Task 1:

You need to build an **Intrusion Detection System (IDS)** using Queue data structure that monitors login attempts on a server. The IDS will keep track of login attempts and detect multiple failed attempts from the same IP address within a certain time window.

The system will:

1. **Queue the login attempts** as they arrive.
2. For each login attempt, **record the IP address and result (success/failure)**.
3. If there are **three or more failed attempts from the same IP address** within the last **60 seconds**, it should raise an **alert**.

Note: you can utilize the code given below:

Code for Queue Data structure using link list:

```
#include <iostream>

# include <malloc.h>

using namespace std;

struct node {

  int data;

  struct node *next;

};

struct node* front = NULL;
```

```
struct node* rear = NULL;
struct node* temp;
void Insert() {
   int val;
   cout<<"Insert the element in queue : "<<endl;
   cin>>val;
   if (rear == NULL) {
      rear = (struct node *)malloc(sizeof(struct node));
      rear->next = NULL;
      rear->data = val;
      front = rear;
   } else {
      temp=(struct node *)malloc(sizeof(struct node));
      rear->next = temp;
      temp->data = val;
      temp->next = NULL;
      rear = temp;
   }
}
```

```
void Delete() {
   temp = front;
   if (front == NULL) {
      cout<<"Underflow"<<endl;
      return;
   }
   else
   if (temp->next != NULL) {
      temp = temp->next;
      cout<<"Element deleted from queue is : "<<front->data<<endl;
      free(front);
      front = temp;
   } else {
      cout<<"Element deleted from queue is : "<<front->data<<endl;
      free(front);
      front = NULL;
      rear = NULL;
   }
}
```

```
void Display() {
   temp = front;
   if ((front == NULL) && (rear == NULL)) {
      cout<<"Queue is empty"<<endl;
      return;
   }
   cout<<"Queue elements are: ";
   while (temp != NULL) {
      cout<<temp->data<<" ";
      temp = temp->next;
   }
   cout<<endl;
}
int main() {
   int ch;
   cout<<"1) Insert element to queue"<<endl;
   cout<<"2) Delete element from queue"<<endl;
   cout<<"3) Display all the elements of queue"<<endl;
   cout<<"4) Exit"<<endl;
```

```
  do {
    cout<<"Enter your choice : "<<endl;
    cin>>ch;
    switch (ch) {
      case 1: Insert();
      break;
      case 2: Delete();
      break;
      case 3: Display();
      break;
      case 4: cout<<"Exit"<<endl;
      break;
      default: cout<<"Invalid choice"<<endl;
    }
  } while(ch!=4);
  return 0;
}
```