

COMP 3512

Object Oriented Programming in C++

Sample Final Exam

Thursday April 19 2018

Full Name	
Signature	
Student ID	
Set	

Instructions:

1. This is a closed-book exam. No cheat sheets. You may not use any notes, texts, manuals, etc., during the exam.
2. No phones. Turn off your phone and put it away. If your phone rings you will earn zero on this exam.
3. No electronic devices. No calculators. No computers. No pocket organizers or translators. No watches. No music players. No headphones.
4. No talking. Speaking during the exam is not allowed. If you speak, you will earn zero.
5. Keep your eyes on your own paper. Looking at another exam, or purposely exposing your exam to the view of other candidates will be considered cheating and you will earn zero.
6. This midterm is 90 minutes long.
7. You must write your answers on this exam. You may write on the back.
8. No candidate will be admitted after 30 minutes.
9. No candidate will be permitted to leave during the first 30 minutes.
10. NO QUESTIONS. Candidates are NOT permitted to ask questions during the exam except in the case of supposed typos.
11. Good luck. You've got this.

Final grade: PART A _____ / ?? + PART B _____ / ?? = _____ / ??

1. (12) Suppose we need to implement a class called Account that stores a string called name and a collection of double called balances.
 - a. Implement the six standard member functions for this class assuming we are not using dynamic memory management.
 - b. Implement the same six standard member functions for this class assuming we ARE using dynamic memory management
 - c. Implement insertion and extraction operators for both versions of Account
2. (4) What is the difference between an rvalue and an lvalue? Write code that demonstrates the difference. Label your code carefully.
3. (3) What is the difference between an rvalue reference and a pointer?
4. (2) What is/are the difference(s) between value semantics and move semantics?
5. (4) How do enumerations in C++ differ from enumerations in Java?
6. (3) Write a snippet of code that uses a lambda expression to sort a list of string according to the length of the string, i.e., strings that are longer are “greater than” strings that are shorter.
7. (3) What is the difference between passing parameters to a lambda and capturing variables for a lambda? Why would we choose one over the other?
8. (3) Define a template class called Record that is parameterized over two typenamees K and V. A Record contains a K called key and a vector of V called values. Record has a single constructor which accepts a K – assign this K to key. Record has a member function called add which accepts a parameter of type V and adds it to values.
9. (6) Write a program that demonstrates the correct use of dynamic_cast to perform a cross cast operation. You will need to create a small inheritance hierarchy. Comment your code.
10. (6) Implement a functor called Prime. Each time the operator() is invoked, the next prime number is returned. Assume the first prime number is 2. For example,
Prime p;
p(); // returns 2
p(); // returns 3
p(); // returns 5
p(); // returns 7

END OF EXAM