Office KC 266 – email

Syllabus and grading

Web site: `http://csserver.evansville.edu/~blandfor`

Text: These two books are available as a free download in pdf format.
1. Bailey, Tim, <u>An Introduction to the C Programming Language and Software Design,</u>
<u>http://www-personal.acfr.usyd.edu.au/tbailey/ctext/ctext.pdf</u>

2. Horton, Ivor, <u>Beginning C</u>,
<u>http://www.mosaic-industries.com/embedded-systems/_media/c-ide-software-</u>
<u>development/learning-c-programming-language/beginning-c-5th-edition-ivor-horton.pdf</u>

Reference:
1. Brian W. Kernighan and Dennis M. Ritchie, <u>The C Programming Language</u>,
<u>https://www.dipmat.univpm.it/~demeio/public/the_c_programming_language_2.pdf</u>
or this is available from Amazon at
<u>https://www.amazon.com/Programming-Language-2nd-Brian-Kernighan/dp/0131103628</u>
for about $20 used.

Software:
1. Microsoft Visual Studio 2019 is available on the campus network. For your personal
computer you can use Visual Studio Community for Windows Desktop which can be
downloaded from <u>https://visualstudio.microsoft.com/vs/express/</u>
Download Community 2019 for Windows Desktop.
2. CA ARM C Compiler for the ARM Cortex microcontrollers from Keil Software. You
may download the most recent student version from http://www.keil.com/
Choose Evaluation Software under downloads and click on ARM Tools. Fill out the
registration form. The demo version includes manuals.
.
Hardware:
1. Printed circuit boards for the ARM Cortex M0+ Nucleo Board. This board will be
available from the EECS office (paid for by lab fees).

There will be 3 hour exams, graded homework projects, and a 2 hour comprehensive final exam.
The homework will count 18%, the final will count 22%, and the 3 hour exams will count 20%
each. All exams are open book and open notes.

Final Exam is   Wednesday, December 11, 2019 at 8:00am

Engr 101   **Fall 2019/20**

Monday	Wednesday	Friday
	Aug. 21 Intro and overview	**Aug. 23** **Notes** Visual Studio – creating a project.
Aug. 26 H27-34, B8-13 Variables types, operators, expressions, simple I/O	**Aug. 28** H35-75, B13-16 Arithmetic, math functions, relational operators	**Aug. 30** H85-128, B17-20 Branching, if-else
Sept. 2 **Labor Day**	**Sept. 4** H135-182, B20-23 Loops	**Sept. 6** H135-182, B20-23 Loops
Sept. 9 Review	**Sept. 11** **Hour Exam 1**	**Sept. 13** B105-114 Review exam. Formatted IO
Sept. 16 H321-342 B25-32 Functions	**Sept. 18** H349-373, B25-32 Parameter passage	**Sept. 20** H349-373, B49-57 Parameter passage - pointers
Sept. 23 Intro to functions	**Sept. 25** H185-247 B59-65 Arrays and strings	**Sept. 27** H185-247 B59-65 Arrays and strings
Nov. 30 Examples	**Oct. 2** Review	**Oct. 4** **Hour Exam 2**
Oct. 7 **Fall Break**	**Oct. 9** **Notes** Review exam Intro to Inventor	**Oct. 11** **Notes** Intro to Inventor
Oct. 14 **Notes** The Keil IDE	**Oct. 16** **Harlaxton**	**Oct. 18** **Notes** STM32L0K6 Proecessor
Oct. 21 **Notes** First Keil Project - MBed	**Oct. 23** MBed classes, Serial I/O	**Oct. 25** Serial I/O Formatting
Oct. 28 Memory FFs, registes LEDs	**Oct. 30** Bit operations, LEDs and Switches	**Nov. 1** **Advising Session**
Nov. 4 Bit operations, time delays	**Nov. 6** A/D Conversion	**Nov. 8** A/D Converstion **(Last day to withdraw with W)**
Nov. 11 PWM	**Nov. 13** PWM	**Nov. 15** Review
Nov. 18 **Hour Exam 3**	**Nov. 20** **Thanksgiving Break**	**Nov. 22** **Thanksgiving Break**
Nov. 25 Review Exam Holiday Decoration	**Nov. 27** Holiday Decoration	**Nov. 29** Holiday Decoration
Dec. 2 Holiday Decoartion	**Dec. 4** Final exam review	

