

King Fahd University of Petroleum & Minerals
Information & Computer Science Department

ICS 410 Programming Languages
Assignment 01

<u>Due Date</u>	<u>Weight</u>	<u>Semester</u>
26 th March 2007	5%	062

Q. 1 [*Boolean Variables and Basic I/O in C*]

- (a): Is there a Boolean data type in C? If not, how does C overcome this deficiency? [1 mark]
- (b): Translate the following Java Program to C: [3 marks]

```
import java.io.*;
public class LeapYear
{
    public static void main(String[] args) throws IOException
    {
        BufferedReader in = new BufferedReader(new InputStreamReader(System.in));
        boolean leap = false;
        int x, y, year;

        System.out.println("Enter an initial year: ");
        x = Integer.parseInt(in.readLine());
        System.out.println("Enter a final year: ");
        y = Integer.parseInt(in.readLine());

        year = x;
        System.out.println("Leap years from " + x + " to " + y + " are: ");

        while(year <= y)
        {
            leap = false;
            if(year % 4 == 0) leap = !leap;
            if(year % 100 == 0) leap = !leap;
            if(year % 400 == 0) leap = !leap;
            if(leap) System.out.print(year + " ");
            year++;
        }
    }
}
```

Q. 2: [*Parameter Passing By Value and Reference*]

- (a) Write a program in C that has the function `int minimum(int a, int b, int c);` [2 marks]
The function finds and returns the minimum of three integers. Write a main() function also which tests the function.
- (b) Now write a function `int reorder(int *a, int *b, int *c);` [2 marks]
The function reorders three integers p, q, r such that $p \leq q \leq r$. In other words, if $p = 9, q = 15$ and $r = 7$, then a function call `reorder(&p, &q, &r)` would result in $p = 7, q = 9$ and $r = 15$. Again, test your function with a main() function.

(c) [String Handling Using Character Arrays] [2 marks]

Write a function **contains** that takes two arguments a string and a character as arguments as follows: **int contains(char *string, char *c)**. The function should return **0** if **string** does not contain any occurrence of **c**, otherwise it should return the number of occurrences of **c** in **string**. Do not use functions from **string.h**. Test your function with several input values.

Q. 3: [Structures]

Write a program which can read a list of names, ids and lgrades from a text file and store it into an array of structures. The text file might look as follows: [10 marks]

Ahmad	981435	A
Al i	224476	B
Saeed	973542	F
Khal ed	218235	D
Esam	234523	C

.....

After the entire file is read, calculate the and print

- (i) the total number of students who passed the course (their lgrades are A, B or C).
- (ii) the total number of students who failed the course (their lgrades are D or F).
- (iii) the class gpa which is calculated as follows:

$$\text{classgpa} = \frac{\text{no of A's} * 4 + \text{no of B's} * 3 + \text{no of C's} * 2 + \text{no of D's} * 1 + \text{no of F's} * 0}{\text{no of A's} + \text{no of B's} + \text{no of C's} + \text{no of D's} + \text{no of F's}}$$

Please submit a hardcopy of all your answers, including source code of your programs. Submit your homework (hardcopy + CD/floppy) in an envelope during the class time on the due date.