Answer of OOP1 Midterm Exam Fall 2017

Question 1:

Write a C++ program to do the following:

- Read the values of 200 unsigned integers (4 Bytes), representing pixels of a full color image segment in ARGB format (Alpha, Red, Green, and Blue). Each color has a range of value from 0 to 255.
- Create three arrays of 200 characters for Red Color, Green Color and Blue Color from the previous segment.
- The program then prints the extracted arrays elements in hexadecimal format.

Answer: Code:

```cpp
#include<iostream>
using namespace std;
void main()
{
        unsigned int pixel[200]={0};
        for (int i = 0; i < 200; i++)
        {
                cout<<"Enter the four colors of element "<<i<<":"<<endl;
                for (int j = 0; j < 4; j++)
                {
                    int c;
                        cin>>c;
                        pixel[i]<<=8;
                        pixel[i]=pixel[i]|c;
                }
        }
        cout<<endl;
        cout<<"elements of ARGB colors array: "<<endl;
        for (int i = 0; i < 200; i++)
                cout<<hex<<(int)pixel[i]<<"  ";

        unsigned char red[200]={0},green[200]={0},blue[200]={0};
        for (int i = 0; i < 200; i++)
        {
                red[i]=red[i]|pixel[i];
                pixel[i]>>=8;
                green[i]=green[i]|pixel[i];
                pixel[i]>>=8;
                blue[i]=blue[i]|pixel[i];
                pixel[i]>>=8;
        }
        cout<<endl<<endl;

        cout<<"Array elements of red color: "<<endl;
        for (int i = 0; i < 200; i++)
                cout<<hex<<(int)red[i]<<"  ";
        cout<<endl<<endl;

        cout<<"Array elements of green color: "<<endl;
        for (int i = 0; i < 200; i++)
                cout<<hex<<(int)green[i]<<"  ";
        cout<<endl<<endl;

        cout<<"Array elements of blue color: "<<endl;
        for (int i = 0; i < 200; i++)
                cout<<hex<<(int)blue[i]<<"  ";
        cout<<endl<<endl;
}
```
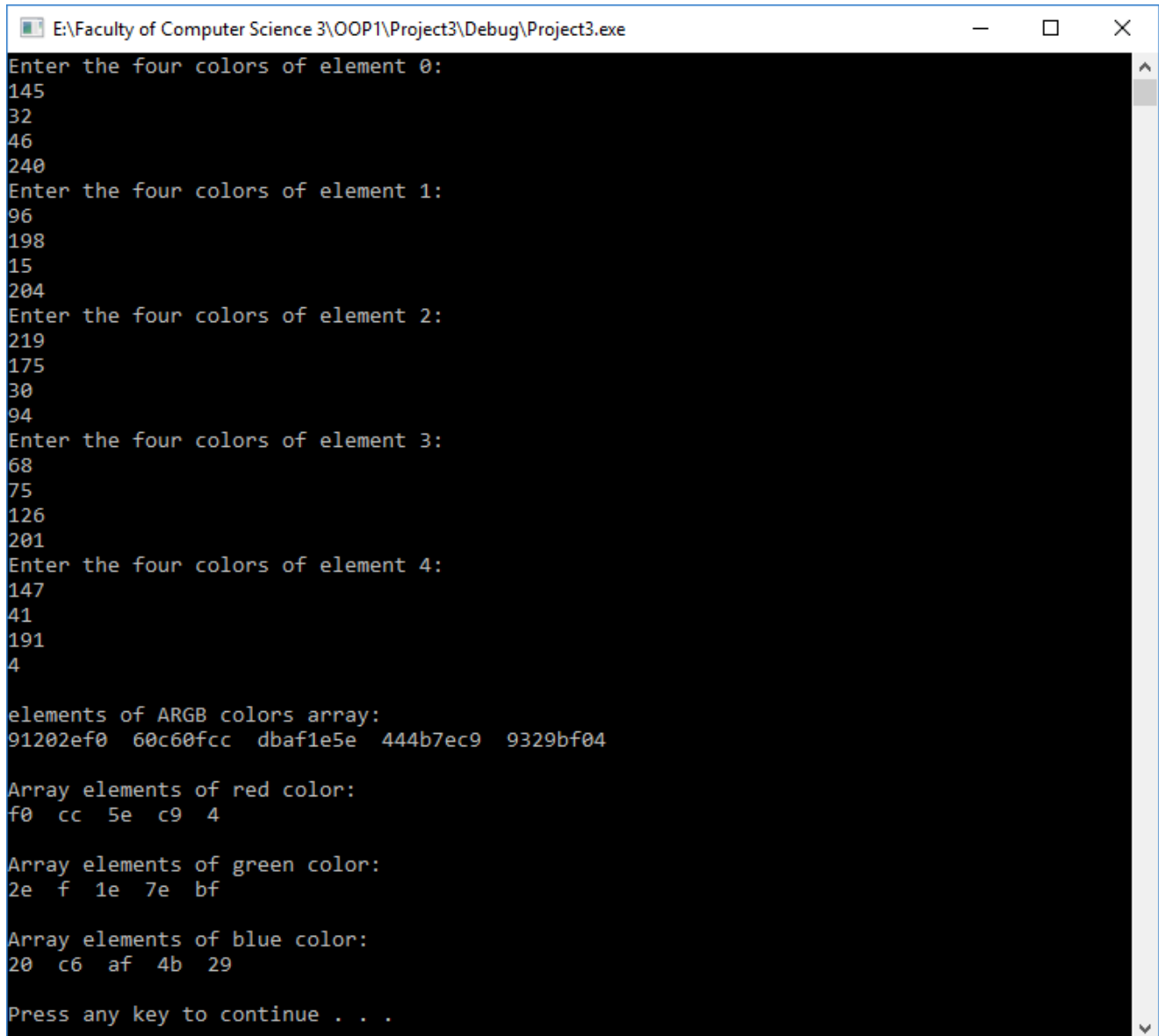
Console: note that the console illustrates the entry of just 5 array elements.

```
E:\Faculty of Computer Science 3\OOP1\Project3\Debug\Project3.exe                    —    □    ×

Enter the four colors of element 0:
145
32
46
240
Enter the four colors of element 1:
96
198
15
204
Enter the four colors of element 2:
219
175
30
94
Enter the four colors of element 3:
68
75
126
201
Enter the four colors of element 4:
147
41
191
4

elements of ARGB colors array:
91202ef0  60c60fcc  dbaf1e5e  444b7ec9  9329bf04

Array elements of red color:
f0   cc   5e   c9   4

Array elements of green color:
2e   f   1e   7e   bf

Array elements of blue color:
20   c6   af   4b   29

Press any key to continue . . .
```