Final Exam is   Wednesday, December 11, 2019 at 8:00am

What is a computer language?
  Machine code – Assembler – High level language

Languages C#, C++, Fortran, Cobol, Pascal, ADA, Basic

Language history C => C++ => Java => C#

Visual Studio 2019 Community – Set tabs
Sample program – from text on console

Getting into the LAB

Access code for KC 267 is 544181. The building is open from about 6:30AM to 10:00PM M-S
and noon to 10:PM on Sunday. If you need to use the lab after hours see Vicky in KC 266 to get
an after-hours pass. There is a card lock on the front door and you should be able to swipe your
card to unlock the doors after hours. If you have trouble with this see Vicky in KC 266 or Kim
in KC 250. If you do not have a pass after-hours the guard will escort you out.

You can download VS2019 to your own computer (see the syllabus). Feel free to bring your
laptop to class and work from that. If you have trouble getting VS 2019 on your laptop see Jeff
in KC 140 (he is hard to catch but he is here 8 to 5 so keep trying.)

Getting Started with Visual Studio

When you open Visual Studio for the first time you may need to sign in to a Microsoft account
or get a license to continue. The account is free and requires only an email address and
password.

Open Visual Studio. Click on *Tools → Options → Startup.* Select Empty Environment as
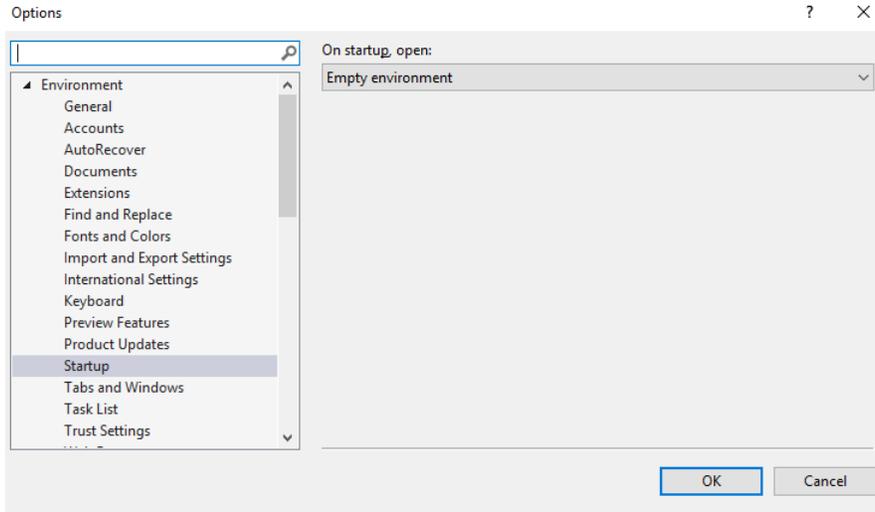shown in Figure 1.

Figure 1 Click on Tools → Options → Startup. Select Empty Environment as shown. Click on OK.

