

# AST21105 Object-Oriented Programming & Design

## Lab 1 – Hello OOP

### A. Submission Details

In this lab, you are required to submit **ONE** C++ program to solve the given problem shown in the section “Compute Total”. To make the program implementation easier, you are suggested to write your program using Visual Studio .NET instead of doing it directly using paper & pencil. After you have completed the implementation, submit your program file (i.e. ComputeTotal.cpp for this lab) using the electronic “drop-box” in Canvas, **One week** after your lab section is conducted. For details, please refer to the following:

<i>Tuesday sections</i>	<i>by 19:00 on 19 January 2016 (Tuesday)</i>
<i>Wednesday sections</i>	<i>by 19:00 on 20 January 2016 (Wednesday)</i>

You are reminded to double-check your solution to verify everything is correct before submission. You are also required to put your name and student ID at the beginning of your source file.

**Important: You are only able to submit your work once.**

### B. Objective

The objective of this lab is to create a couple of C++ programs using Visual Studio .NET, an Integrated Development Environment (IDE) runs on Windows platform. This aims to help you to familiarize yourself with the working programming environment.

We will be using Microsoft’s Visual Studio .NET development environment for performing labs and writing programs in this course. The lab machines have a version of Visual Studio .NET installed on them for your use for labs and programming assignments. In addition, you will be provided a link to a software download site so that you may obtain a free and valid copy of the software for your own use at home or on a laptop.

The first part of this lab is meant to be a simple review of the basics of writing a program in C++, creating a main function, and using iostream object to do simple program output.

The second part of this lab is a more complete review of control statements. You will be asked to write a program to compute the total value for a list of integers obtained from the keyboard and display the result on the screen.

## C. Review on How to Use Visual Studio .NET

Let's say you have written a C++ program on a paper and want to run it on one of the computers in the lab. The following steps will be involved.

- (1) Log on the PC
- (2) An **editor** will be used to enter and modify your C++ program
- (3) A C++ **compiler** will be invoked / run to translate your C++ program into an executable file (.exe). If your program has syntax errors (i.e. grammatical errors), the compiler will prompt you the errors and you need to go back to step (2) to correct the errors.
- (4) Run the executable program on your PC.

In this lab experiment, you will go through the steps above and learn through practice.

### Experiment

1. Start up the Visual Studio .NET development environment (Figure 1) and create a new project (You can click the “New Project” button on the Start Page, OR use the file pull down menu sequence “File->New->Project”, Figure 2). A New Project dialog will be displayed.

Double click this icon



Figure 1: Start up the Visual Studio .NET

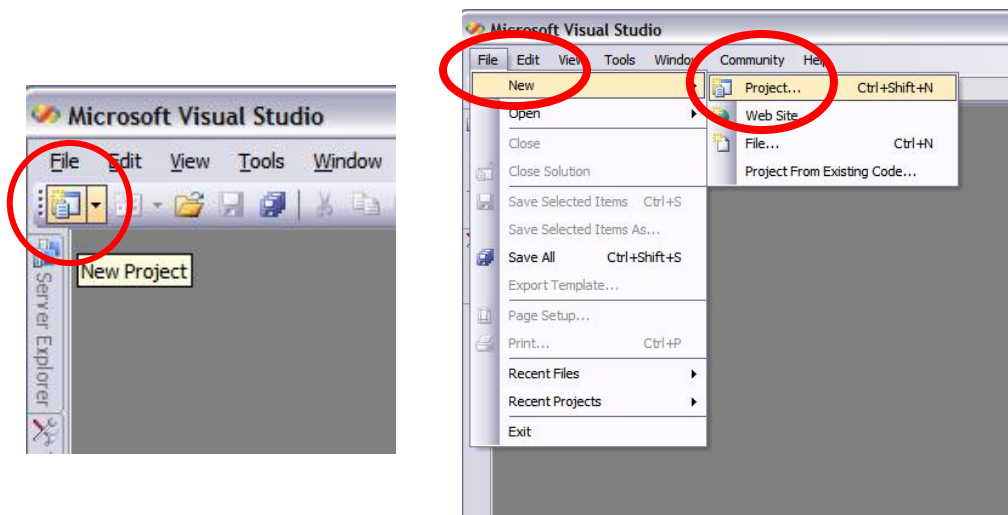


Figure 2: Create a new project

Expand the Visual C++ projects in the Project types on the left and select the Visual C++ (**Win32 Console Application**). Finally you need to name your project. Give your project the name **Lab1a** and press “OK” (Figure 3). Whenever you are starting a new lab or programming assignment, your first step will be this one, to **create a new empty project** and give it a name.

