

Introduction to Computing Test 1

Question 1. (6 points) What is the purpose of testing a program with sample data as input?

To see if its logic is correct.

Question 2. (9 points) Indicate the resulting value by evaluating each of the following expressions.

- | | |
|--|----------------------|
| a) $4.0 / 10.0 + 3.5 * 2$

6.3 | Result: <u>7.4</u> |
| b) $11 + 10 \% 3 + 2.1 * 3$ | Result: <u>18.3</u> |
| c) $!(4.0 < 10.0) \quad \quad 3 >= 5$ | Result: <u>false</u> |

Question 3. (15 points) Complete a simple program that allows the user to enter the lengths of three sides of a triangle (a, b, c) and calculates the triangles area by the following formulas:

$$s = \frac{a+b+c}{2}$$

$$\text{area} = \sqrt{s(s-a)(s-b)(s-c)}$$

```
#include <cmath> // From the cmath module use the sqrt( ) function
#include <iostream>
using namespace std;

int main() {
    double a, b, c, s, area;
```

cout << "Enter the three sides of a triangle: "
 cin >> a >> b >> c;

$$+4 \quad S = (a+b+c) / 2.0$$

$$+4 \quad \text{area} = \sqrt{s * (s-a) * (s-b) * (s-c)}; \quad +1 \text{ for } *$$

cout << "The triangle area is " << area << endl;

2 for Question 4. (10 points) For the following program indicate the output for each of the inputs:

```

cout << "Enter three numbers: ";
cin >> a >> b >> c;
if (a > b) {
    cout << "Who?";
    if (b > c) {
        cout << "Dog";
    } else {
        cout << "Cat\n";
    }
} else if (b > c) {
    cout << "What?\n";
    if (a >= c) {
        cout << "One";
    } else if (a < b) {
        cout << "Two\n";
    } else if (c == b) {
        cout << "Three";
    }
} else {
    cout << "Where?";
    if (a == b) {
        cout << "Up";
    } else {
        cout << "Down\n";
    }
}
cout << "Done\n";

```

a)

Expected Output if a = 3, b = 4, and c = 5
--

Where? Down Done

b)

Expected Output if a = 5, b = 4, and c = 3
--

Who? Dog Done

c)

Expected Output if a = 3, b = 3, and c = 5
--

Where? Up Done

Question 5. (10 points) Write C++ statement(s) to generate a random integer value between 4 and 18 (inclusive). Assume that the appropriate includes have been done, and the `rand()` function has been properly seeded.

15
 $\text{number} = \text{rand}() \% (18-4+1) + 4$
2 for 14

Question 6. (15 points) Using any appropriate kind of if statements, write C++ code to output the appropriate string according to variable myTemperature's value.

myTemperature	String
myTemperature < 96	"Below normal"
96 <= myTemperature < 100	"Normal"
100 <= myTemperature <= 102.5	"Slight temperature" <i>Fever</i>
102.5 < myTemperature	"High Fever"

```

if (myTemperature < 96) {
    cout << "Below normal" << endl;
} else if (myTemperature < 100) {
    cout << "Normal" << endl;
} else if (myTemperature <= 102.5) {
    cout << "Slight temperature" << endl;
} else {
    cout << "High Fever" << endl;
}
}

```

-2 for extra
conditions

Question 7. (10 points) What would be the expected output of the following program?

```

for (i = 1; i <= 5; i++) {
    for(j = 1; j <= 4; j++) {
        cout << "j ";
    } // end for
    cout << endl;
    for(k = i; k <= 6; k++) {
        cout << "k ";
    } // end for
}

```

j j j j \n
K K K K K j j j j \n
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K K

Question 8. (10 points) Consider the following menu code.

```
const int SIZE = 50;
char grade[SIZE];

• • •

cout << "Math Tutor Menu" << endl << endl;

cout << "1. First Grade" << endl;
cout << "2. Second Grade" << endl;
cout << "3. Third Grade" << endl << endl;

cout << "Enter your grade (1, 2, or 3): ";
cin.getline(grade, SIZE);
```

Why would reading the grade as a string be better than reading it as an integer (int variable)?

They might misunderstand and type "First"
which cannot be read into an integer variable.

Question 9. (15 points) Correct the logic errors in the following code that should calculate the average test score. The while loop is sentinel-controlled with any negative test score signaling the end of the input. The sentinel value should not be included in the average calculation.

```
int counter;
double average, total, nextScore;

counter = ①;
total = ②;

cout << "Enter a test score (or -1 when done): ";
cin >> nextScore;

while (nextScore >= -③) {
    total = nextScore; + total
    counter = X counter + 1;

    cout << "Enter a test score (or -1 when done): ";
    cin >> nextScore;

} // end while

total = total + nextScore;
average = counter / total;
cout << "The test average was " << average << endl;
```