

UBI 503 Data Structures and Algorithms

1st Homework

Assignment Date: 13.11.2020

Due Date: 20.11.2020

From: C How to Program (7th Edition), Paul Deitel and Harvey Deitel, Prentice Hall, 2013.

3.35) (*Printing the Decimal Equivalent of a Binary Number*) Input an integer (5 digits or fewer) containing only 0s and 1s (i.e. a “binary” integer) and prints its decimal equivalent. [Hint: Use the remainder and division operators to pick off the “binary number’s” digits one at a time, from right to left. Just as in the decimal number system, in which the rightmost digit has a positional value of 1, and the next digit left has a positional value of 10, then 100, then 1000, and so on, in the binary number system, the rightmost digit has a positional value of 1, the next digit left has a positional value of 2, then 4, then 8, and so on. Thus the decimal number 234 can be interpreted as $4*1+3*10+2*100$. The decimal equivalent of binary 1101 is $1*1+0*2+1*4+1*8$ or $1+0+4+8$ or 13.] **(40 points)**.

3.45) (*Factorial*) The factorial of a nonnegative integer n is written as n! (pronounced as “n factorial”) and is defined as follows:

$$n! = n.(n-1).(n-2). \dots .1 \text{ (for values of } n \text{ greater than or equal to } 1)$$

and

$$n! = 1 \text{ (for } n=0)$$

For example $5! = 5.4.3.2.1$, which is 120.

- a) Write a C program that reads a nonnegative integer and computes and prints its factorial.
- b) Write a C program that estimates the value of the mathematical constant e by using the formula:

$$e = 1 + \frac{1}{1!} + \frac{1}{2!} + \frac{1}{3!} + \dots$$

- c) Write a program that computes the value of e^x by using the formula:

$$e^x = 1 + \frac{x}{1!} + \frac{x^2}{2!} + \frac{x^3}{3!} + \dots$$

(60 points)

Important Notes:

1. All source codes and related homework reports should be submitted via [Ege Ders](#) platform: Derslerim → Veri Yapıları ve Algoritmalar - 430882-4 → Hafta 2: Structured Program Development in C → Homework 1. Please also send a copy of your files to sinem.getir@ege.edu.tr in the format of ogrenci_no_odev_no.zip
2. Do not forget to include appropriate comments in the source codes. Hence the grader can easily understand the program during his/her assessment.
3. Write the programs in a simple and straightforward manner by considering structured programming.

4. Each report should include the printout of the related source code and two or more screenshots (depending on the illustration requirements) which exemplify execution of the programs.