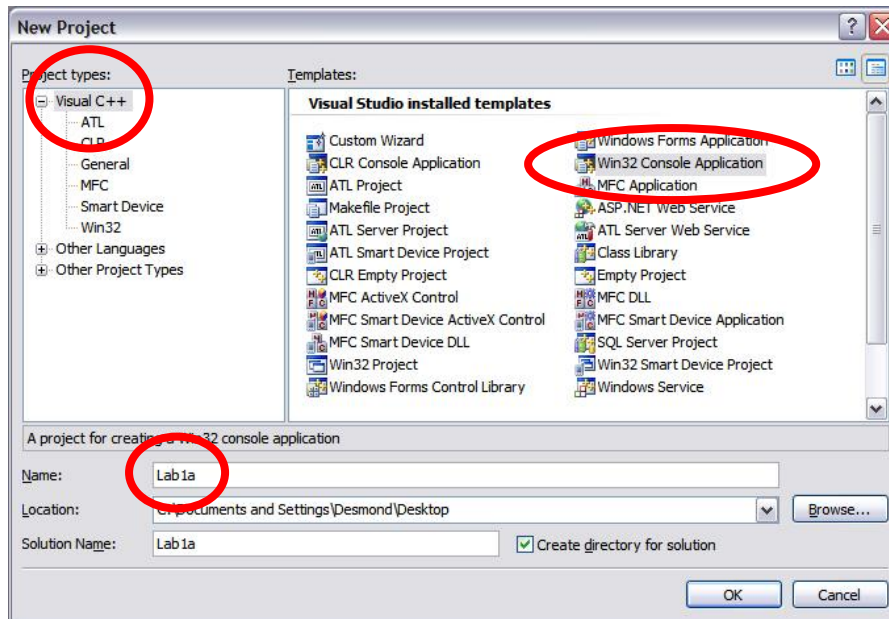


Figure 3: Create a Win32 console application and give a name “Lab1a”

Click “Next” to change the project settings (Figure 4).

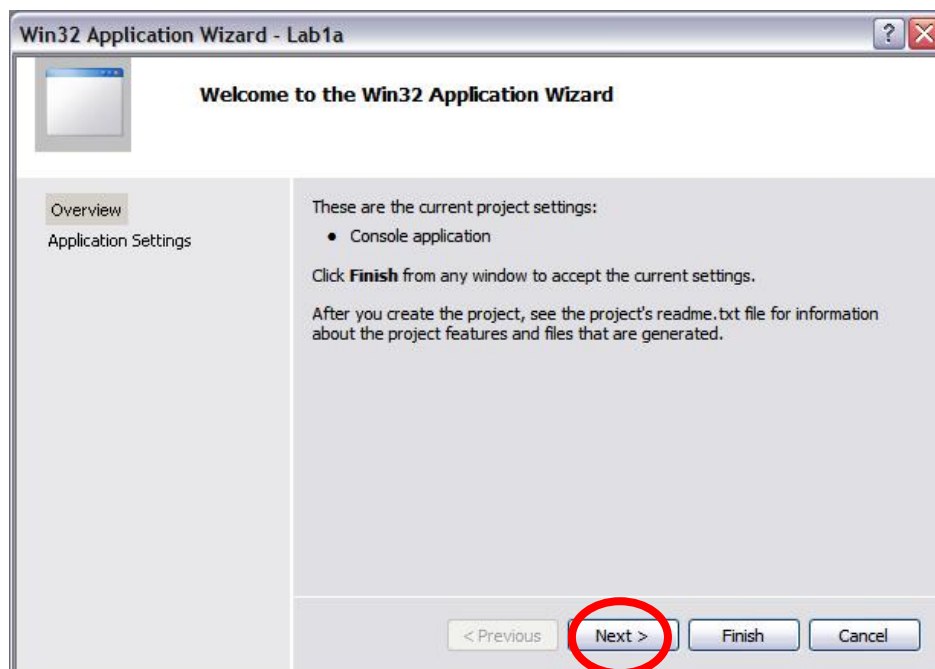


Figure 4: Change the project settings

Check the “Empty project” item under the additional options and click “Finish” to confirm the setting (Figure 5).

