

## CISS245: Advanced Programming Quiz q04

Name: YOUR EMAILScore: 

Q1. Either write down the output of this code fragment or write ERROR if it is not valid C++.

```
int x = 0, y = 42, z = 99;
if (x < 0)
{
    int y = 1, z = 100;
    if (x == 0)
    {
        int y = 2;
        if (y < 1)
        {
            std::cout << z;
        }
        else
        {
            std::cout << z;
        }
    }
    else
    {
        int y = 3;
        if (y < 2)
        {
            std::cout << z;
        }
        else
        {
            std::cout << z;
        }
    }
}
else
{
    int y = 4, z = 200;
    if (x == 0)
    {
        if (y < 3)
        {
            std::cout << z;
        }
        else
        {
            std::cout << z;
        }
    }
    else
    {
        if (y < 4)
        {
            std::cout << z;
        }
    }
}
```

```
        else
        {
            std::cout << z;
        }
    }
}
```

ANSWER:

Q2. Rewrite the following function so that the if-else statement is replaced by the ternary operator. The function should contain only one statement.

```
int sign(double x)
{
    int ret;
    if (x >= 0)
    {
        ret = 1;
    }
    else
    {
        ret = -1;
    }
    return ret;
}
```

ANSWER:

Q3. Write a function

```
int numdigits(int n);
```

that returns the number of digits in **n**. For instance if **n** is 0 or 5 or 9, the function returns 1. If **n** is 23 or 42 or 99, the function returns 2. If **n** is -123 or -243 or -798, the function returns 3. Etc.

ANSWER:

Q4. Write a function

```
bool isprime(int n);
```

that returns **true** if and only if **n** is a prime. For instance if **n** is 2, 3, 5, 7, 11, 13, 17, 19, 23, or 29, the function returns **true**. If **n** is 0, 1, 4, 6, 8, 9, 10, 12, 14, or 15, the function returns **false**.

ANSWER:

## INSTRUCTIONS

In the file `thispreamble.tex` look for

```
\renewcommand\AUTHOR{}
```

and enter your email address:

```
\renewcommand\AUTHOR{jdoe5@cougars.ccis.edu}
```

(This is not really necessary since alex will change that for you when you execute `make`.) In your bash shell, execute “`make`” to recompile `main.pdf`. Execute “`make v`” to view `main.pdf`.

Enter your answers in `main.tex`. In the bash shell, execute “`make`” to recompile `main.pdf`. Execute “`make v`” to view `main.pdf`.

For each question, you’ll see boxes for you to fill. For small boxes, if you see

```
1 + 1 = \answerbox{}
```

you do this:

```
1 + 1 = \answerbox{2}
```

`answerbox` will also appear in “true/false” and “multiple-choice” questions.

For longer answers that need typewriter font, if you see

```
Write a C++ statement that declares an integer variable name x.  
\begin{answercode}  
\end{answercode}
```

you do this:

```
Write a C++ statement that declares an integer variable name x.  
\begin{answercode}  
int x;  
\end{answercode}
```

`answercode` will appear in questions asking for code, algorithm, and program output. In this case, indentation and spacing is significant. For program output, I do look at spaces and newlines.

For long answers (not in typewriter font) if you see

```
What is the color of the sky?  
\begin{answerlong}  
\end{answerlong}
```

you can write

```
What is the color of the sky?
\begin{answerlong}
The color of the sky is blue.
\end{answerlong}
```

A question that begins with “T or F or M” requires you to identify whether it is true or false, or meaningless. “Meaningless” means something’s wrong with the question and it is not well-defined. Something like “ $1 + 2 = 4$ ” is either true or false (of course it’s false). Something like “ $1+2 = 4?$ ” does not make sense.

When writing results of computations, make sure it’s simplified. For instance write 2 instead of  $1 + 1$ .

#### HIGHER LEVEL CLASSES.

For students beyond 245: You can put L<sup>A</sup>T<sub>E</sub>X commands in `answerlong`.

More examples of meaningless statements: Questions such as “Is  $42 = 1+2$  true or false?” or “Is  $42 = \{2\}^{\{3\}}$  true or false?” does not make sense. “Is  $P(42) = \{42\}$  true or false?” is meaningless because  $P(X)$  is only defined if  $X$  is a set. For “Is  $1 + 2 + 3$  true or false?”, “ $1 + 2 + 3$ ” is well-defined but as a “numerical expression”, not as a “proposition”, i.e., it cannot be true or false. Therefore “Is  $1 + 2 + 3$  true or false?” is also not a well-defined question.

More examples of simplification: When you write down sets, if the answer is  $\{1\}$ , do not write  $\{1, 1\}$ . And when the values can be ordered, write the elements of the set in ascending order. When writing polynomials, begin with the highest degree term.

When writing a counterexample, always write the simplest.