Click on Tools → Options → Text editor → C/C++ → Tabs and choose block indenting, tab size 4 and indent size 4.   Also choose insert spaces. See Figure 2.
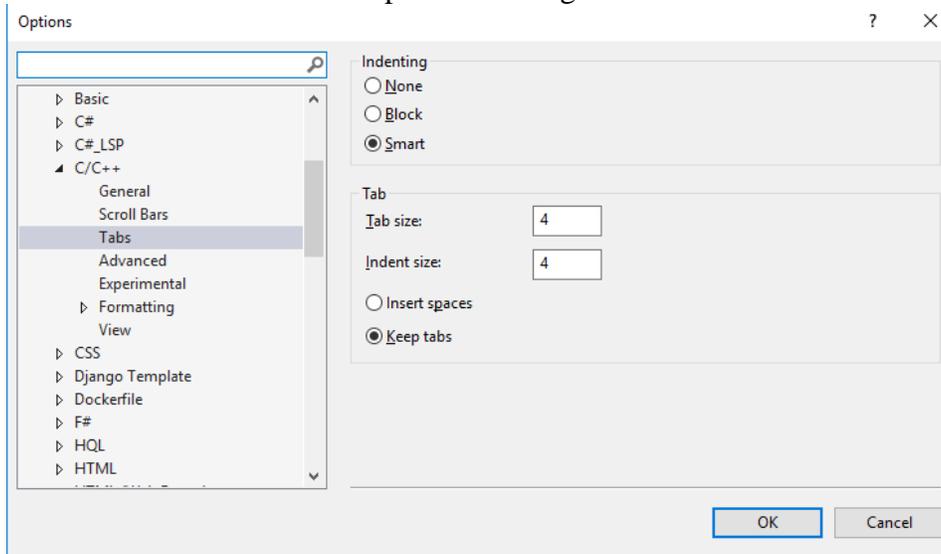

Figure 2 Setting up tables.

Click on Tools → Options → Text editor → C/C++ → Formatting and slect *Do Nothing* under the Paste option. See Figure 3.
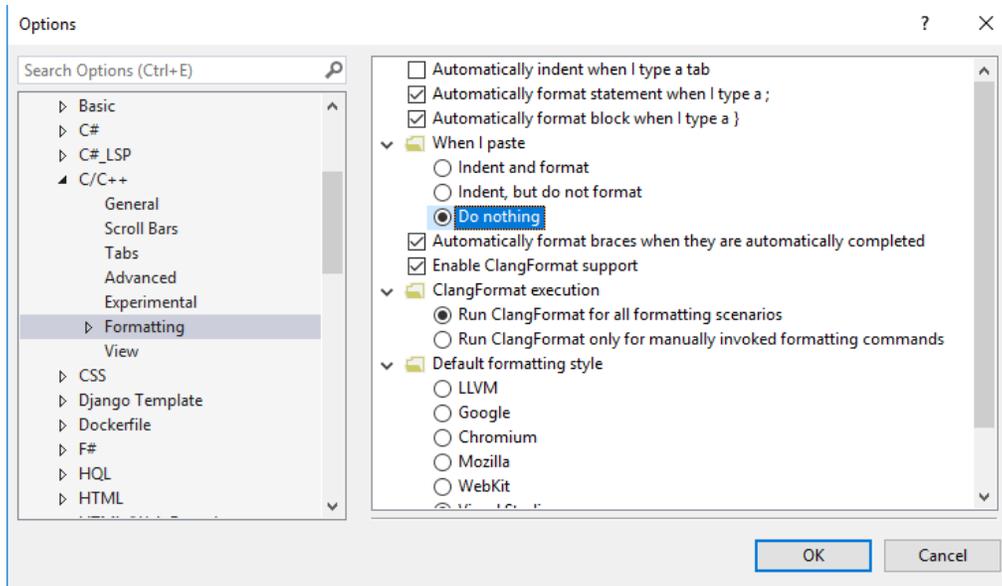
Figure 3 Setting paste option.

Writing C in Visual Studio

When you open Visual Studio for the first time you may need to sign in to a Microsoft account or get a license to continue. The account is free and requires only an email address and password.

From the start menu which comes up when Visual Studio open click on "New Project". Alternatively, you can get rid of the *Start* page by clicking on Tools → Options → Startup. In the menu that comes up select "Show empty environment" and unclick the box that downloads content every so often. You can then open a project from the empty environment by clicking on File → New project. This will get you the *New Project* window shown in Figure 4. Select *Language* from the tab at the top and choose C++. Click on Empty Project and select *Next*

Figure 4 New project window.

