CSC10001

LAB01 – Conditional

FIT-HCMUS

Exercise 1

Write a program with input: hours, minutes, and seconds. Check the validity of the input data

Exercise 2

Write a program to input the students' scores in 3 subjects: Math, Physics, and Chemistry

- If the total score is >=15 and no subject is less than 4, print the passing result,
- If pass and all subjects are greater than 5, print out 'All good',
- If pass and have at least 1 subject under 5, print out 'Need to improve',
- Other cases are 'Failed'

Exercise 3

Write a program to input a positive integer n. Check if n is a perfect square? (A perfect square is a number that when taking the square root of 2, the result is an integer)

Exercise 4

Write a program to input an integer n. Output to the screen "Even" if n is an even number; otherwise "Odd" if n is odd.

Exercise 5

- Write a function that checks for a leap year (leap year: divisible by 4 and not divisible by 100 or divisible by 400)
- Enter 1 month, year, show how many days that month (month has 31 days: 1, 3, 5, 7, 8, 10, 12; month has 31 days: 4, 6, 9, 11; February have 28 or 29 days)

Exercise 6

Write a program to input a number from 0 to 9, print the corresponding digit. For example, enter the number 3, print the word 'Three' (switch case)

Exercise 7

Enter 3 numbers a, b, c

- Print the largest and the smallest number
- Print out these 3 numbers in ascending order

Exercise 8

Enter the lengths of 3 sides a, b, c of a triangle

- Do these 3 sides form a triangle?
- If yes, indicate the type of triangle (regular triangle, isosceles triangle, right triangle, equilateral triangle)

Exercise 9

Calculate taxi fare from the number of kilometers entered, knowing:

- First 1 km costs 15,000 VND,
- From the 2nd to the 5th km, the price is 13,500 VND,
- From the 6th kilometer onwards, the price is 11,000 VND,
- If you go more than 120km, you will receive a 10% discount on the total amount

Exercise 10

Write a program to calculate electricity bill with new and old electricity numbers entered from the keyboard. Print out the old electricity number, the new electricity number and the amount to be paid. Know that:

- first 100 kWh, price 1,000 VND,
- from 101 - 150 kWh, price 1,200 VND,
- from 151 – 200 kWh, price 2,000 VND,
- from 201 and up, price 2,500 VND

Exercise 11

Write a program that calculates a fine when a car exceeds the allowed speed (assuming the allowed speed is 60 km/h) according to the following fines (where `x` is the number of km/h exceeding the allowed speed):

No.	Violations	Penalties
1	$5 < x \leq 10$	0.7 million
2	$10 < x \leq 20$	2.5 million
3	$20 < x \leq 35$	5.5 million
4	$35 < x$	7.5 million

The program allows input `x`, output the fine amount to the screen.

Exercise 12

Write a program that allows the user to enter an integer `x` between 0 and 35 ($0 \leq x \leq 35$). Output to the screen according to the following rules:

- If $x \leq 9$, output `x`
- Output `A` if $x = 10$, `B` if $x = 11$, `C` if $x = 12$, ..., `Z` if $x = 35$

(Hint: Use `static_cast<char>()` with $x \geq 10$)

Exercise 13

According to the Pythagorean theorem, in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides. Write a program that allows you to enter any 3 numbers, check if those 3 numbers are the lengths of the 3 sides of a right triangle.

Exercise 14

Write a program to input 3 numbers `a`, `b`, `c` then solve the equation $ax^2 + bx + c = 0$.

Exercise 15

Write a program to build a simple calculator. The program allows to input 2 operands and 1 operator (operators can be: + - * / %), then output the result of the operation to the screen.
For example:

- Input: operand 1: 2, operand 2: 4, operator: +
- Output: "2 + 4 = 6" is printed on the screen

Exercise 16

A bank in town A updates its customer accounts at the end of each month. The bank offers two types of accounts: savings and current (current accounts). Each customer must maintain a minimum balance. If the customer's balance falls below the minimum balance, the customer will be charged a service fee of $10 for a savings account and $25 for a checking account. If the balance at the end of the month is greater than or equal to the minimum balance, the account will receive interest as follows:

- Savings account: receive 4% interest
- Current Account: if the balance at the end of the month - minimum balance $\geq$ $5000 will receive interest 3%; otherwise, the interest rate is 5%.

Write a program that allows the user to enter the account type (`char`); 't' if it's a savings account, 'v' if it's a checking account), minimum balance (int) and balance end of month (int) of the customer. Output to the screen the total amount of interest received by the customer, if any, or the amount of the penalty.

Exercise 17

One way to determine how healthy a person is is to measure the person's body fat. The formulas for determining body fat for women and men are as follows:

- Determination of body fat for women:
  - A1 = (weight $\times$0.732) + 8,987
  - A2 = wrist size (because at the point of the largest size) / 3,140
  - A3 = waist size (measured at the navel) $\times$0.157
  - A4 = hip size (measured at the widest point) $\times$0.249
  - A5 = arm size (measured at the largest point) $\times$0.434
  - B = A1 + A2 – A3 – A4 + A5
  - Fat = weight - OVER
  - Fat percentage = fat amount $\times$ 100 / weight
- Determine the amount of fat for men
  - A1 = (weight $\times$1.082) + 9.442
  - A2 = wrist size $\times$4.15
  - B = A1 - A2
  - Fat = weight - OVER
  - Fat percentage = fat amount $\times$ 100 / weight

Write a program to calculate body fat for a person.

Exercise 18

Write a program to calculate the index BMI of a person when the person's weight and height are known according to the following formula:

$$BMI(kg/m^2) = \frac{W}{H^2}$$

In which: - W is weight, in kg
- H is the height, in m

Then output a message about a person's weight status according to the following convention:

- Substandard: BMI less than 18.5
- Standard: BMI from 18.5 - 25
- Overweight: BMI from 25-30
- Fat - should lose weight: BMI 30 - 40
- Very fat – need to lose weight immediately: BMI over 40

Exercise 19

Write a program to read any Number from 0 to 999 in integer and display in the word.

Example

- **Input**: 145
- **Ouput**:
  One hundred forty five

Exercise 20

Given an amount, find the minimum number of notes of different denominations that sum up to the given amount. Starting from the highest denomination note, try to accommodate as many notes as possible for a given amount. We may assume that we have infinite supply of notes of values 500, 200, 100, 50, 20, 10, 5, 1.

Example

- **Input**: 145
- **Ouput**:
  Currency Count: 100 : 1, 20 : 2, 5 : 1

Exercise 21

Write a program with input: day, month, and year. Check the validity of the input data.

Exercise 22

Write a program to add 2 number of second together. The output is returned in the format " dd : hh : mm : ss ". If the result is greater than 8553600 (99 days), print out "Out of range"

Example

- **Input**: 145 3670
- **Ouput**:
  00 : 01 : 03 : 35