Question 2:

a) Construct the class Student with the following member elements:

ID	(of type int)
Name	(of type char)
Address	(of type char)
Weight	(of type float)
Height	(of type float)
Gender	(of type char)

b) Write a function **GoodShape** which checks the ideal body shape of an object of type Student according the following:
   - If Weight+10 < Height-65 then function returns "Over Weight"
   - If Weight > Height-90 then function returns "Under Weight"
   - If Weight-5 <= Height-80 then function returns "Ideal Weight"

Then it is required to show how this function can be called from a main program.

Answer: Code:

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


struct student
{
    int id;
    char name[40];
    char adress [50];
    float height;
    float weight;
    char gender;
};

string goodshape(student s)
{
    if (s.weight+10<s.height-65)
        return "Over Weight";

    if (s.weight>s.height-90)
        return "Under Weight";

    if (s.weight-5<=s.height-80)
        return "Ideal Weight";
}
```

```cpp
void main()
{
        student s;

        cout<<"Enter student information: "<<endl;
        cout<<"Enter student`s ID: "<<endl;
        cin>>s.id;
        cout<<"Enter Student`sName: "<<endl;
        cin>>s.name;
        cout<<"Enter Student`s Adress: "<<endl;
        cin>>s.adress;
        cout<<"Enter student`s Weight: "<<endl;
        cin>>s.weight;
        cout<<"Enter student`s Height: "<<endl;
        cin>>s.height;
        cout<<"Enter student`s Gender: "<<endl;
        cin>>s.gender;

        cout<<endl;
        cout<<"Sudent` Shape: "<<endl;
        cout<<goodshape(s)<<endl;