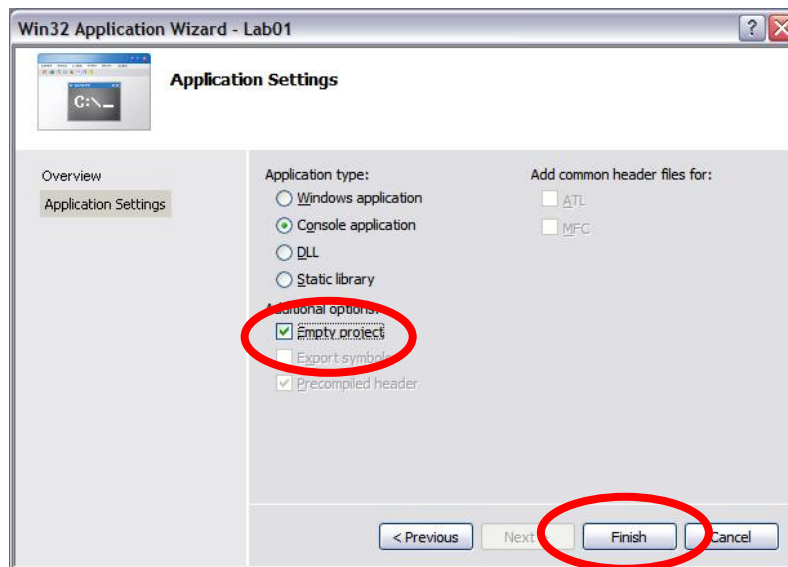


Figure 5: Select empty project and confirm the project settings

2. Our project for lab 1a will be very simple, it will consist of a single source file. You need to add a source file to your project so that you can write your C++ code for this lab. If you cannot see the Solution Explorer in Visual Studio, open it up by selecting the menu sequence “View->Solution Explorer”. The solution explorer is used to manage all of the files and resources you use to build a project, and looks something like the picture below. You need to add a source file to your project, called Lab1a.cpp. To do this, right click on the “Source Files” folder in the Solution Explorer and select Add->Add New Item (Figure 6).

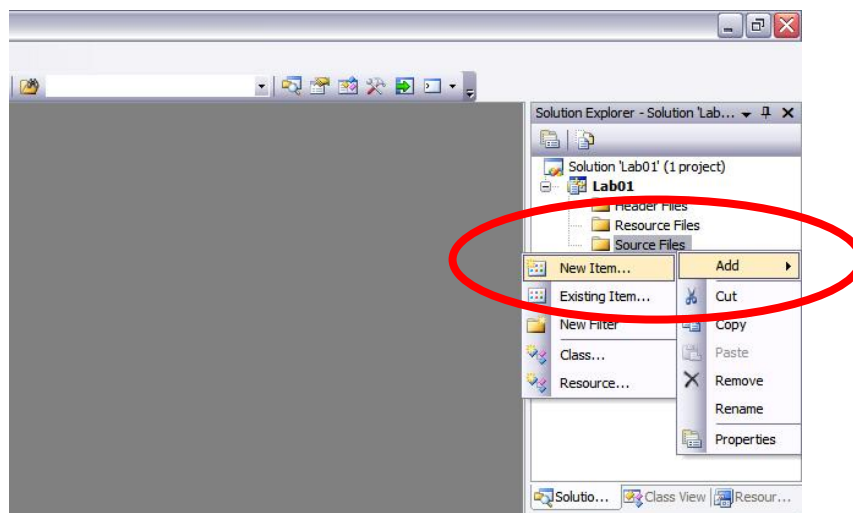


Figure 6: Add a source file to your project

Select the C++ (.cpp) as the file template, and name the file Lab1a.cpp. You should now see that a file called Lab1a.cpp has been added to your Lab1a project in your Source Files, and you should have a new tab with a title of Lab1a.cpp ready to type in your source code for the project (Figure 7).

