Tutorial 3

1 pointers

- What is a pointer?
- Why do we use pointers?
- What is the output?

```
#include <iostream>
using namespace std;

struct Coord {
  int x;
  int y;
};

int main() {
  int a = 0;
  int b = 1;
  int *p1 = &b;
  int *p2 = &a;
  p1 = &a;
  *p1 = 10;
  int **p3 = &p2;
  p2 = *&*&p1;
  Coord *c = new Coord{*p2, **p3};
  **p3 = 4;
  *p3 = p1;
  c->y = **p3;
  **p3 = 8;
  cout << *p1 << ' ' << *p2 << ' ' << **p3 << endl;
  cout << c->x << ' ' << c->y << endl;
  delete c;
}
```

2 Linked List

```
struct Node {
    string/int val;
    Node *next;
};
```

2.1 Exercise

1. Implement queue using linked list

   ```
   struct Node {
       int val;
       Node *next;
   };
   struct Queue {
       Node *frt;
       Node *last;
   };

   Queue *initQueue(); //initialize an empty Queue
   bool isEmpty(Queue *q); //check if a queue is empty
   void add(Queue *q, int val); //add an element to the back of a queue
   void remove(Queue *q); //remove an element form the front of a queue
   bool check(Queue *q, int num); //check if an element is in the queue
   void nuke(Queue *q); //delete all elements in the queue
   ```

2. Now implement queue using vector