COMPOSITION & AGGREGATION

Question 1 [30 Marks]

(i) Define the concept of aggregation and composition. Show aggregation and composition relationships between classes with some examples. (10 marks)

// *notes:* space for answer

(ii) Given the following incomplete `Teacher/Department` code segment as shown in Program 1. Update the Program so that the `Department` can handle multiple `Teachers`.

(20 marks)

```cpp
1   // Program 1
2
3   #include <iostream>
4   using namespace std;
5
6
7   // Update Program 1 here.
8
9
10
11
12
13
14
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17
18
19
20  int main()
21  {
22      // Create a teacher outside the scope of the Department
23      Teacher *t1 = new Teacher("Ali"); // create a teacher
24      Teacher *t2 = new Teacher("Abu");
25      Teacher *t3 = new Teacher("Alyssa");
26
27      {
28        // Create a department and use the constructor parameter
29  to pass the teacher to it.
30          Department dept; // create an empty Department
31          dept.add(t1);
32          dept.add(t2);
33          dept.add(t3);
34
35          cout << dept;
36
37      } // dept goes out of scope here and is destroyed
38
39      cout << t1->getName() << " still exists!\n";
40      cout << t2->getName() << " still exists!\n";
41      cout << t3->getName() << " still exists!\n";
42
        delete t1;
        delete t2;
        delete t3;

        return 0;
    }
```

The complete program should execute:

```
Software Eng Department: Ali Abu Alyssa
Ali still exists!
Abu still exists!
Alyssa still exists!


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Process exited after 0.1436 seconds with return value 0
Press any key to continue . . .
```