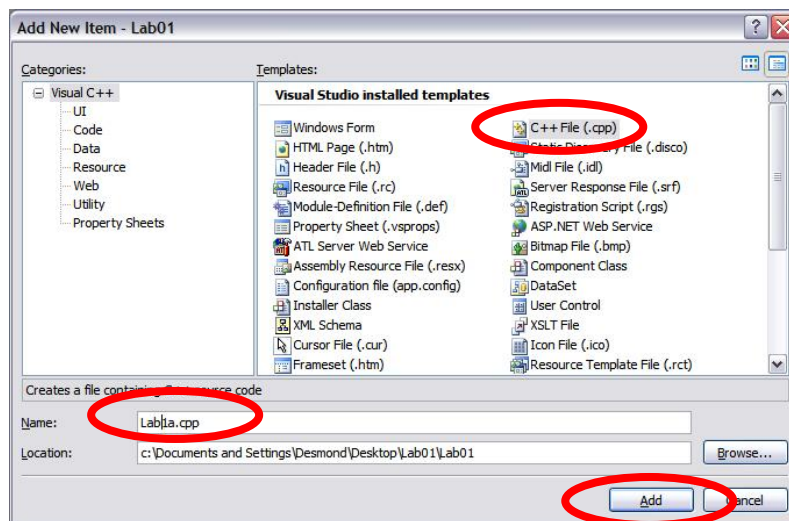


Figure 7: Add a C++ file (.cpp) named “Lab1a.cpp” to your project

- Let’s create a simple “Welcome to AST21105 – OO Programming and Design” program. Type in the following code in your Lab1a.cpp source file:

```
// Assignment: Lab #1a
// Description:
// This program demonstrates the use of a simple main() function, and
// displays output to a console window using the C++ iostream library.

#include <iostream>
using namespace std;
int main()
{
    cout << "Welcome to AST21105 – OO Programming and Design" << endl;
    system("pause");
    return 0;
}
```

Make sure you save your file at this point (press Ctrl-S or click the sequence “File”->”Save Lab01a.cpp”).

#### Reminder:

- Did you remember the semi-colon ; at the end of your statements?
- Did you use double quotes?

We will now try to compile your program. To compile your program, use the debug menu item to select “Debug->Start Debugging” (Figure 8).

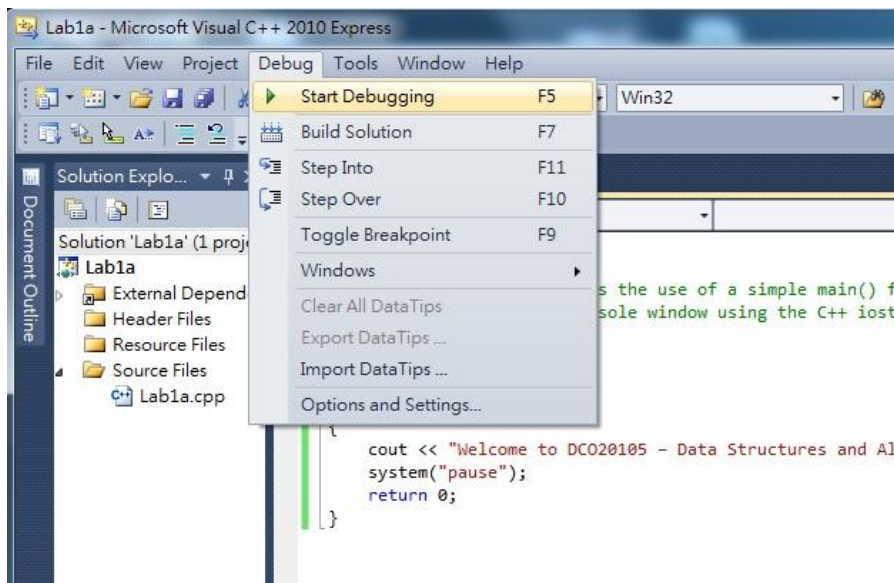


Figure 8: Compile and run your program by clicking “Debug-> Start Debugging”

This causes all of the files in your project to be compiled and run together.

4. If your program was correct and successfully runs, you should see a DOS terminal pop up and display the words “Welcome to AST21105 – OO Programming and Design” followed on the next line by “Press any key to continue...” (Figure 10). If you press a key, the terminal should go away and you can go back to Visual Studio and do more work if needed.

