

## HW09 Extra Credit Assignment [5 pts]

```
class Shape
{
public:
    Shape(int x, int y) : x{x}, y{y} { }
```

[...]

... add *Print* member function

... add *Move* virtual function (does this make sense?)

... add *UpdateDimensions* pure virtual function

```
private:
    int x; // x-coordinate
    int y; // y-coordinate
};
```

```
class Circle : public Shape
{
    Circle (int r) : r{r} { }
```

[...]

... override *Print* // static polymorphism

... override *UpdateDimensions* // dynamic polymorphism

```
private:
    int r; // radius
};
```

```
class Rectangle : public Shape
```

## HW09 Extra Credit Assignment [5 pts]

```
{  
    Rectangle (int l, int w) : l{l}, w{w} { }  
  
[...]  
  
... override Print // static polymorphism  
... override UpdateDimensions // dynamic polymorphism  
  
private:  
    int l; // length  
    int w; // width  
};
```

1. Implement the *Print*, *Move* and *UpdateDimensions* member functions for class *Shape*; *Move* and *UpdateDimensions* are virtual functions.
2. Override *Print* and *UpdateDimensions* for derived classes *Circle* and *Rectangle*.
3. Do we need to override *Move* for derived classes? Explain?
4. What kind of binding is occurring for *Print* vs *UpdateDimensions*? Explain the difference between static and dynamic binding, static and dynamic polymorphism?
5. Write the function prototype and definition for a global function *DrawShape* which will invoke the *Move* and *UpdateDimensions* virtual functions. Explain the importance of *Interface Inheritance* and how this applies to *DrawShape*.

CS1C Spring 2023 TTH HW09EC 5pts **Due: Tu 3/14/2023**

## HW09 Extra Credit Assignment [5 pts]

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/09ec $ script hw09ec.scr
```

```
Script started, file is hw09ec.scr
```

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/09ec $ date
```

```
...
```

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/09ec $ ls -l
```

```
...
```

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/09ec $ make all
```

```
...
```

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/09ec $ ls -l
```

```
...
```

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/09ec $ ./hw09ec
```

... // test *Print*, *Move*, *UpdateDimensions* and *DrawShape* from steps 1, 2 & 5. Include written answers for questions 3, 4 & 5.

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/09ec $ exit
```

```
Script done, file is hw09ec.scr
```

```
cs1c@cs1c-VirtualBox ~/cs1c/hw/09ec $ make tar
```

```
...
```

Submit the tar package file hw09ec.tar by Tuesday March 14, 2023.