

دانشکده
مهندسی مکانیک

به نام خدا
برنامه سازی کامپیوتر

Assignment 2



دانشگاه صنعتی شاهرود

استاد درس:

دکتر مهکامه شربتدار

زمان تحویل:

1401/1/31

- برای کدها فقط فایل "cpp" را قرار داده و به همراه سایر فایل‌ها ارسال کنید.
- پاسخ‌هایی که به صورت کد نیستند را تایپ کرده و یا به صورت دست‌نویس ارسال نمایید.
- تمامی فایل‌ها را در یک فایل "zip" یا "rar" ذخیره کرده و به شکل زیر نامگذاری و سپس در سایت بارگذاری نمایید. (AS1_ID_LastName)

برای مثال برای فردی با نام خانوادگی کریمی و شماره دانشجویی 9912345 نام فایل "AS1_9912345_Karimi" خواهد بود.

1. Write a function called `convertNumber(int Num, int k)` in which it converts a number(`Num`) in base 10(decimal) entered by the user to base `k`. (`k` is a positive integer that should be taken from the user). Call and test the function in the main function.

Example:

Input: `N=3007, k=2`

Output: `10111011111`

2. Write a function called `gcc(int a, int b)` to determine the greatest common divisor of `a` and `b` in which `a` and `b` are two positive integers entered by the user. Call and test the function in the main function.

Sample Input: `35, 50`

Sample Output: `5`

3. Suppose you want to deposit a certain amount of money into a savings account and then leave it alone to draw interest for the next 10 years. At the end of 10 years you would like to have \$10,000 in the account. How much do you need to deposit today to make that happen? You can use the following formula, which is known as the present value formula, to find out:

$$P = \frac{F}{(1 + r)^n}$$

The terms in the formula are as follows:

- P is the **present value**, or the amount that you need to deposit today.
- F is the **future value** that you want in the account. (In this case, F is \$10,000.)
- r is the **annual interest rate**.
- n is the **number of years** that you plan to let the money sit in the account.

Write a program that has a function named `presentValue` that performs this calculation. The function should accept the future value, annual interest rate, and number of years as arguments. It should return the present value, which is the amount that you need to deposit today. Demonstrate the function in a program that lets the user experiment with different values for the formula's terms.

4. Write a program that calculates the average number of days a company's employees are absent. The program should have the following functions:
- A function called by main that asks the user for the number of employees in the company. This value should be returned as an int. (The function accepts no arguments.)
 - A function called by main that accepts one argument: the number of employees in the company. The function should ask the user to enter the number of days each employee missed

during the past year. The total of these days should be returned as an int.

- A function called by main that takes two arguments: the number of employees in the company and the total number of days absent for all employees during the year. The function should return, as a double, the average number of days absent. (This function does not perform screen output and does not ask the user for input.)
 - *Input Validation: Do not accept a number less than 1 for the number of employees. Do not accept a negative number for the days any employee missed.*
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5. Write a program that calculates the average of a group of test scores, where the lowest score in the group is dropped. It should use the following functions:
- void getScore() should ask the user for a test score, store it in a reference parameter variable, and validate it. This function should be called by main once for each of the five scores to be entered.
 - void calcAverage() should calculate and display the average of the four highest scores. This function should be called just once by main and should be passed the five scores.
 - int findLowest() should find and return the lowest of the five scores passed to it. It should be called by calcAverage, which uses the function to determine which of the five scores to drop.
 - *Input Validation: Do not accept test scores lower than 0 or higher than 100.*
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