Data structure

Lab (8) : Applications on queues.

Week : 22/5 to 26/5/1433h

المملكة العربية السعودية
وزارة التعليم العالي
جامعة الدمام
كلية التربية بالجبيل
قسم
الحاسب

1. **Write a program toaddfivenumbers as show in sample run, then delete one of them, and print the numbers befor and after delete, by using an array queue.**

```
enter five numbers in queue:
10
20
30
40
50
queue befor delete:
10
20
30
40
50

10 Has Been Deleted!
queue after delete:
20
30
40
50
```

---

2. **Write a program to input and print any seven letters of any word, by using a linked list queue.**

```
enter 7 letters in queue:
a
b
c
d
e
f
g
displag word in queue:abcdefg
```

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Answer tothe first exercise

```
# include <iostream.h>
# define MAXSIZE 5
structst
{intfront,rear;
int queue[MAXSIZE];}s;
int empty();
int full();
void add(int);
void delete1();
void display();
void main()
{  int n;
    s.front = -1;
    s.rear = -1;
    cout<<"enter five numbers in queue:"<<endl;
    for(int i=0;i<5;i++)
    {cin>>n;
    add(n);}
    cout<<"queue befor delete:"<<endl;
    display();
```


```
    delete1();
    cout<<"queue after delete:"<<endl;
    display();}
int full()
{if (s.rear == MAXSIZE-1)  return(1);
    else  return(0);}
int empty()
{if (s.front == s.rear + 1)
            return(1);
   else
            return(0);}
void add(int x)
{if(full() == 1)
 {cout<<"\n\nQueue Full\n";}
 else
 {s.rear = s.rear + 1;
   s.queue[s.rear] = x;
    if(s.rear == 0) s.front ++;}}
void delete1()
{if(empty() == 1)
 {cout<<"\n\nQueue Empty\n";}
```

```
  else
  {cout<<"\n"<<s.queue[s.front]<<" Has Been Deleted!"<<endl;
    s.front = s.front + 1;}}
void display()
{int i;
 if(empty () == 1)
          cout<<"\nQueue Empty!!";
  else
  {for(i = s.front ; i<=s.rear ; i++)
  {cout<<s.queue[i]<<endl;}}}
```

Answer the second exercise

```
#include<iostream.h>
#include<stdlib.h>
struct word
{char x;
struct word *next;};
typedefstruct word *n;
typedef n queue;
void get1(queue &head,char x)
```

```
{ cin>>x;
    queue temp1=(struct word*)malloc(sizeof(struct word));
    temp1->x=x;
    temp1->next=NULL;
    queue temp ;
    temp=head;
    if(head==NULL)
    { head=temp1; }
    else
    {while(temp->next!= NULL)
            {temp=temp->next;}
            temp->next= temp1;}}
char Deq(queue &head)
{if(head==NULL)
   {cout<<"\n No Element to Dequeue \n";}
   else
   { queue temp;
           temp=head;
           head=temp->next;
           free(temp);
           return temp->x;}}
```

```
void main()
{ queue head=NULL;
   char x;
   cout<<"enter 7 letters in queue:"<<endl;
   for(int i=0;i<7;i++)
   {getl(head,x);}
   cout<<"display word in queue:";
   for(i=0;i<7;i++)
   {cout<<Deq(head);}}
```

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1433 هـ - 1434

الاسم/ .....

Declare two functions first is a: (getMax) to found maximum value to four elements of array .second function is (getMin) to found minimum value to elements of array.

In the main function input the elements of one array and print the max and min value.

As shown in sample run :

```
Enter 4 numbers:
3
4
7
1
Max=7
Min=1
```

تمنياتي لكن بالتوفيق

حل السؤال:

```
#include <iostream.h>
getMax(int ar[], int &max) {
        max = ar[0];
        for(int i=1; i<=3; i++)
            if(ar[i] > max) max = ar[i];
}

getMin(int ar[], int &min) {
        min = ar[0];
        for(int i=1; i<=3; i++)
            if(ar[i] < min) min = ar[i];
}

main() {
        int max, min;
        int a[4];
        cout<<"Enter 4 numbers:\n";
        for(int i=0; i<=3; i++)
            cin>>a[i];
        getMax(a, max); getMin(a, min);
        cout<<"Max="<<max<<endl;
```

```
    cout<<"Min="<<min<<endl;
}
```

```
Enter 4 numbers:
3
4
7
1
Max=7
Min=1
```

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الاسم/ .....

Declare two structure **first is a ''date structure''** contains of day, month and year. **second structure is '' students structure''** contains of name ,age and date structure. In the main function input and print all information in the structure for three students .

As shown in sample run :

```
Student number: 1
Name:           sara
Age:            18
Birth day:      1
Birth month:    2
Birth year:     1990

 Num     Name     Age      Birthdate
-------------------------
1        sara     18       1/2/1990
Student number: 2
Name:
```

تمنياتي لكن بالتوفيق

حل السؤال :

```
#include<iostream.h>
#include<string.h>
struct date{
int day;
int month;
int year;};
struct students{
int num;
char name[20];
int age;
date birthdate;};
void main(){
students stud;
for(int i=0; i<3; i++){
stud.num = i;
```

```
    cout << "Student number: " << i+1 << endl;
    cout << "Name:\t\t"; cin >> stud.name;
    cout << "Age:\t\t"; cin >> stud.age;
    cout << "Birth day:\t"; cin >> stud.birthdate.day;
    cout << "Birth month:\t"; cin >>
    stud.birthdate.month;
    cout << "Birth year:\t"; cin >> stud.birthdate.year;
    cout << "\n Num\tName\tAge\tBirthdate\n";
    cout << "-----------------------\n";
    cout << i+1 << "\t";
    cout << stud.name << "\t";
    cout << stud.age << "\t";
    cout << stud.birthdate.day << "/" ;
    cout << stud.birthdate.month << "/";
    cout << stud.birthdate.year << "\n";}
}
```

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الاسم/ .....

Declare function (iseven) with one parameter then pass integer number to the function to test the parameter if mod parameter 0n 2 equal 0 return 1 or return 0.

In main function input five elements of array, then print the even numbers by call function (printeven).

As shown in sample run :

```
Enter 5 numbers:
4 5 6 7 3
Even numbers: 4 6
```

تمنياتي لكن بالتوفيق

حل السؤال

```
#include <iostream.h>
int even(int a[])
{cout<<"Even numbers: ";
      for(int i=0; i<=4; i++)
       if(a[i] % 2 == 0)cout<<a[i]<<" ";
 }
int odd(int a[])
{cout<<"Odd numbers: ";
      for(int i=0; i<=4; i++)
       if(a[i] % 2 != 0)cout<<a[i]<<" ";
}
main() {
      int a[5];
      cout<<"Enter 5 numbers:"<<endl;
      for(int i=0; i<=4; i++)
      cin>>a[i];
       even(a);
     cout<<endl;
      odd(a);}
```

```
#include <iostream.h>

isEven(int x) {
        if(x % 2 == 0) return 1;
        return 0;
}
printEven(intar[]) {
        cout<<"Even numbers: ";
        for(int i=0; i<=4; i++)
                if(isEven(ar[i])) cout<<ar[i]<<" ";
        cout<<endl;
}
main() {
        int a[5];
        cout<<"Enter 5 numbers:";
        for(int i=0; i<=4; i++)
        cin>>a[i];
        printEven(a);
}
```