Alexandria University
Faculty of Engineering
Computer and Systems Engineering Department

CS121: Computer Programming 1
Assigned: Saturday, October 5th, 2024
Due: Saturday, October 12th, 2024

Lab 1
Environment Setup
&
Variables - Operators - Selection

In this problem set, you are only required to try to set up the environment for writing and compiling C programs on your home machine or laptop

Lab Objectives

- Setting up the environment for writing and compiling C programs
- Learning what is a compiler
- Learning what is an IDE (Integrated Development Environment)
- Practice some Problems

Environment Setup

Install your own choice of IDE (Codeblocks is recommended for now. For other choices, you will be responsible for handling any problems that may appear)

- Code::Blocks Binary releases - Code::Blocks (codeblocks.org)
- Visual Studio Code Download Visual Studio Code - Mac, Linux, Windows
- Clion Download CLion: A Smart Cross-Platform IDE for C and C++ (jetbrains.com)
- Any other IDE if you prefer something else

Step-by-step Tutorial for Installing Code::Blocks on Windows

Download Code::Blocks

- Go to this website: http://www.codeblocks.org/downloads
- Follow the link to “Download the binary release”.
- Go to the Windows 2000 / XP / Vista / 7 / 8 / 10 section
- Find the file “codeblocks-20.03-setup.exe” and choose download from FossHUB

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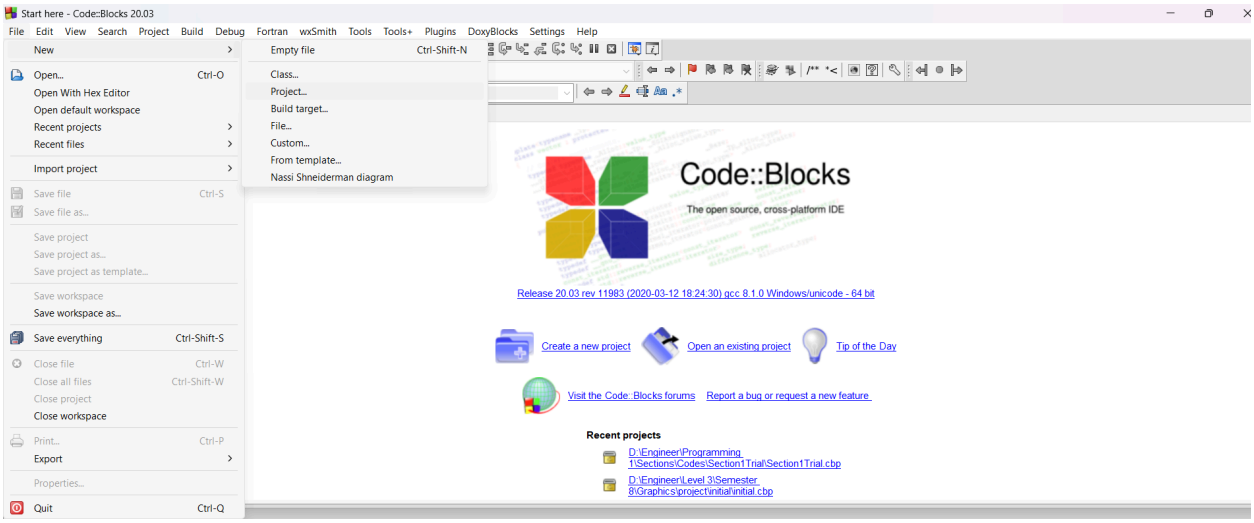
- Find Codeblocks 64 or 32 bit that including compiler
- To know either to choose 64 or 32 bit : search in your laptop of "System Information", you will find a field named "System Type"

