

Object Oriented Programming using C++11 - OOP345ABC

Mid-Term Test - Fall Semester 2016, Wednesday Oct 19, 8 AM, S1208

Student Name: _____

Student Number: _____ Class Section: _____

The test consists of two questions worth a total of 20 marks. This test is closed book. You must demonstrate you have mastered the material.

Question 1. (15 marks for question 1)

Show that you completely understand the C++11 rule of five.

Write a class with

- Basic constructors as covered in OOP244
- C++ rule of three member functions as covered in OOP244
- The two new C++11 rule of five member functions
- Each member function prints a message when the function is called

Write a program that shows how to call each of the rule of five member functions.

A viable approach would be to complete the following code:

Consider a templated class X whose X.h file begins (NOTE templates never have a .cpp file):

```
#pragma once // What year is this? Is it after 2000?
template <class T>
class X {
    size_t size; // number of 'T' units in 'data', may be zero.
    T* data; // pointer to a table with 'size' type 'T' elements
public:
    // member functions, constructors, destructor, assignment operators, etc.
};
```

Add (10 marks)

- a default constructor which leaves the object in a safe state.
- a constructor with a size_t size parameter. It allocates a 'T' table of that size.
- a print member function which prints the object memory size.
- the member functions required to complete the C++ 'rule-of-three' (OOP244)
- the remaining member functions required to complete the C++11 'rule-of-five'

Demonstrate calling the 'rule-of-five'. (5 marks)

- Write sample code that exercises the rule-of-five member functions.
- Move something with a large data size back and forth between a pair of objects.
- Show the expected print output. These prints prove correct program operation.

Question 2. (5 marks for question 2)

Write some code that demonstrates complete understanding of the boolean **AND**, **OR**, **XOR**, and bit-shift c language operations. Start with a function template (covered in OOP244) that prints the bits in a data element.

Use this function template to print tables of **AND**, **OR**, and **XOR** operations. Show the output.