University College Dublin
An Coláiste Ollscoile, Baile Átha Cliath

SEMESTER I EXAMINATION – 2014/2015: SAMPLE SOLUTIONS

COMP 20080

Computer Science for Engineers II

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Prof. P. Cunningham

Prof. L. Murphy*

Time allowed: 2 hours

Instructions for candidates

Answer ALL questions. Question 1 is worth 40 marks. All other questions are worth 3 marks each.

Write your answers in the Answer Books provided.

Instructions for invigilators

Loose Rough Work sheets are not to be distributed or used.

Use of all calculators is prohibited.

SAMPLE SOLUTIONS

1. *[40 marks]*

(a) **Time.cpp**

```
#include "Time.h"
#include <iostream>
using namespace std;

Time::Time(int h, int m, int s)
{
     hours = h;
     minutes = m;
     seconds = s;
}
Time::Time(int totalSeconds)
{
     int remaining_sec;
     hours = totalSeconds / (60*60);
     remaining_sec = totalSeconds % (60*60);
     minutes = remaining_sec / 60;
     seconds = remaining_sec % 60;
}
Time Time::operator+(Time t)
{
     int remaining_sec, h, m, s;
     int sumSec = (hours + t.getHours())*(60*60) + (minutes +
t.getMinutes())*60 + (seconds + t.getSeconds()); // sumSec = total number
of seconds in the sum
     h = sumSec / (60*60);
     remaining_sec = sumSec % (60*60);
     m = remaining_sec / 60;
     s = remaining_sec % 60;
     Time t1(h,m,s);
     return t1;
}
void Time::zeroTime()
{
     hours = minutes = seconds = 0; // or can set each separately to 0
}
void Time::printTime()
{
     cout << "hours=" << hours << ", minutes=" << minutes << ", seconds="
<< seconds << "\n";
}
```

(b) **Correct version with errors fixed:**

```
#include "Time.h"
int main()
{
     Time t1(3661), t2(2,45,0), t3=t1+t2; // need to specify 3 ints for t2
     t3.printTime();
     // t1.seconds = 0; // cannot access private field directly
     t2.zeroTime();
     // t2 = t2.zeroTime(); -- no return value from this method
     t3=t1+t2;
     t3.printTime();
}
```

SAMPLE SOLUTIONS

2. (a) and (d)

3. True

4. (a), (b) and (c)

5. False

6. (b)

7. (a) and (c)

8. (c) and (d)

9. False

10. (a)

11. (c)

12. True

13. (b) and (c)

14. (d)

15. (b) and (c)

16. (a) and (d)

17. (a) and (c)

18. True

19. (a) and (c)

20. (a), (b) and (c)

21. False