Install Code::Blocks

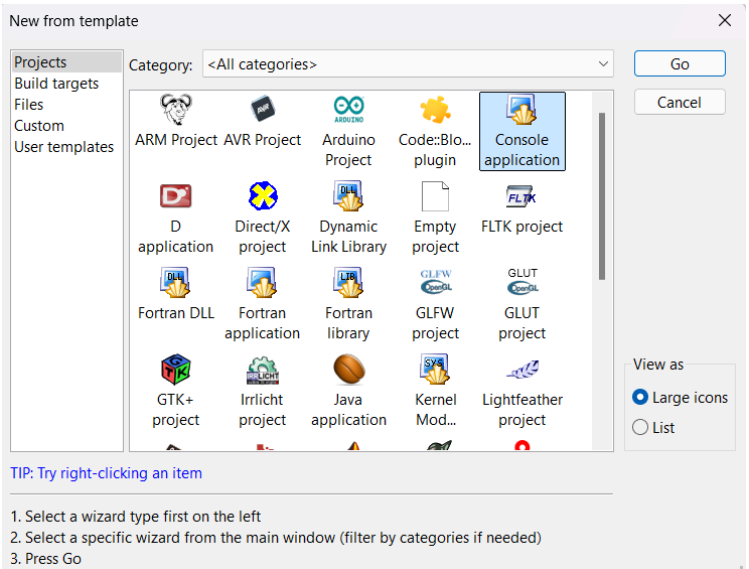
- Double click the installer (the file you downloaded in step 1).
- Hit "Next" several times. Default settings will install Code::Blocks in "C:\Program Files\CodeBlocks", however, you may install it elsewhere if you like.
- Do a Full Installation.
- Launch Code::Blocks.

