COEN 79

Object-Oriented Programming and Advanced Data Structures

Assignment #3

Name: Date:

2 points per question, unless noted

1. The sequence's insert member function normally puts a new item before the current item. What does insert do if there is no current item?

2. (4 pts) Modify the following code to generate the given output. Do not modify the `main` function.

```
#include < iostream >
using namespace std;

class box {

public:
    // Constructor definition
    box(double l = 2.0, double b = 2.0, double h = 2.0) {
            length  = l;
            breadth = b;
            height  = h;
            }

    double volume() {
        return length * breadth * height;  }

private:
    double length;
    double breadth;
    double height;
};

int main(void) {
    box Box1(3.3, 1.2, 1.5);   // Declare box1

    box Box2(8.5, 6.0, 2.0);   // Declare box2

    return 0;
}
```

Output:
Number of box objects created so far: 1
Number of box objects created so far: 2

3. (6 pts) In the following code, indicate if the selected lines are legal or illegal:

```
#include <iostream>


class small
{
public:
    small( ) {size = 0;};
    void k() const;
    void h(int i);
    friend void f(small z);

private:
    int size;
};


void small::k() const
{
    small x, y;
    x = y; // LEGAL/ILLEGAL?
    x.size = y.size; // LEGAL/ILLEGAL?
    x.size = 3; // LEGAL/ILLEGAL?
};

void small::h(int i)
{

};

void f(small z)
{
    small x, y;
    x = y; // LEGAL/ILLEGAL?
    x.size = y.size; // LEGAL/ILLEGAL?
```

```
    x.size = 3; // LEGAL/ILLEGAL?
    x.h(42); // LEGAL/ILLEGAL?
};


int main() {

    small x, y;
    x = y; // LEGAL/ILLEGAL?
    x.size = y.size; // LEGAL/ILLEGAL?
    x.size = 3; // LEGAL/ILLEGAL?
    x.h(42); // LEGAL/ILLEGAL?

    return 0;
}
```

4. (4 pts) We create an array of `fruit` in the `main` function. How can we make sure that for all the items in array `fruit_ptr` the values of `weight` and `color` are equal to 1 and 2, respectively? Please show your solution. Do not modify the main function.

```
1.  class fruit {
2.  private:
3.      int weight;
4.      int color;
5.  }
6.
7.  main() {
8.      fruit * fruit_ptr;
9.      fruit_ptr = new fruit[100];
10. }
```

5. Explain why *heap* variables are essentially global in scope. Please present an example as well.

6. Is it possible to use the keyword "`this`" inside a friend function? Please explain your answer.

7. (4 pts) Does the following code compile? Does it run? Is there any problem with the code? If yes, how do you fix it?

```
1.  #include < iostream >
2.  using namespace std;
3.
4.  class Computer {
5.      int Id;
6.
7.  public:
8.      Computer(int id) {  this -> Id = id;  }
9.      void process() {  cout << "Computer::process()";  }
10. };
11.
12. class Employee {
13.     Computer* c;
14.
15. public:
16.     Employee() {  c = new Computer(123); }
17.     ~Employee() {}
18.     void foo() {
```

```
19.         cout << "Employee::foo()";
20.         c -> process();
21.     }
22. };
23.
24. int main() {
25.     Employee ob;
26.     ob.foo();
27.     return 0;
28. }
```