29/01/24 LAB-5 1BM22CS242

1)WAP to Implement Single Link List to simulate Stack and Queue Operations.

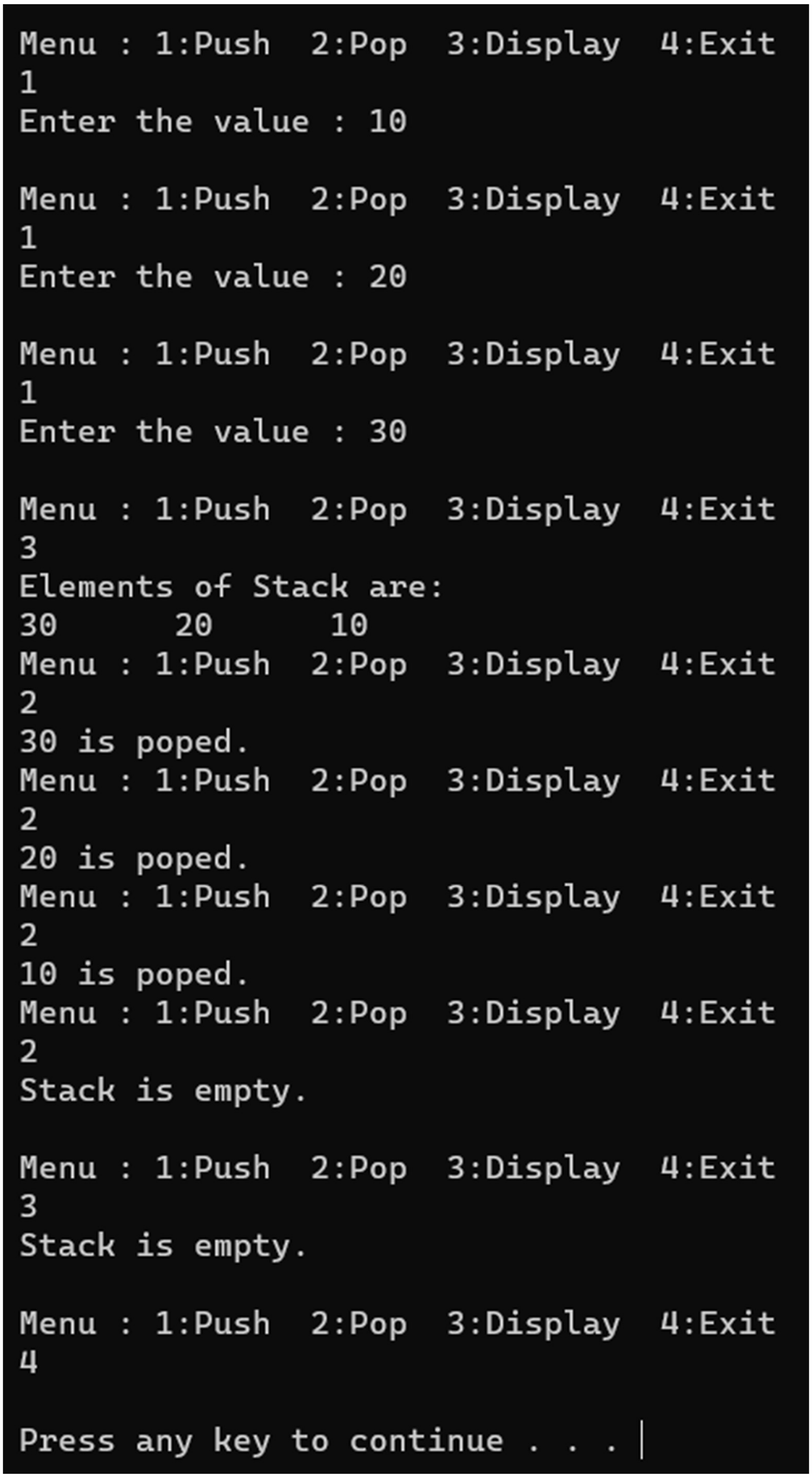
1.Stack using linked list.

