

**King Fahd University of Petroleum & Minerals**  
**Information and Computer Science Department**  
**ICS 103: Computer Programming in C (2-3-3) [Term 092]**  
**Homework Assignment #2 [Due Friday April 9 before midnight]**

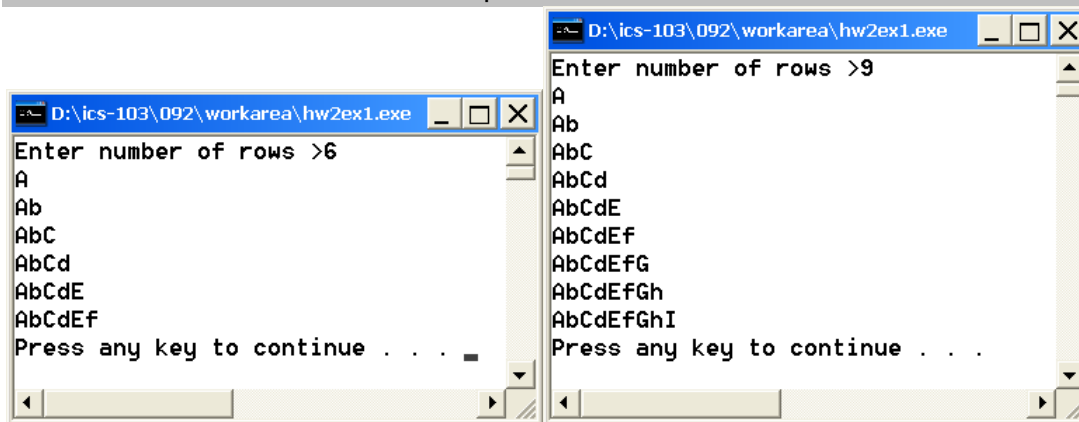
➤ Instructions

- Create **three** program files named q1.cpp, q2.cpp and q3.cpp (the files you save from Dev++ or turbo compiler).
- Zip the 3 files in one file named hw1\_YourID.zip and upload it in WebCT. Make sure that you include cpp files containing source code and not executable files i.e. files with exe extension.
- **No group work is allowed. The homework solution has to be your own work. Any cheating will lead to severe consequences.**

**Question 1: (15 points)**

Write a c program that, using **nested loops**, displays the following pattern shown below. Your program takes from the user the number of rows as input.

Notice the case of the letters from capital to small.



```
D:\ics-103\092\workarea\hw2ex1.exe
Enter number of rows >6
A
Ab
AbC
AbCd
AbCdE
AbCdEf
Press any key to continue . . .
```

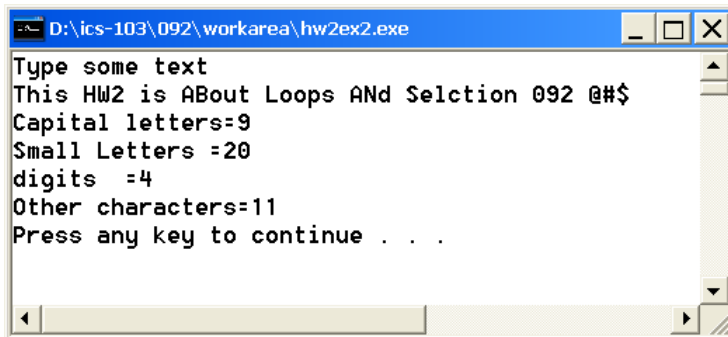
```
D:\ics-103\092\workarea\hw2ex1.exe
Enter number of rows >9
A
Ab
AbC
AbCd
AbCdE
AbCdEf
AbCdEFG
AbCdEFGH
AbCdEFGHI
Press any key to continue . . .
```

```
#include <stdio.h>
#include <stdlib.h>
int main(void) {
int i,n,j;
char ch;
printf("Enter number of rows >");
scanf("%d",&n);
for(i=1;i<=n;i++) {
for(j=1;j<=i;j++) {
if(j%2==1)
ch='A'+j-1;
else
ch='a'+j-1;
printf("%c",ch);
}
}
```

```
printf("\n");
}
    system("pause");
    return (0);
}
```