Creating a new Project

- Go to File → New → Project

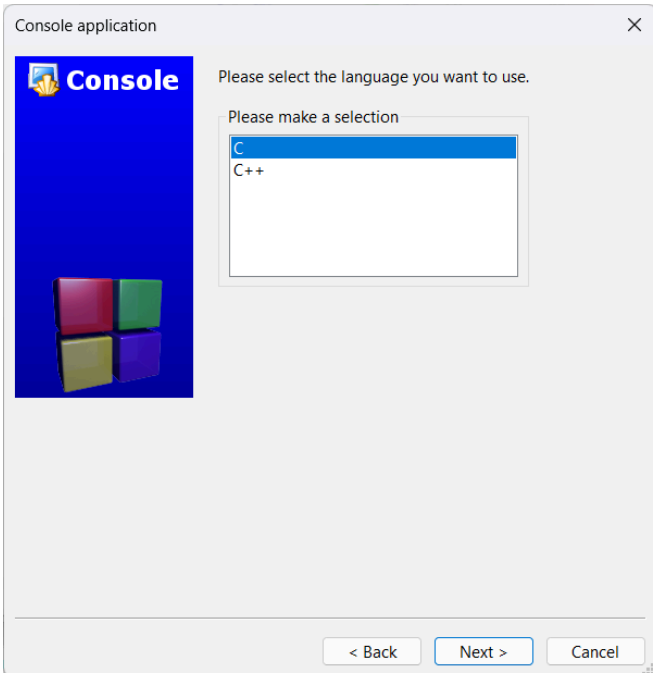


- Select "Console application

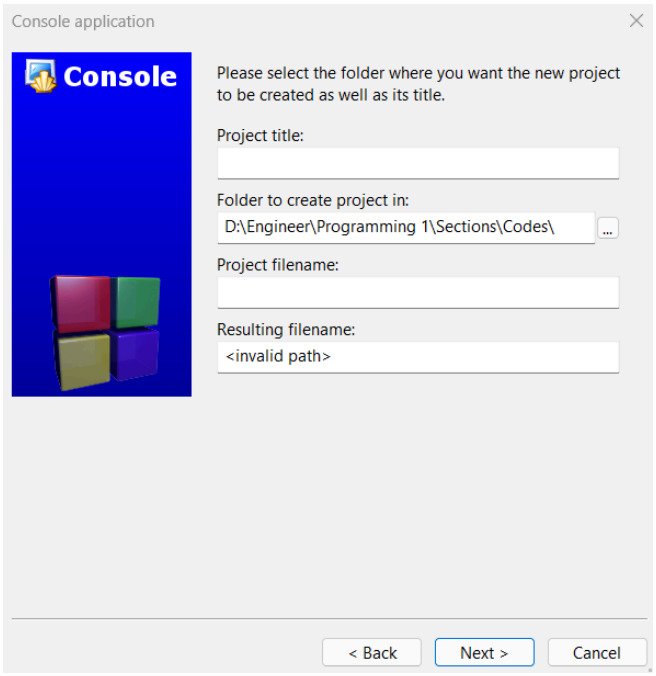


Eng/ Veronica Romany

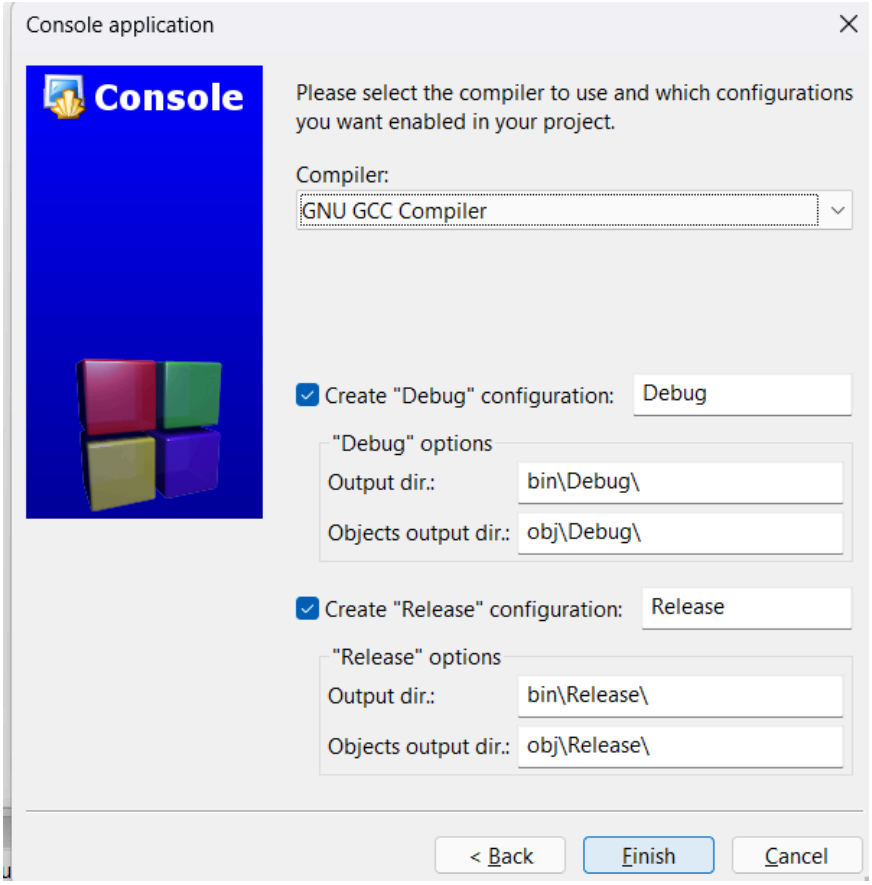
- Then the following window will appear. So choose C.



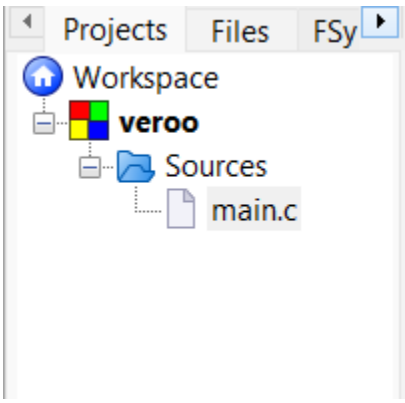
- Write your project name and then click Next.