The next screen (Figure 5) allows you to configure your project. You need to give your project a name. I used Engr101DB. You need a descriptive name here with no spaces. You also need to select a folder into which your project will be stored. For now use the browse button to place your project on the desktop. Click on Create.

Figure 5 Configure your project.

After you configure your project and click on *Create* you get a screen that looks like that in Figure 6.
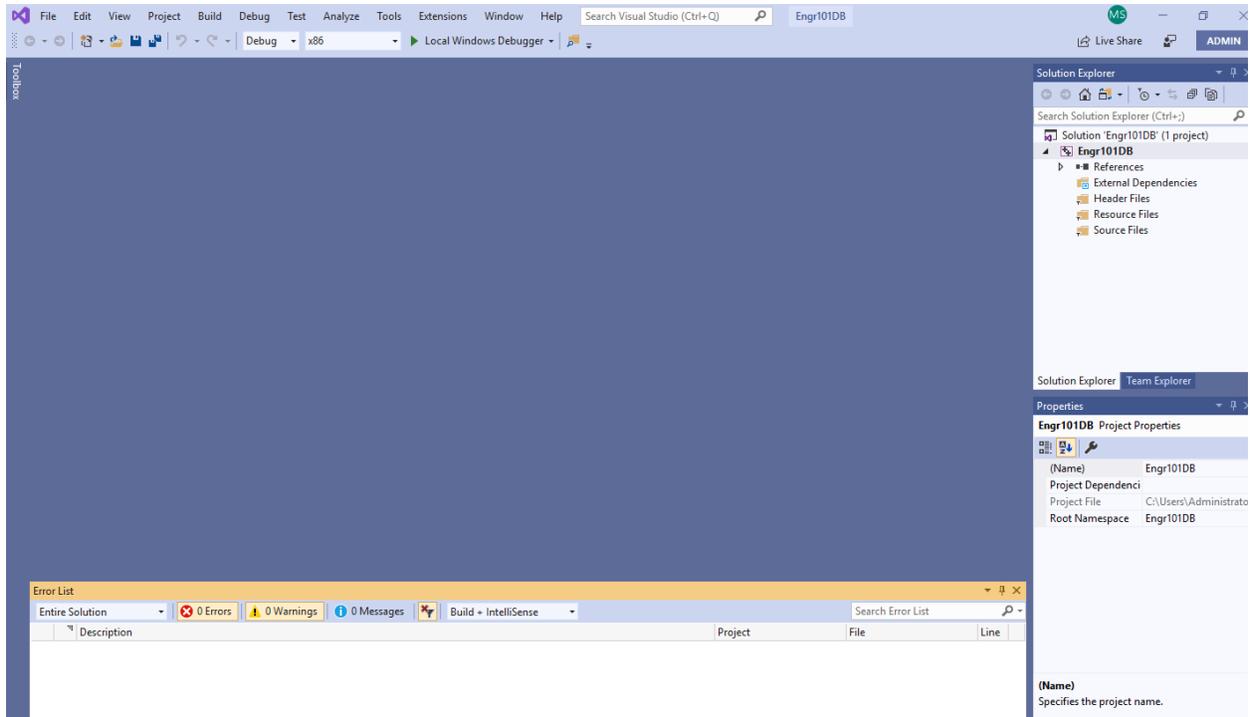

Figure 6 The opening screen after a project has been created.

If your screen does not have the *Solution Explorer* and the *Properties* windows visible click on View and select them from the menu.

The *Solution Explorer* has a list of all of the files in your project. Since we created an empty project there are no files listed – just empty folders.