### **Question 2: (15 points)**

Write a program that asks the user to type some text. Then it will count different types of characters and display the result as shown in the sample run below.



```
D:\ics-103\092\workarea\hw2ex2.exe
Type some text
This HW2 is ABout Loops AND Selction 092 @#$
Capital letters=9
Small Letters =20
digits =4
Other characters=11
Press any key to continue . . .
```

```
#include <stdio.h>
#include <stdlib.h>
int main(void) {
int up,low,dig,others;
char ch;
up=low=dig=others=0;
printf("Type some text\n");
scanf("%c",&ch);
while(ch!='\n') {
    if(ch>='a' && ch <= 'z')
        low++;
    else if (ch >='A' && ch <= 'Z')
        up++;
    else if (ch>='0' && ch <= '9')
        dig++;
    else
        others ++;
    scanf("%c",&ch);
}
printf("Capital letters=%d\n",up);
printf("Small Letters =%d\n",low);
printf("digits =%d\n",dig);
printf("Other characters=%d\n",others);
    system("pause");
    return (0);
}
```

}

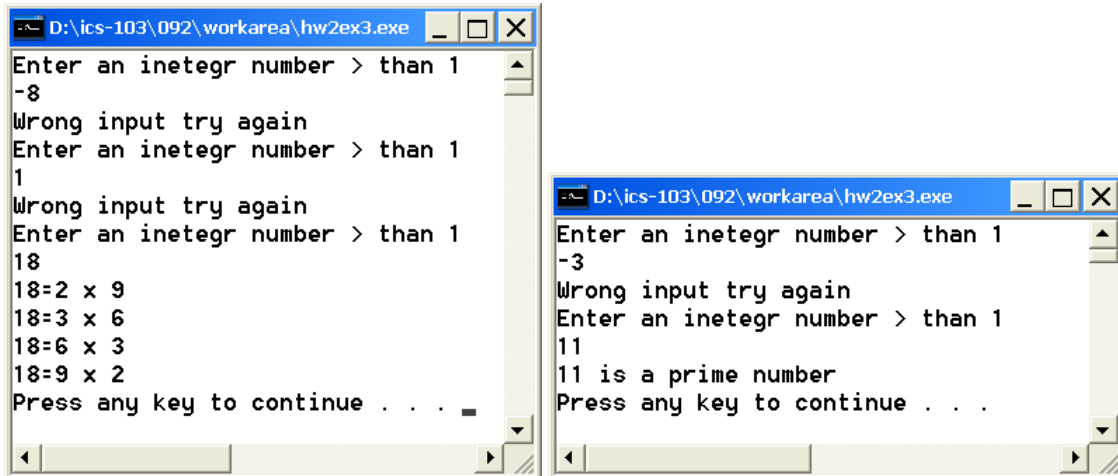
### Question 3: (20 points)

Write a c program to prompt the user for an integer number greater than 1. Use do-while loop to make sure that the user enters a valid number.

After that, your program displays the typed number as a product of 2 factors (all possible factors greater than 1).

If the number cannot be represented as a product of 2 factors, display that is a prime number.

A prime number is an integer number greater than 1 which has no other factor except itself and 1.



```
D:\ics-103\092\workarea\hw2ex3.exe
Enter an inetegr number > than 1
-8
Wrong input try again
Enter an inetegr number > than 1
1
Wrong input try again
Enter an inetegr number > than 1
18
18=2 x 9
18=3 x 6
18=6 x 3
18=9 x 2
Press any key to continue . . .

D:\ics-103\092\workarea\hw2ex3.exe
Enter an inetegr number > than 1
-3
Wrong input try again
Enter an inetegr number > than 1
11
11 is a prime number
Press any key to continue . . .
```

```
#include <stdio.h>
#include <stdlib.h>
int main(void) {
int n,count,i;

do {
    printf("Enter an inetegr number > than 1\n");
    scanf("%d",&n);
    if(n<= 1)
        printf("Wrong input try again\n");
}while (n<=1);
count=0;
for(i=2;i<=n/2;i++) {
    if(n%i==0) {
        count++;
        printf("%d=%d x %d\n",n,i,n/i);
    }
}
if(count==0)
    printf("%d is a prime number\n",n);
    system("pause");
```

```
    return (0);  
}
```