


## National University of Computer and Emerging Sciences, Lahore Campus

	Course Name:	Programming Fundamentals	Course Code:	CS1002
	Program:	Electrical Engineering	Semester:	Fall 2023
	Duration:	1 Hour	Total Marks:	30
	Exam Date:	08 Nov 2023	Weight:	15%
	Section:	All	Page(s):	4
	Exam Type:	Sessional - 2 Exam Solution	CLO #	2,3

Student Name: \_\_\_\_\_ Roll No. \_\_\_\_\_ Section: \_\_\_\_\_

**Instructions:**

1. Do not forget to write your Name and Roll Numbers.
2. Solve on the paper and Return. **Answer sheets are not required.**

### Question No. 1 (CLO No. 3)

**Marks: 15**

**Generate** an algorithm in the form of a C++ program as follows. The program contains a function (named speedCalculator()) that returns a double type value (i.e. speed in m/s). The function accepts two parameters as follows.

- 1) Double type speed in miles/hour. The function converts it into m/s and returns to the calling function
- 2) An integer type reference parameter named alertLevel. The function sets it as follows.
  - alertLevel =1 if speed is up to 60 km/h
  - alertLevel =2 if speed is between 61 km/h up to 80 km/h
  - alertLevel =3 if speed is 81 km/h or above.

Write down a main function that uses this function as many times as user's wish, using a sentinel controlled while loop. For each user defined input value (in miles/hour) the program prints the speed in m/s and AlertLevel for that speed. **Do not take any input or print any output from within the function speedCalculator(). One mile is equal to 1.60934 km.**

A sample run for one iteration of the program should look like below:

Enter speed in miles/hour or -1 to terminate (the user enters 40)

Speed in m/s = 17.8816

Alert Level is 2 for the above speed.

### Write down your code here

```
double speedCalculator(double milesPerHour, int & alertLevel)
{
    double kmPerHour, meterPerSecond;
    kmPerHour = milesPerHour*1.60934;
```

```

meterPerSecond = kmPerHour*1000/3600;

if(kmPerHour<=60)
    alertLevel=1;
else if(kmPerHour>60 && kmPerHour<=80)
    alertLevel=2;
else if(kmPerHour>80)
    alertLevel=3;

return meterPerSecond;
}
int main ()
{
    double speed_miles_per_h, speed_meters_per_s;
    int alert_Level;

    cout<<" enter Enter speed in miles/hour or -1 to terminate "<<endl;
    cin>>speed_miles_per_h;

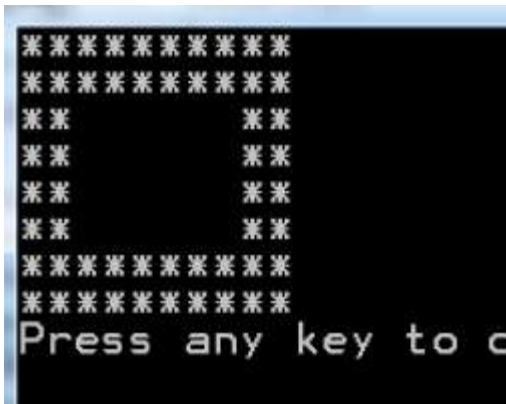
    while (speed_miles_per_h!= -1)
    {
        speed_meters_per_s = speedCalculator(speed_miles_per_h, alert_Level);
        cout<<" Speed in m/s = "<<speed_meters_per_s<<endl;
        cout<<" Alert Level is "<<alert_Level<<" for the above speed. "<<endl;
        cout<<" enter Enter speed in miles/hour or -1 to terminate "<<endl;
        cin>>speed_miles_per_h;
    }
    return 0; }

```

Generate output of the following C++ code segment, clearly show your working.

```
int row, col, noOfRows=8, noOfColumns=10;  
char ch = '*';  
for(row= 0; row < noOfRows; row++)  
{  
    for(col= 0; col < noOfColumns; col++)  
    {  
        if (row== 0 || row== 1 || row== noOfRows-2 || row==noOfRows-1)  
        { cout<<ch;}  
        else if((col== 0 || col== 1 || col== noOfColumns-2 || col==noOfColumns-1))  
        { cout<<ch;}  
        else  
        { cout<<' ' ;}  
    }  
    cout<<endl;  
}
```

### Solution



```
*****  
*****  
**      **  
**      **  
**      **  
**      **  
*****  
*****  
Press any key to c
```