- Click Finish



- Then Double click main.c to start writing your first program.

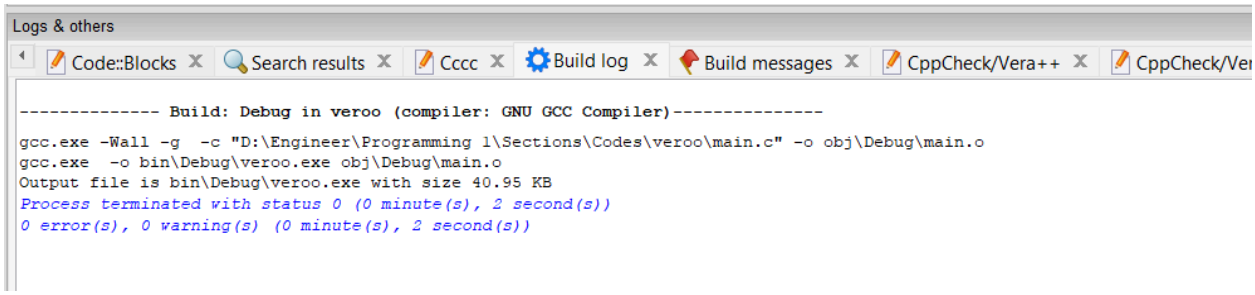


- Then you will find the simple hello world program written like the following image.

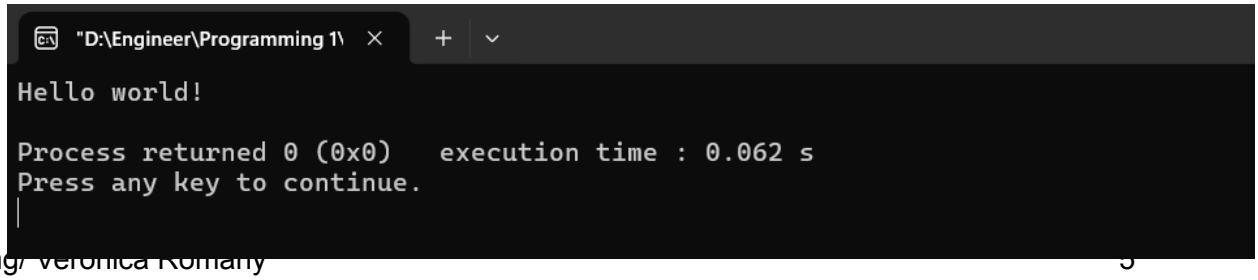
```c
#include <stdio.h>
#include <stdlib.h>

int main()
{
    printf("Hello world!\n");
    return 0;
}
```

- To build the program: From Build Menu choose Build
  If there are no errors you will find as the image below “zero errors, 0 warnings”.

