

CS 10061 Sample Final Exam

Name _____

Multiple Choice. Circle the correct answer (4 points each).

1. What is the effect of the following code fragment?

```
int num1 = 3;
int num2;
cin >> num2;

if ( num2 / num1 == 1 )
    cout << "first option" << endl;
else
    cout << "second option" << endl;
```

- a) display first option if num2 is divisible by 3, and the second option if num2 is not divisible by 3.
- b) displays first option if num1 and num2 are equal to 1, and second option otherwise
- c) displays first option if the number 3,4, or 5 are entered as input, and second option if any other integer is entered as input
- d) displays first option if num1 and num2 are equal and second option otherwise

2. What is the output of the following code fragment if the input values are 1 and 2 respectively?

```
int x;
int y;
cin >> x;
cin >> y;
cout << y;
cout << x << endl;
```

- a) 1
2
- b) 2 1
- c) 2
1
- d) 21

3. Which of the following directives must be included in a program in order to use C++ facilities for file input and output?

- a) #include <fstream>

- b) #include <fiostream>
- c) #include <fstream>
- d) #include <iostream>

4. Which is the correct C++ condition to check whether the value of integer x is between 5 and 9 (inclusive) ?

- a) 5 <= x <= 9
- b) 5 < x < 10
- c) 5 <= x && x <= 9
- d) 5 <= x || x <= 9

5. What is displayed by the C++ statements that follow if the value input is 0?

```
cin >> color;
if ((color == 0) && (color == 1))
    cout << "red ";
else if (color > 0) && (color < 2)
    cout << "blue ";
else if (color < 3)
    cout << "green ";
else
    cout << "yellow ";
cout << endl;
```

- a) blue
- b) red
- c) yellow
- d) red blue green yellow

6. The value of the expression below is _____ if

```
int a = 2, b = 4, c = 8;
(a / b)*c
```

- a) 0
- b) 1
- c) 2
- d) 4

Questions 7–10 refer to the following program fragment. Assume that all variables are of type `int` and that `y` and `z` are initialized to 0.

```
int i=1;
while (i < 10) {
    cin >> x;
    y = y * x;
    if ( x % 3 == 0 )
        z=z+1;
    i=i+1;
}
```

7. How many times is the loop body of the `for` statement executed?

- a) Once
- b) 9 times
- c) 10 times
- d) until a number larger than 10 is entered

8. Which variable is the loop control variable?

- a) `i`
- b) `x`
- c) `y`
- d) `z`

9. The value of variable `y` at loop exit could best be described as

- a) the sum of the values entered
- b) the number of values entered
- c) the product of the values entered
- d) the number of their odd values entered

10. The value of `z` at loop exit could best be described as

- a) the percentage of `x` multiplied by 2
- b) the number of integers entered that are multiples of 3
- c) the number of times 3 is entered
- d) the number of time a number greater than 3 is entered.

11. You are designing a loop that is to exit only if the values of both `x` and `y` are 1 and 2 respectively. Which of the following would you use for your loop repetition condition?

- a) `x != 2 && y != 1`
- b) `x == 1 && y = 2`
- c) `(x != 1) || (y != 2)`
- d) `(x != 1) && (y != 2)`

12. What is the error in the line

```
int a=product ( 6, 5 );
```

Definition of sum:

```
int product( int& num1, int num2 )
{ int num3;
  num3=num1; num1=num2;
  return( num3 * num2 );
}
```

- a) A function cannot be used to initialize a value
- b) The first parameter should be a variable
- c) The second parameter should be a variable
- d) Both parameters should be variables

13. What is the output from this program?

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

void doSomething ( int&, int& );

int main ()
{
    int first;
    int second;
    first = 1;
    second = 2;
    doSomething( first, second );
    cout << first << second << endl;
    return 0;
}

void doSomething( int& this, int& that )
{
    int theOther;

    theOther = 5;
    that = 2 + theOther;
    this = theOther * that;
}
```

- a) 35 2
- b) 7 35
- c) 35 7
- d) 1 2

14. What is the output from this program?

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

double doSomething ( double, int );

int main ()
{
    double A;
    int B;
    double C;
    A = 1;
    B = 2;
    C=doSomething( A, B );
    cout << A << B << C <<endl;
    return 0;
}

double doSomething( double B, int A )
{
    int C;

    C=A+1;
    B =C/A + B;
    return B;
}
```

- a) 2.0 1 2.0
- b) 1.0 2 2.5
- c) 2.0 1 2.5
- d) 1.0 2 2.0

15. What is the value returned by funA(2.1,3.1) if

```
int funA(float x, float y){
    int a,b;
    a=x+1;b=y-1;
    return funB(a,b);
}

int funB(int x, int y){
    return (x%y +x/y);
}
```

- a) 1
- b) 2
- c) 3
- d) 4

Answer the following in the space provided. Use the back of the test if necessary (8 points each)

1. Given the following environment:

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

int main()
{
    int    num1;
    double num2;
    char  c;
    ...
}
```

Write a code fragment that displays a message telling the user what type of data to enter, copies into the variables `num1`, `num2`, and `c` the values entered by the user, and then echoes (prints) their values to the screen.

2. Write an expression to represent the following condition:

digit is strictly between (i.e. not equal to) 9 and -1.

3. Write a program fragment to extract numbers from the keyboard, compute the sum of the odd numbers entered, and display the result. Use the integer 0 as a sentinel.

4. Write a program fragment that uses nested loops to display the following lines

```
1 2 4 6 ...100
2 3 5 7 ...101
3 4 6 8 ...102
4 5 7 9 ...103
. . . . .
. . . . .
. . . . .
10 11 13 15 109
```

1. Define a function named `divr` that take two integers `x` and `y` and returns `x%y` and `x/y`. For instance, given the number numbers 9 and 4, `divr` would return the values 2 and 1. Function `divr` has two type `integer` input parameter and two `integer` output parameters.

Part II. Each question is worth 20 points.

1. Write a code fragment to
 - a) Ask the user to enter the number of integer test scores to be read in
 - b) Ask the use to enter the test scores
 - c) compute and output the average and standard deviation.

The standard deviation is define as $\sqrt{\text{ssq}/n}$

$\text{ssq} = (\text{scores}[0] - \text{avg})^2 + (\text{scores}[1] - \text{avg})^2 + \dots + (\text{scores}[n-1] - \text{avg})^2$

Declare all the variable you used.

2. Write a code fragment to print out the array of characters defined by
`char tble[30][15];`
in a table with 30 rows and 15 columns with one space between each character in a row.

3. Write a function to print out a triangle with n lines that looks like this

```
0 0 0 0 0
0 0 0 0
0 0 0
0 0
0
```

4. An image is stored in an array defined by
char pic[256][256][3];
Write a code fragment to color each pixel red.

5. An image is stored in an array defined by
`char pic[256][256][3];`

Write a code fragment to produce an 8x8 checkerboard with blue and red squares..

