CISS245: Advanced Programming
Quiz q6301

Name: cadalebout1@cougars.ccis.edu Score:

Open `main.tex` and enter answers (look for `answercode`, `answerbox`, `answerlong`). Turn the page for detailed instructions. To rebuild and view pdf, in bash shell execute `make`. To build a gzip-tar file, in bash shell execute `make s` and you'll get `submit.tar.gz`.

Q1. Correct the following.
Answer:

```
#include <iostream>
#include <manip>

class Time
{
public:
    // ... other methods now shown ...
    void println()
    {
        std::cout << set::width(2) << set::fill('0') << hour_
                  << set::width(2) << set::fill('0') << min_
                  << set::width(2) << set::fill('0') << sec_ << '\n';
    }
private:
    int hour_, min_, sec_;
};

int main()
{
    // code not shown
    return 0;
}
```

Q2. Complete *and correct* the following.
Answer:

```
#include <iostream>
#include <manip>

class Rational
{
public:
    Rational(int n, int d)
    :n_(n), d_(d);
```

```
    {}
    Rational max(Rational r)
    {
        Rational temp(n_, d_);
        if((n_*r.d_)- (r.n_*d_) < 0)
        {
                return r;
        }
        return *this;
    }
    // ... other methods not shown ...
private:
    int n_, d_; // numerator and denominator
};

int main()
{
    Rational r0(1, 2);
    Rational r1(2, 3);
    Rational r2 = r0.max(r1); // r2 models 2/3
    Rational r3 = r1.max(r0); // r3 models 2/3

    // In other words f.max(g) returns the max of f and g.
    // (Similar to the max of the Int class from my notes.)

    return 0;
}
```

Q3. Complete *and correct* the following.
Answer:

```
#include <iostream>
#include <manip>

class Robot
{
public:
    Robot
        : x_(0), y_(0)
    {}

    void walk_east()
    {
        ++x_;
    }

private:
    int x_, y_;
};
```

```
int main()
{
    Robot r2d2;                                 // r2d2.x_ is 0
    r2d2.walk_east();                           // r2d2.x_ is 1
    r2d2.walk_east().walk_east();               // r2d2.x_ is 3
    r2d2.walk_east().walk_east().walk_east(); // r2d2.x_ is 6
    return 0;
}
```

Instructions

In `main.tex` change the email address in

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

to yours. In the bash shell, execute "`make`" to recompile `main.pdf`. Execute "`make v`" to view `main.pdf`. Execute "`make s`" to create `submit.tar.gz` for submission.

For each question, you'll see boxes for you to fill. You write your answers in `main.tex` file. 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 needs 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}
```

For students beyond 245: You can put LaTeX commands in `answerbox` and `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 statement and it is not well-defined. Something like "$1+_2$" or "$\{2\}^{\{3\}}$" is not well-defined. Therefore a question 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.

When writing results of computations, make sure it's simplified. For instance write 2 instead of $1 + 1$. When you write down sets, if the answer is $\{1\}$, I do not want to see $\{1, 1\}$.

When writing a counterexample, always write the simplest.

Here are some examples (see `instructions.tex` for details):

1. T or F or M: $1 + 1 = 2$ ..... T
2. T or F or M: $1 + 1 = 3$ ..... F
3. T or F or M: $1+^2 =$ ..... M
4. $1 + 2 =$ 3
5. Write a C++ statement to declare an integer variable named `x`.

   ```
   int x;
   ```

6. Solve $x^2 - 1 = 0$.

   Since $x^2 - 1 = (x - 1)(x + 1)$, $x^2 - 1 = 0$ implies $(x - 1)(x + 1) = 0$. Therefore $x - 1 = 0$ or $x = -1$. Hence $x = 1$ or $x = -1$.

7. Which is true? C
   (A) $1 + 1 = 0$
   (B) $1 + 1 = 1$
   (C) $1 + 1 = 2$
   (D) $1 + 1 = 3$
   (E) $1 + 1 = 4$