

Problems to solve 4 consists of problems to solve for developing programming skills in C language:

1. Create a C program that contains a **printf** to take as parameter a string and a list of arguments of variables. The string must contain only the format identifiers for characters **%c**, double **%d**, float **%f**, and string **%s** specifiers and characters. The function is to process the string and the list of arguments and to call of **printf()** to output their values.
 2. Create a C function to compute the largest common divisor of two positive whole numbers. Assume two integers **p** and **q**, where **p > q**. If **q** divides **p** precisely, this is the largest common divisor. If the remainder **z** of the division **p/q** and it is not **0**, then we divide **q** with **z**. If the new remainder of the division is **0**, then the LCD is **z**; otherwise, this process is repeated. Write a C program to read two whole integers and use the C function to compute their largest common divisor.
 3. Given is the polynomial of the form $c_0 + c_1y + c_2y^2 + \dots + c_ny^n$ for a given **y**. Create a C function to return the value of the polynomial $c_0 + c_1y + c_2y^2 + \dots + c_ny^n$ for the given **y**. Select the function prototype be double polynomial(**double c[], double y, int z**); where the coefficients of the polynomial are stored into **c** and **z** that represents its degree. Write a C program to read the degree of a polynomial, the coefficients of the polynomial, and a value such as **y** and use the function to compute the value of the polynomial. Assume that the maximum degree is 25. It is your choice to use a formula or a C code for the power of the function.
 4. Create a C function of the type **void** to take as parameters an array which contains the prices of some books in a bookstore and their number and use proper variables to return the highest, the lowest, and the average of the prices. Write a C program to read the prices of less than **75** books and stores them in an array. If the user enters **-1**, the insertion of prices is to be terminated. The C program needs to use a C function to output the highest, the lowest, and the average of the prices.
 5. Create a C function that takes as parameter an integer **n** and calculates the n^{th} term of the sequence such as $a_n = a_1 + d(n - 1)$, where a_n is the n^{th} term in the sequence, a_1 is the first term in the sequence, **n** is the term number and **d** is the common difference. Write a C program to read an integer **n** and to use the C function to output the n^{th} term.
 6. Create a C program that uses a function to generate and to output seven random integers between user-specified limits. This is an user-defined C program. Use the hint to solve for the problem.
Hint: Generating random integers over a specified range is using the rand function. For example, if it is to generate random integers between 0 and 7. First, it is generates a random number between 0 and RAND_MAX; then it uses the modulus operator to compute the modulus of the random number and the integer 8 so that **z = rand()%8**; The result of the modulus division is the remainder after rand() is divided by 8, so the value of **z** is an integer value between 0 and 7. Assume you are to generate a random integer between 0 and 24. The total number of integers is 25, and a single random number in this range can be computed with **y = rand()%25**;
- For the C function to generate an integer between two specified integers, **p** and **q**, the function first computes **z**, which is the number of all integers between **p** and **q**, inclusive; this value is equal to **q-p+1**. The function then uses the modulus operation with the rand function to generate a new integer between **0** and **p-1**. The lower limit **p** is added to the new integer to give a value between **p** and **q**. All three steps can be combined in the return statement in the C function:
7. Create a C function to evaluate the mathematical expression: $f(y)=0.1 y^2-y\ln y$ for the subintervals of the roots, i.g. left and right. Write a C program to check the root intervals.
 8. Write a user defined C program to solve the following equation: $ky + n + m = 0$, where **k** is a coefficient, **y** is a function, **n** and **m** are coefficients. The user enters the coefficients, write C code to output the solution of the equation.