Program:

```
#include <stdio.h>

struct node{
   int data;
   struct node* next;
};

void push(struct node**head,int val){
   struct node* newnode=(struct node*)malloc(sizeof(struct node));
   newnode->data = val;
   newnode->next =*head;
   *head = newnode;
}

void pop(struct node**head){
   if (*head == NULL) {
      printf("Stack is empty.\n");
      return;
   }

   struct node* temp = *head;
   *head =(*head)->next;
   printf("%d is poped.",temp->data);
   free(temp);
}

void display(struct Node* head) {
   struct node* temp = head;
   if (temp == NULL) {
      printf("Stack is empty.\n");
      return;
   }
   printf("Elements of Stack are:\n");
   while (temp != NULL) {
      printf("%d\t",temp->data);
      temp = temp->next;
   }
}

int main(){
   struct node* head=NULL;
   int ch,val;
   while(ch!=4){
      printf("\nMenu : 1:Push  2:Pop  3:Display  4:Exit\n");
```

```
        scanf("%d",&ch);
        switch(ch){
        case 1:
            printf("Enter the value : ");
            scanf("%d",&val);
            push(&head,val);
            break;
        case 2:
            pop(&head);
            break;
        case 3:
            display(head);
            break;
        case 4:
            return 0;
        default:
            printf("Invalid Choice\n");
            break;
        }
    }
}
```

Output:



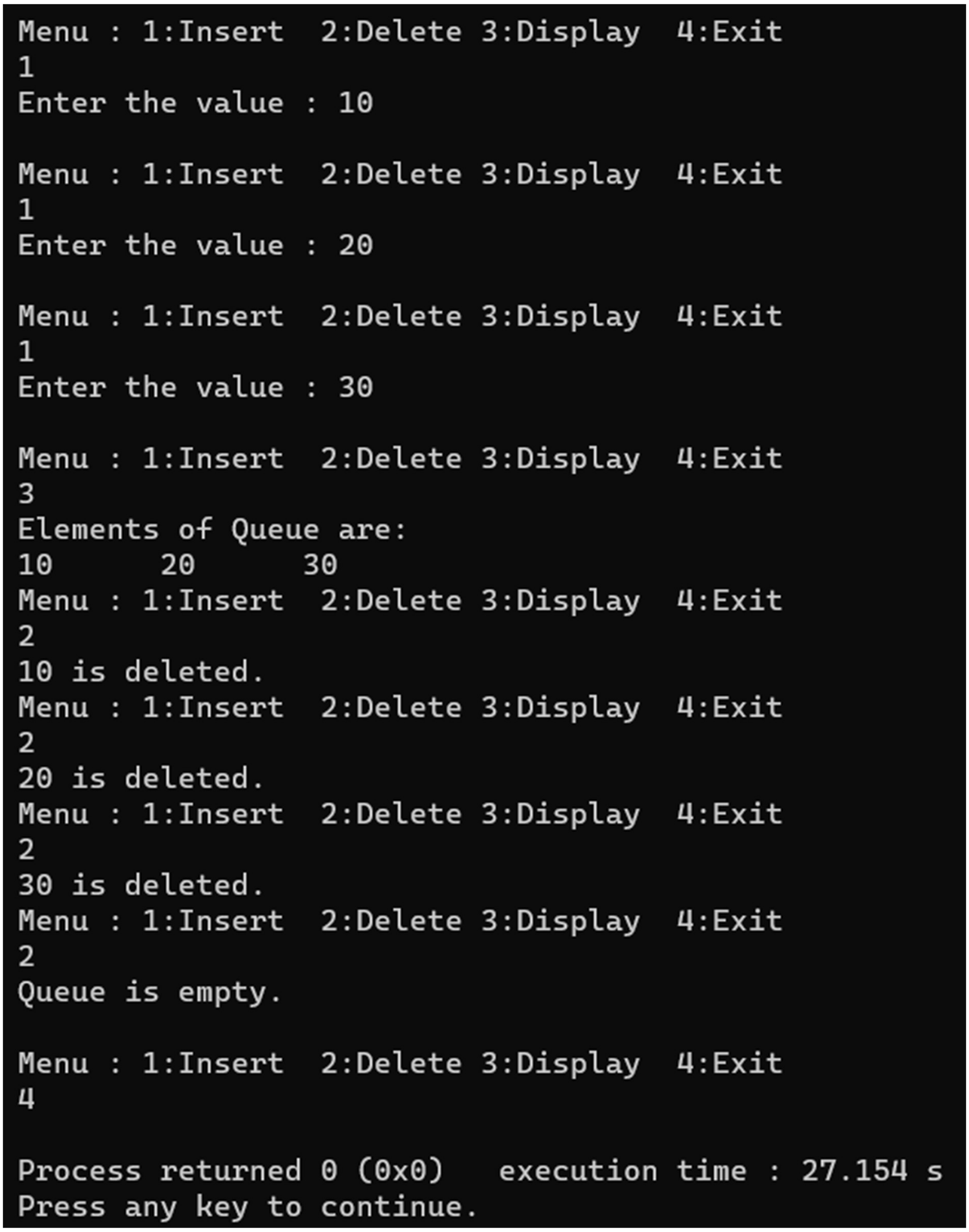
```
Menu : 1:Push  2:Pop  3:Display  4:Exit
1
Enter the value : 10

Menu : 1:Push  2:Pop  3:Display  4:Exit
1
Enter the value : 20

Menu : 1:Push  2:Pop  3:Display  4:Exit
1
Enter the value : 30

Menu : 1:Push  2:Pop  3:Display  4:Exit
3
Elements of Stack are:
30      20      10
Menu : 1:Push  2:Pop  3:Display  4:Exit
2
30 is poped.
Menu : 1:Push  2:Pop  3:Display  4:Exit
2
20 is poped.
Menu : 1:Push  2:Pop  3:Display  4:Exit
2
10 is poped.
Menu : 1:Push  2:Pop  3:Display  4:Exit
2
Stack is empty.

Menu : 1:Push  2:Pop  3:Display  4:Exit
3
Stack is empty.

Menu : 1:Push  2:Pop  3:Display  4:Exit
4

Press any key to continue . . .
```

