UNIVERSITY OF KWAZULU-NATAL
COMP102: Compute Programming
Practical 3: if Statements, Loops & Arrays

Thursday, 18 August 2022

Question 1: Grade Symbol
Write a program that prompts a user for a mark between 0 and 100, that we will call x. The program should then output a grade symbol according to the criteria below:

- x =< 75   => 'A'
- 75 < x <=70   => 'B'
- 70 < x <= 60   => 'C'
- 60 < x <= 50   => 'D'
- x < 50   => 'F'

Question 2: Perfect Square I
A perfect square is a number that is the product of an integer multiplied by itself. For example, 16 is a perfect square because $16 = 4 \times 4$.

You can determine whether a number is a perfect square by checking if the square root of that number of a whole number, i.e. contains no fractional part. If the square root is a whole number, then the initial number is a perfect square.

Write a program that prompts a user to enter an integer. Test whether that integer is a perfect square or not and communicate the result to the user. **Note that 0 and 1 are also perfect squares.**

Question 3: Perfect Square II
Write a program that finds and displays all of the perfect squares under 1000. **Note that 0 and 1 are also perfect squares.**

Question 4: Finding Factors
A factor of a number is defined as any integer that can divide a number without leaving a remainder. For example, 2 and 3 are factors of 12, because both can divide 12 to produce a quotient and no remainder.

Write a program which will prompt the user to enter an integer. Then display all factors of that integer in a message on the console as shown below:

The factors of 12 are: 1, 2, 3, 4, 6 and 12.

Question 5: Greatest Common Divisor (GCD)

"In mathematics, the greatest common divisor (GCD) of two or more integers, which are not all zero, is the largest positive integer that divides each of the integers."[1]

Write a program which prompts a user to enter two integers. Determine the GCD of those two integers and display it on the console.

Question 6: Lowest Common Multiple (LCM)

"In arithmetic and number theory, the least common multiple, lowest common multiple, or smallest common multiple of two integers a and b, usually denoted by lcm(a, b), is the smallest positive integer that is divisible by both a and b."[2]

Write a program which prompts the user to enter two integers. Determine the LCM of those two integers and display it on the console.

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[1] https://en.wikipedia.org/wiki/Greatest_common_divisor, accessed 17th August 2022
[2] https://en.wikipedia.org/wiki/Least_common_multiple, accessed 17th August 2022