If this lab is an Individual assignment, you must do all coded programs on your own. You may ask others for help on the language syntax, but you must organize and present your own logical solution to the problem. No lab is complete until the student submits the signed pledge form associated with that lab. I realize that no coded programs will be graded until I turn in the sign & pledge form associated with that program; any late penalties will continue to compound until the pledge form is submitted.

If this lab is a team assignment, both team members may share logic as they program side by side on their own computers. Each person must type all of his/her own code as part of the learning process. Team assignments are never to be "You do this portion and I'll do that portion" or "You do this lab and I'll do the next lab".

Some of the lab assignments will have short answer questions. These short answer questions will be spot checked and graded for completion, but not checked for accuracy. Once these labs are graded and returned, I encourage you to compare answers with another class member who has also had the lab graded and returned.

I/We realize that the penalty for turning in work that is not my own, or assisting others in doing so, can range from an "F" in the class to dismissal from Trinity University. I realize that it is a violation of academic integrity to share any portion of this lab with any person (outside my 2320 team & professor)!

---

OOP-2 C++ Classes
Individual Assignment
15 Points

Short Answer Questions
Electronic Solutions Of Short Answer Questions Will Not Be Accepted. Print A Copy Of Short Answer Question & Write Answers On Printed Copy

1] ___________________________________________________________ _?_ is a collection of objects treated as one unit..

2] _____ {T/F} A struct is not an aggregate.

3] _____ {T/F} A class is an aggregate.

4] _____ {T/F} A array is an aggregate.

5] __________________________________________________________ A(n) _?_ is an aggregate in which all of the arguments have to be of the same type.

6] __________________________________________________________ A _?_ is an aggregate in which all of the arguments do not have to be of the same type.

Employee Struct

7] Write the C/C++ code to create a struct, called Employee, that has a short integer component called Age and a 30 character string component called Name.
8] Write the C/C++ code that could be added to main to create an Employee structure, called Employee1.

9] Write the C/C++ code for a function, called EmployeeSet, that could be used to place the argument NewName and the argument NewAge, into the argument pointed to by argument EmployeePtr.

10] Write the C/C++ code that could be added to main to use the EmployeeSet function to fill the Employee1 struct with your name and age.

---

**Employee Class**

11] ________________ The _?_ is a special class method that does all that is necessary to initialize the class object.

12] ________________ The _?_ is a special class method that does all that is necessary to destroy the class object.

13] _____ (T/F) The constructor is automatically called each time an object is created.

14] _____ (T/F) The destructor is not automatically called each time an object is goes out of scope.

15] _____ (T/F) Every class must have a destructor.

16] ________________ The slides discuss two specific times that destructors are required. List them.

17] ________________ If the constructor allocates dynamic memory, then the destructor should generally _?_.

18] ________________ If the constructor opens a file, then the destructor should generally _?_.

19] Write the C++ code to create a class, called `Employee`, that has a short integer component called `Age` and a 30 character string component called `Name`. You need not include the prototypes for any member functions/methods. [Test your solution on the computer if you are not 100% sure!]

20] Write the complete C++ code for an `Employee` constructor which will accept the following declaration. Do not overload this constructor. [Test your solution on the computer if you are not 100% sure!]

```cpp
Employee
    Employee1 ("Nancy", 20);
```

21] Write the C++ code for an `Employee` constructor which will accept the following declarations. Overload a single constructor in such a way that it will accept all of the signatures in the calls below. Set the numeric defaults to 0. Set the character defaults to blank. [Test your solution on the computer if you are not 100% sure!]

```cpp
Employee
    Employee1,  
    Employee2 (30),  
    Employee1 (20, "Nancy");
```

22] Write the C++ code that could be added to `main` to create an array, called `BlockBuster`, of 20 Employees.
23] Write the C/C++ code for a method, called `Set`, that could be used to place the argument `NewName` and the argument `NewAge`. Overload a single constructor in such a way that it will accept the same signatures below. Set the numeric defaults to 0. Set the character defaults to blank. [Test your solution on the computer if you are not 100% sure!]

Employee

```cpp
Employee1;
Employee1.Set();
Employee1.Set(20);
Employee1(20, "Nancy");
```

22] Write the C++ code that could for an Employee Destructor which simply displays the message "Evoking Destructor ~Employee()".

24] ____________________________ The scope operator is _?_.

25] ____________________________ A C++ function/method is overloaded if it will accept more than one _?_.

