

**CISS245: Advanced Programming
Quiz q6001**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. The class `Date` has member functions `add_y(int inc_y)`, `add_m(int inc_m)`, and `add_d(int inc_d)` that respectively increments the year, month, and day of a `Date` object. Complete the following function that increments the year, month, day of a `Date` object.

ANSWER:

```
void Date::add_y_m_d(int inc_y, int inc_m, int inc_d)
{
    *this.add_y(inc_y);
    *this.add_m(inc_m);
    *this.add_d(inc_d);
}
```

Q2. You are given

```
class Position
{
private:
    int x_, y_;
};
```

Add enough code to the above so that the following works:

```
Position p;
p.set_x(0); // p.x_ is set to 0
p.set_y(1); // p.y_ is set to 1
p.print(); // print "<0, 1>" (without double quotes)
```

ANSWER:

```
class Position
{
public:

void set_x(int v){ x_ = v; }
void set_y(int v){ y_ = v; }

void print()
```

```
{
    std::cout << '<' << x_ << ", " << y_ << ">\n";
}

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

Q3. You are given

```
class Array
{
public:
    push_back(int v)
    {
        if (size_ < capacity_)
        {
            x_[size_] = v;
            ++size_;
        }
    }
private:
    int x_[1024];
    int size_;
    int capacity_;
};
```

Add a method `is_ascending()` that will return true if `x_[0], ..., x_[size_ - 1]` is in ascending order. For instance

```
Array a;
a.push_back(1);
a.push_back(3);
a.push_back(3);
a.push_back(5);
std::cout << a.is_ascending() << '\n'; // prints 1
```

ANSWER:

```
class Array
{
public:
    void push_back(int v)
    {
        if (size_ < capacity_)
        {
            x_[size_] = v;
            ++size_;
        }
    }
};
```

```
bool is_ascending()
{
    if (size_ == 1)
        return true;
    for(int i = 1; i < size_; ++i)
    {
        if(x_[i] < x[i-1])
            return false;
    }
    return true;
}

private:
    int x_[1024];
    int size_;
    int capacity_;
};
```

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) $1 + 1 = 4$