2.Queue using Linked list.

Program:

```
#include <stdio.h>

struct node {
   int data;
   struct node* next;
};

void insert(struct node** head, int val) {
   struct node* newnode = (struct node*)malloc(sizeof(struct node));
   struct node* temp = *head;
   newnode->data = val;
   newnode->next = NULL;

   if (*head == NULL) {
      *head = newnode;
      return;
   }

   while (temp->next != NULL) {
      temp = temp->next;
   }

   temp->next = newnode;
}

void delete1(struct node** head) {
   if (*head == NULL) {
      printf("Queue is empty.\n");
      return;
   }

   struct node* temp = *head;
   *head = (*head)->next;
   printf("%d is deleted.",temp->data);
   free(temp);
}

void display(struct Node* head) {
   struct node* temp = head;
   if (temp == NULL) {
      printf("Queue is empty.\n");
      return;
   }
   printf("Elements of Queue are:\n");
   while (temp != NULL) {
      printf("%d\t",temp->data);
      temp = temp->next;
   }
}

int main(){
    struct node* head=NULL;
    int ch,val;
    while(ch!=4){
        printf("\nMenu : 1:Insert  2:Delete 3:Display  4:Exit\n");
        scanf("%d",&ch);
        switch(ch){
        case 1:
            printf("Enter the value : ");
            scanf("%d",&val);
            insert(&head,val);
            break;
        case 2:
            delete1(&head);
            break;
        case 3:
            display(head);
            break;
        case 4:
            return 0;
        default:
            printf("Invalid Choice\n");
            break;
        }
    }
}
```

Output:



```
Menu : 1:Insert  2:Delete 3:Display  4:Exit
1
Enter the value : 10

Menu : 1:Insert  2:Delete 3:Display  4:Exit
1
Enter the value : 20

Menu : 1:Insert  2:Delete 3:Display  4:Exit
1
Enter the value : 30

Menu : 1:Insert  2:Delete 3:Display  4:Exit
3
Elements of Queue are:
10      20      30
Menu : 1:Insert  2:Delete 3:Display  4:Exit
2
10 is deleted.
Menu : 1:Insert  2:Delete 3:Display  4:Exit
2
20 is deleted.
Menu : 1:Insert  2:Delete 3:Display  4:Exit
2
30 is deleted.
Menu : 1:Insert  2:Delete 3:Display  4:Exit
2
Queue is empty.

Menu : 1:Insert  2:Delete 3:Display  4:Exit
4

Process returned 0 (0x0)   execution time : 27.154 s
Press any key to continue.
```