26] ____________________________ One of the signatures for the function `foo` below can be abbreviated as (s,l,b). List all of the acceptable signatures.

```cpp
void foo (char NewName [] = "", long int NewNo = 0, bool NewSex = true );
```

26] Write the C++ code for a function, called `Display`, which which is passed an optional `Message`. If the Message is not blank, display it on the first line. Then display the rest of the Employee data in the following format: [Test your solution on the computer if you are not 100% sure!]

```cpp
This Is Jane Doe's Info
Employee Name: Jane Doe
Employee No.: 121
```
27) Circle all of the functions in Student if overloaded correctly. If the attempted overload is incorrect, place a box around the function.

```cpp
class Student
{
    public:
        Student (char NewName [], long int NewNo = 0, bool NewSex = 0);
        ~Student (void);
        void Set (char NewName [], long int NewNo = 0, bool NewSex);
        void Display(char Message [] = "");
};
```

28) A "Memory Leak" occurs when dynamic memory is allocated but ___.

29) ADT is an acronym for ___.

30) Operators are ___ in order to enable the programmer Searching & Sort through the class.

31) Write the complete C++ code to create the operator overload that will enable the programmer to make the following comparison: [The explicit return should be boolean!] [Test your solution on the computer if you are not 100% sure!]

```cpp
if (Employee1 == "Nancy")
```

32) Write the complete C++ code to create the operator overload that will enable the programmer to make the following Employee comparison: [The explicit return should be boolean!] [Test your solution on the computer if you are not 100% sure!]

```cpp
if (Employee1 > 111)
```
33] Write the complete C++ code to create the Name-Oriented operator overload that will enable the programmer to make the following Employee comparison: [The explicit return should be boolean!] [Test your solution on the computer if you are not 100% sure!]

if (Employee1 <= Employee2)

34] Write the complete C++ code to create function Get for the Employee class; like the one in the slides, it is to return false if the user hits the return key when entering the Name. If the user enters the name, prompt for the No and return true. [Test your solution on the computer if you are not 100% sure!]

if (Employee1.Get())
        Employee1.Display("This Is Employee!");
else
        puts("Employee1 – Kick-Out!");
35] Write the complete C++ code to create function Display50 for the Employee class (like the one in the slides). Use stdio.h utilities. It is to display the output in the following format: [Test your solution on the computer if you are not 100% sure!]
Name : 38 Characters
Blank: 2 Characters
No: 10 Characters

36] Write the complete C++ code to create function operator << for the Employee class (like the one in the slides). Use stream.h utilities. It is to display the output in the following format: [Test your solution on the computer if you are not 100% sure!]
Name : 38 Characters
Blank: 2 Characters
No: 10 Characters

37] Write the complete C++ code for the prototype of operator << (Hint: friend)

What To Turn In

- - - - - - - - - - - No Lab Is Complete Until Both Are Complete - - - - - - - - - - -

1] You sign & submit the Pledge form.
   a) Make sure that all program files have a header box with a purpose that clearly defines what you are accomplishing in this lab.
   b) Make sure that each and every program function has a well formed documentation box that clearly describes the purpose.
c) Make sure that each and every program function header box has the appropriate Written By and Date.

d) Review the Pledge statement

e) Sign & Pledge

f) Record the amount of time you think you spent on this lab

g) Staple all pages of this lab. Fold in half length-wise (like a hot-dog). Put your name on the outside. Place it on the professor desk before the beginning of lecture on the day it is due. The penalty for late homework will not exceed 25% off per day.

2] Place all programming code associated with this program, if any, in the Professor’s Code Drop Box

a) I do not accept programs by mail; do not submit labs via email!

- - - - - - - - - - - - - - - - - Comments - - - - - - - - - - - - - - - - -

A] Programs that do not compile are worth little, if anything.

B] If a print statement format is off, the penalties will often be less than the 25% per day late penalty; turn in the lab. You would not be happy if you went to Best Buy and purchased a large screen TV that did everything except show the picture; you would consider it pretty worthless. Most users consider software that does not work properly pretty useless as well. If the lab is not working correctly, credit will be small (if any); you might be better to accept a 25% (1 day) late penalty and turn in the lab working correctly!

C] Start all programs early so that you can get in contact with the professor if you have problems.

D] If you are turning in this lab late, you may

- hand it to me if I am in the office
- put it in the mail box outside my office door
- slide it under the outer door to our suite (if locked)
- slide it under my office door. The sooner I get late labs, the sooner the late penalty meter quits clicking.

E] Backup your programs in at least three places. Put a copy on your Y drive. Put a copy on your flash drive. Put a copy on your personal computer. Send yourself a copy in your e-mail.