In the *Solution Explorer* right click on source file and select *Add → New item*. This will give you the screen shown in Figure 7. Click on *C++ File (.cpp)* and at the bottom of the screen enter the file name. This is usually the same as the project name. Change the file extension from .cpp to .c. In Figure 7 we have set this to *Engr101DB.c*. Click on *Add* to close this screen.
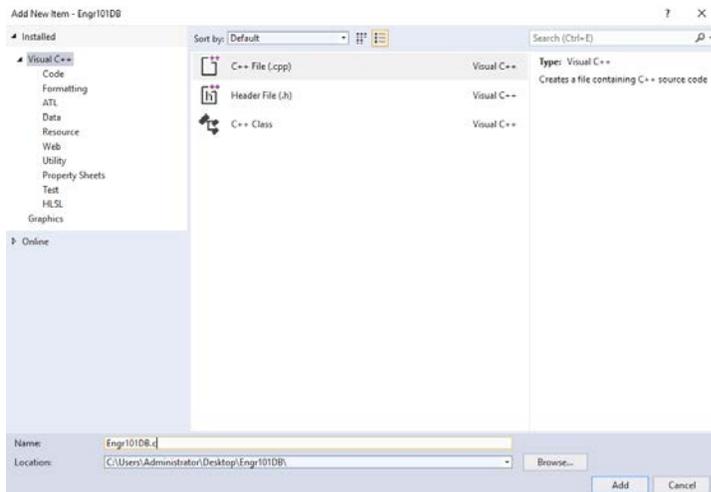
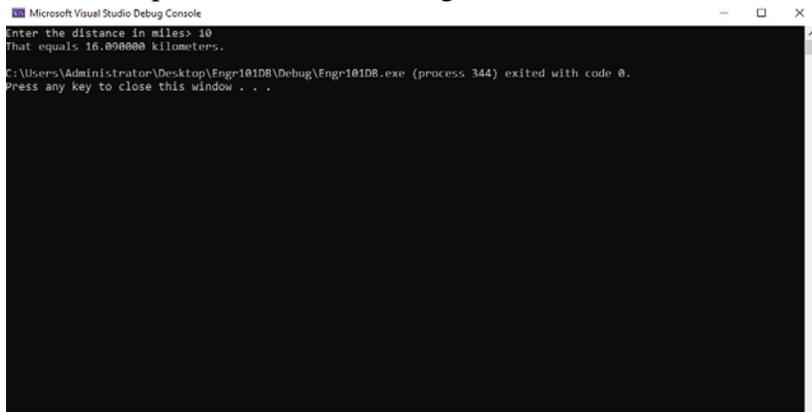**Figure 7** The add new item screen. Change the file extension from cpp to c.

At this point the main window in the center is ready for you to enter your c-code. Here is some sample code that you can enter to see how to compile a c-program. This code asks the user to enter a number for miles and it prints the equivalent number of kilometers.

```c
#include <stdio.h>
#define KMS_PER_MILE 1.609

int main(void)
{
    double miles, kms;
    printf("Enter the distance in miles> ");
    //If you use scanf here you get a compiler warning
    //scanf_s prevents buffer overflow
    scanf_s("%lf", &miles);  //this is lf not 1f
    kms = KMS_PER_MILE * miles;
    printf("That equals %f kilometers.\n", kms);
    return (0);
}
```

After you have the program entered, click on *Build → Build Solution*. If you have been living a good clean life in the very bottom left of the screen you will see a message that the Build succeeded. If this is not the case, you have most likely typed something in wrong. Try again.

If you build succeeded you can click on *Debug → Start without debugging*. This will pop up the console output screen shown in Figure 8

Figure 8 The console output screen. Enter the number 10 to see the result.

Press any key to go back to your c-code.

At this point you have successfully entered and compiled a c-program. You can close it by going to *File → Close Solution*. To reopen it click on *File → Open project/solution*. Browse back to the folder where you stored your project and find Engr101DB.*sln*. Click on this file to reopen your project. Alternatively, you can close Visual Studio and locate the folder with the solution on your computer. Double click on *Engr101DB.vcxproj*. This will open Visual Studio and your project.

Engr 101   **August 21, 2019**
In Class Assignment 1   **Due: August 26, 2019**

Create a new project in C named *ConvertAcres* which inputs a number in acres and produces an equivalent number in square miles. (There are 640 acres in 1 square mile.) Add comments to the top of your program which give your name, the date, the assignment number, and a one or two sentence description of what the program does. Run your program and verify that it works. Print a copy of your source code and turn it in during class.