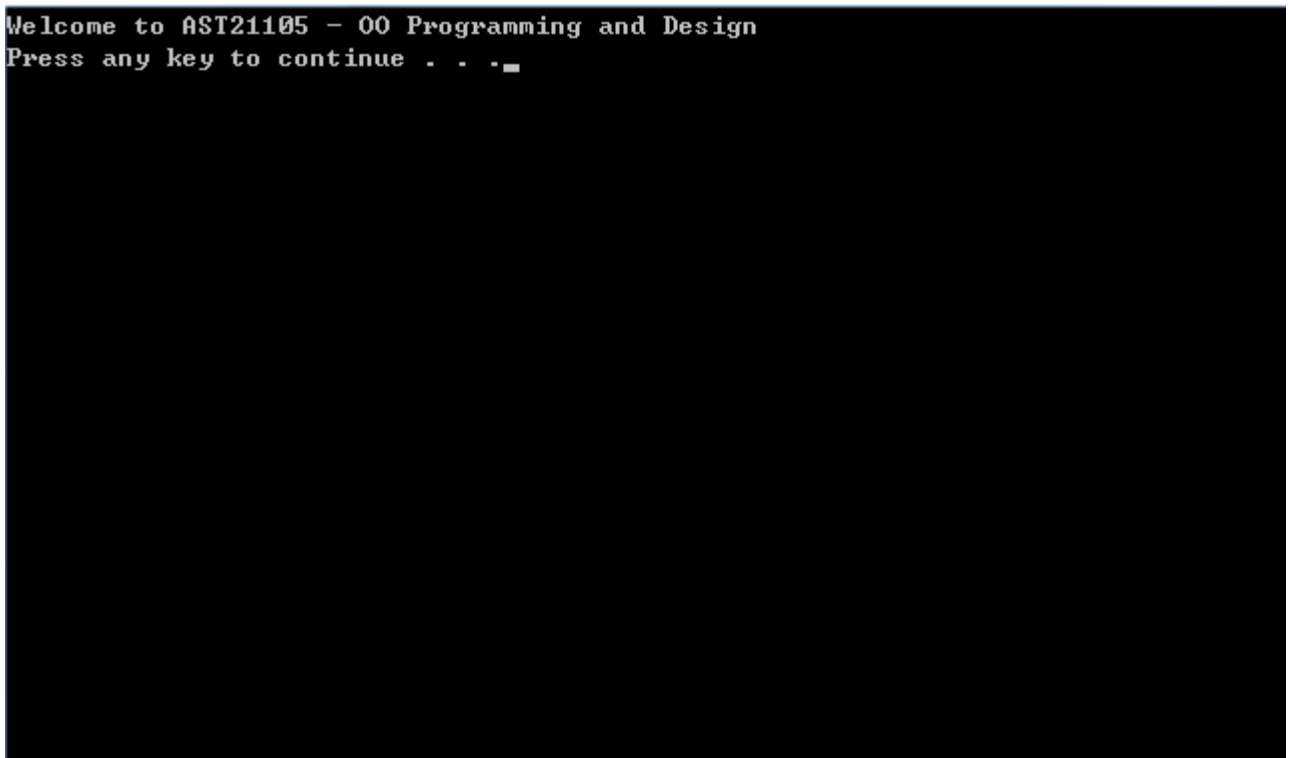


Figure 10: DOS terminal displaying “Welcome to AST21105 – OO Programming and Design”

This completes the first part of our lab. At this point you should start re-familiarized yourself with how to start up the Visual Studio development environment. Also how to create a simple project, adding a file to the project, and writing a simple C++ main function to display the words “Welcome to AST21105 – OO Programming and Design”. You should also be familiar now how to compile a program in Visual Studio and how to run the program and see its results.

## **D. Compute Total**

In this part, you are required to:

- i) Create a New Project and give your project the name Lab1b.
- ii) Add a source file to your project, called ComputeTotal.cpp
- iii) Write a C++ program that reads in several lists of numbers, one per line, computes the total for each list and displays the total on the screen. For each list of numbers, the first number indicates how many elements are in the list. The sentinel value -1 is used to indicate the end of user input. A sample input and output session of this program is given below:

Enter input: 5 4 6 8 2 4

Output total: 24

Enter input: 2 3 7

Output total: 10

Enter input: 3 6 8 9

Output total: 23

Enter input: -1

Hints: You can use the following sample program as a reference for getting input from keyboard and outputting information to screen.

```
#include <iostream>
using namespace std;
int main()
{
    // Declare a variable number to store an integer
    int number;
    // Display a string "Enter an integer: "
    cout << "Enter an integer: ";
    // Obtain an integer from keyboard and store it "number"
    cin >> number;
    // Display the entered number on screen and go to the nextline
    cout << "The entered number is " << number << endl;
    // Hold the command window
    system("pause");
    return 0;
}
```

iv) Compile your program and test it by executing your program.



## Marking Scheme:

Graded items	Weighting
1. Correctness of program (i.e. whether your code is implemented in a way according to the requirements as specified.)	60%
2. Indentation	30%
3. Documentation (with reasonable amount of comments embedded in the code to enhance the readability.)	10%
	100%

## Program Submission Checklist

Before submitting your work, please check the following items to see you have done a decent job.

### Items to be checked

☒ / ☒

1. Did I put my name and student ID at the beginning of all the source files? ☐
2. Did I put reasonable amount of comments to describe my program? ☐
3. Are they all in .cpp extension and named according to the specification? ☐
4. Have I checked that all the submitted code are compliable and run without any errors? ☐
5. Did I zip my source files using Winzip / zip provided by Microsoft Windows? Also, did I check the zip file and see if it could be opened?  
(*Only applicable if the work has to be submitted in zip format.*) ☐
6. Did I submit my lab assignment to Canvas? ☐

-End-