) 23(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
4
  Enter an ID to remove 21
      byte_buf_mask: 0 1 1 1 1 0 0 0
      queue content: 22(2) 23(2)

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
4
  Enter an ID to remove 22
      byte_buf_mask: 0 1 1 0 0 0 0 0
      queue content: 23(2)
```

```
Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
4
  Enter an ID to remove 23
      byte_buf_mask: 0 0 0 0 0 0 0 0
      queue content:

Which type you are going to operate?
1. Add a type 1 (small) item
2. Add a type 2 (big) item
3. Remove a type 1 item with a specific Id
4. Remove a type 2 item with a specific Id
```