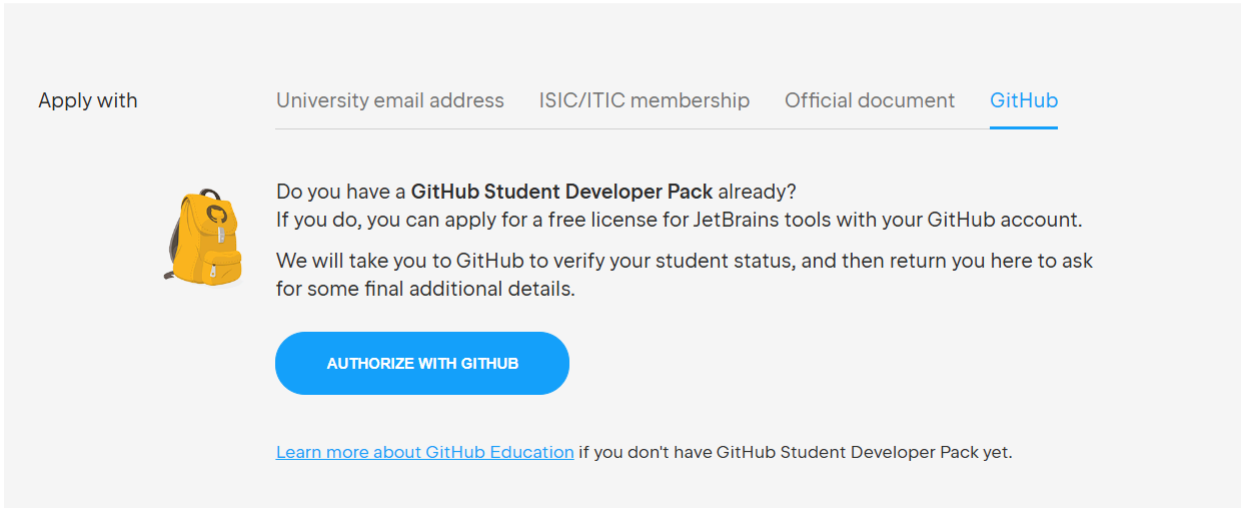


- To run the program: From Build Menu choose Run. Then the following window will appear and you will find “Hello world!” printed on the screen



Guidance to Install Clion from JetBrains

1. First get student pack of Github using (.edu mail), you can follow this video to get it but for the submitting ID step you have to replace it by Screen shot from "Ebn El Haitham" website to your grades
   How to get Github Students Developer Pack for FREE 2023 | NO EDU MAIL REQUIRED (youtube.com)
2. After Get student Pack please remove (.edu mail) from github
   JetBrains Products for Learning go to this link and authorize using github



Problem Set

1. Write a program that reads the radius of a circle as a user input, then uses this radius to print the following (Consider the value of π=3.14159):
   - Circle's diameter (2 * radius).
   - Circle's circumference (2 * π * radius).
   - Circle's area (π * radius * radius).

   According to another input that scanned from user that decide what does the user want so if he/she

   - Pressed "D" or "d" the output will be the diameter
   - Pressed "C" or "c" the output will be the circumference
   - Pressed "A" or "a" the output will be the area
   - Pressed "Z" or "z" the output will be the diameter and circumference and are

   Try to think of all cases that can happen and test your program accordingly.

2. Write a program to evaluate each of the following expressions: (all parameters should be taken as input from the user).

   (a) $\frac{3x+2*10^5}{4x+5.2*10^4}$

   (b) $5(\frac{x+y+3}{27+z})^2$

   (c) $\frac{a+\frac{b}{c}}{d+\frac{e}{f+g}}$

   (d) $(sin(x+y))^2$

3. Given two numbers 0 ≤ x, y ≤ 15 you are required to store them in the most efficient way. x and y need only 4 bits so using int(32 bit), short(16 bit), char(8 bit) will be a wast of memory. It may sound that the waist is small but when you have to store 10^6 such variable then you will start to worry about memory usage. The trick is to use char to save x and y. So you should store x in higher 4 bits and y in lower 4 bits of char. Scan x and y as integers from the user and check that 0 ≤ x, y ≤ 15. Compress x and y in char z and print z as integer.

Example: 1
int x = 7;// 0111
int y = 3;//0011
char z;
do some work here
printf("%d", z);// output 115(01110011)

Example: 2
int x = 15;// 1111
int y = 3;//0011
char z;
do some work here
printf("%d", z);// output -13(11110011)

4. A year with 366 days is called a leap year. A year is considered a leap year if it is divisible by 4 (for example, the year 1980), except it is not a leap year if it is divisible by 100 (for example,the year 1900); however, it is a leap year if it is divisible by 400 (for example, the year 2000).Write a program that asks the user for a year and computes whether that year is a leap year or not.

NOTES

1. You are encouraged to ask any questions on MS teams, or in person.
2. Cheating will be severely penalized (for both parties). So, it is better to deliver nothing than deliver a copy!.
3. You are not allowed to use any AI Tool.
4. Submission details will be announced on MS Teams.

Good Luck