        system("pause");
}
```
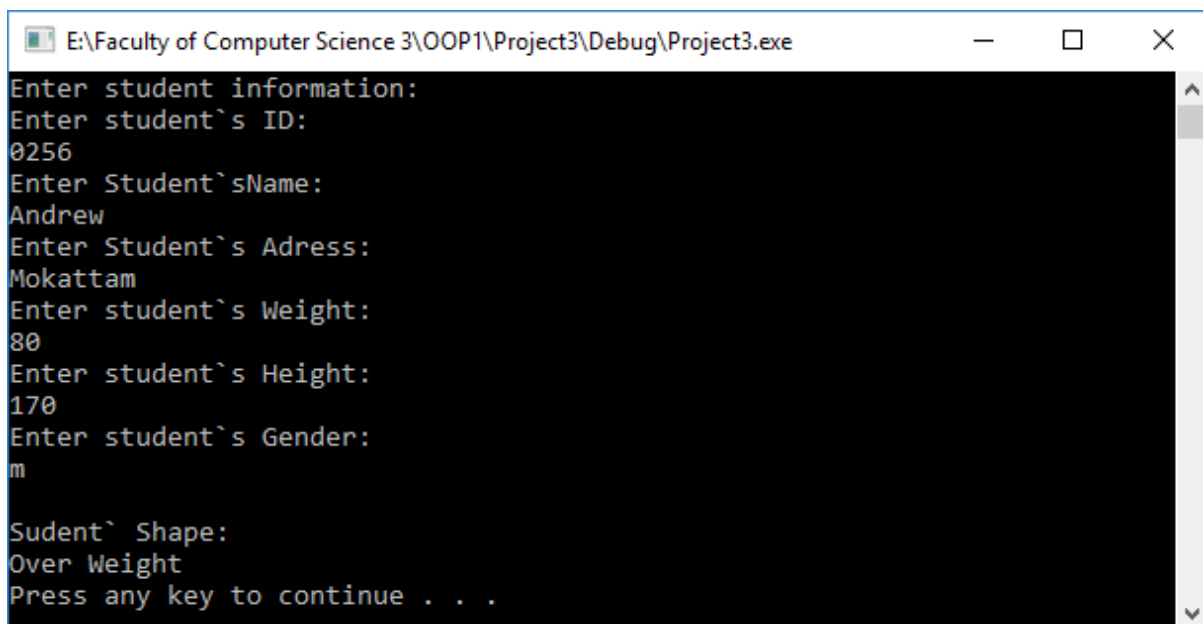
We can skip these steps

Console:

E:\Faculty of Computer Science 3\OOP1\Project3\Debug\Project3.exe   —   □   ✕

```
Enter student information:
Enter student`s ID:
0256
Enter Student`sName:
Andrew
Enter Student`s Adress:
Mokattam
Enter student`s Weight:
80
Enter student`s Height:
170
Enter student`s Gender:
m

Sudent` Shape:
Over Weight
Press any key to continue . . .
```

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Question 3:

Write a C++ function that receive a stack of characters then it is required to remove the character 'a' if exist.

Show how you can call it from the main function and print its content.

Answer: Code:

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

struct stack
{
    char s[40];
    int top;
};

void reset (stack *stk)
{
    stk->top=0;
}

void push (char c,stack *stk)
{
    stk->top++;
    stk->s[stk->top]=c;
}

char pop (stack *stk)
{
    return(stk->s[stk->top--]);
}
bool empty (stack *stk)
{
    if (stk->top==0)
        return(true);
    else
        return (false);
}
bool full (stack *stk)
{
    if (stk->top==39)
        return(true);
    else
        return(false);
}
```

```cpp
void remove(stack *st)
{
        stack temp;
        char c;

        reset(&temp);
        while(empty(st)==false)
        {
                c=pop(st);
                if(c!='a')
                        push(c,&temp);
        }

        while (empty(&temp)==false)
                push(pop(&temp),st);
}


void main()
{
        stack s;

        char name[40];
        cout<<"Enter a Word: ";
        cin>>name;
        reset(&s);

        int i=0;
        while(name[i])

                if(full(&s)==false)
                {
                        push(name[i],&s);
                        i++;
                }

        remove(&s);

        cout<<endl;
        cout<<"poping the characters after removing the letter a if exists: "<<endl;
        while(empty(&s)==false)
                cout<<pop(&s);

        cout<<endl<<endl;


        system("pause");
}
```
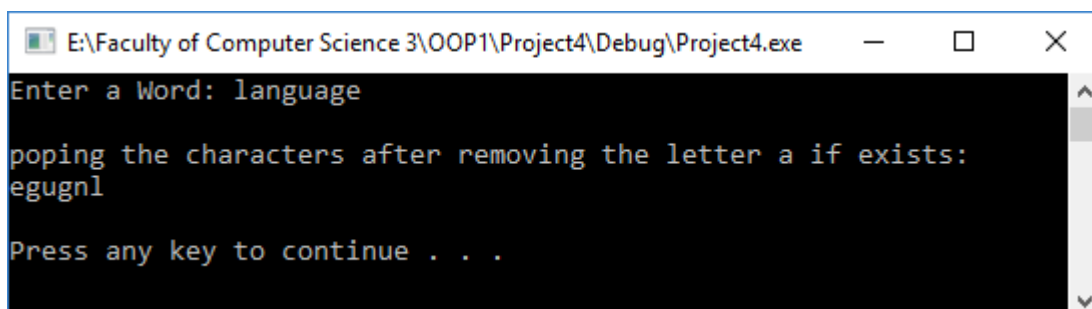
Console:

Enter a Word: language

poping the characters after removing the letter a if exists:
egugnl

Press any key to continue . . .