CS 357: Object Oriented Programming, Lab 7, Week 9
Review Questions Chapters 13-15

Instructions: Read the questions carefully. Think about them. If it is a coding question asking what is the output of code, trace through the code on paper and consider the choices. Next, run the code snippet if you would like.
Look up phrases and concepts that you need to brush up on. Do a few problems each day to keep things in your mind fresh, instead of all at once Sunday night.
Remember, it's not just a rush to get the correct answer. It's about understanding OOP concepts writ large. Turn in your answers like last week to Moodle.

1. Which of the following statements are true?

A. Computers do not differentiate binary files and text files. All files are stored in binary format, and thus all files are essentially binary files.
B. The C++ executable files are stored in binary files and are read by the operating system.
C. All of the above. X
D. Text I/O is built upon binary I/O to provide a level of abstraction for character encoding and decoding.
E. The C++ source programs are stored in text files and can be read by a text editor.

2. What is the output of the following code?

```
#include <iostream>
#include <fstream>
using namespace std;

int main()
{
  // Create a file
  ofstream output("scores.txt");

  // Write two lines
  output << "John" << " " << "T" << " " << "Smith"
    << " " << 90 << endl;
  output << "Eric" << " " << "K" << " " << "Jones"
    << " " << 85;
```

```
    output.close();

    ifstream input;

    // Open a file
    input.open("scores.txt");

    // Read data
    char firstName[80];
    char mi;
    char lastName[80];
    int score;
    input >> firstName >> mi >> lastName >> score;
    double sum = score;

    input >> firstName >> mi >> lastName >> score;
    sum += score;

    cout << "Total score is " << sum << endl;

    input.close();

    return 0;
  }
```

A. Total score is 175 X
B. Total score is 90
C. Total score is 85
D. Total score is 0

3. To know whether the I/O operation succeeded, you use the function _____.

A. stream.fail()X
B. stream.good()
C. stream.clear()
D. stream.bad()
E. stream.eof()

4. This book uses .dat to denote _____ file.

A. an input
B. a binary X
C. a text
D. a source
E. an output

5. What does the following statement do?

```
ifstream stream("scores.txt");
```

A. Open a file for input. The statement fails if the file does not exist. X
B. Open a file for input. The contents of the file are destroyed if the file already exists.
C. Open a file for input. The statement fails if the file already exists.
D. Open a file for input. The statement executes normally even if the file does not exist.

6. To open a file in c:\example\scores.txt on Windows, you use _____.

A. stream.open("\example\scores.txt");
B. stream.open("scores.txt");
C. stream.open("c:\\example\\scores.txt"); X
D. stream.open("c:\example\scores.txt");

7. The functions seekg and seekp may have two arguments. The first argument is the offset and the second argument may indicate the base for the offset. Which of the following cannot be used as the second argument?

A. ios::cur
B. ios::now X
C. ios::end
D. ios::beg

8. To write a character string to a binary file, use the function _____.

A. biStream.write(char* address)
B. biStream.write(string address, int size)
C. biStream.write(char* address, int size) X
D. biStream.write(string address)

9. To open a file for binary input, use the mode _____.
Hint:See LiveExample 13.13.

A. ios::ate | ios::binary
B. ios::out | ios::binary
C. ios::in | ios::binary X
D. ios::app | ios::binary

10. Suppose you declare a double array[SIZE] and the array is written to the file using binary I/O. To read the array to result (double result[SIZE]), use _____.

A. binaryio.read(result);
B. binaryio.read(&student1);
C. binaryio.read(reinterpret_cast<char*>(&result),
   sizeof(result)); X
D. binaryio.read(&result, sizeof(Student));

11. Suppose you want to read an int to the variable value from a binary file, use _____.

A. binaryio.read(reinterpret_cast<char*>(&value),
   sizeof(value)); X
B. value = biStream.read();
C. biStream.read(value);
D. biStream.read(&value);

12. Can you open a file for both input and output?
A. No
B. Yes X

13. To read data from a file, you create an instance of _____.

A. ifstream X
B. stream
C. ofstream
D. iostream

14. To read a character string from a binary file, use the function _____.

A. biStream.read(char* address, int size) X
B. biStream.read(string address, int size)
C. biStream.read(char* address)
D. biStream.read(string address)

15. Suppose the file scores.txt does not exist. What will be displayed by the following code?

```
// Open a file
input.open("scores.txt");

if (input.fail())
{
  cout << "File does not exist" << endl;
  return 0;
}
```

A. File does not exist X
B. Nothing printed

16. What do the following statements do?

```
ofstream stream("scores.txt");
```

A. Open a file for input.
B. Open a file for output, the contents of the file is destroyed if the file already exists. X
C. Open a file for input, the statement fails if the file does not exist.
D. Open a file for output, the statement fails if the file already exists.

17. The stream.get() function reads _____.

A. one line
B. one word
C. one character X
D. all lines

(this is Jackie typing, 18's missing)

19.
The _____ class is for writing data to a file.

A. ifstream
B. ofstream X
C. stream

20. You can combine modes using the _____ operator.

A. + X
B. &
C. ||
D. &&
E. | X

21. What do the following statements do?

```
ifstream stream("scores.txt");
```

A. Open a file for input. X
B. Open a file for output, the contents of the file is destroyed if the file already exists.
C. Open a file for output, the statement fails if the file already exists.
D. Open a file for input, the statement fails if the file does not exist.

(22 is missing!)

23. What is the purpose of invoking the close function?

A. If this function is not invoked, the data may not be saved properly in the file.
B. If this function is not invoked, the file may be deleted. X

24. What do the following statements do?

```
ifstream stream;
stream.open("scores.txt");
```

A. Open a file for output, the statement fails if the file already exists.
B. Open a file for input. X
C. Open a file for output, the contents of the file is destroyed if the file already exists.
D. Open a file for input, the statement fails if the file does not exist.

25. To know whether the I/O operation succeeded, you use the function _____.

A. stream.clear()
B. stream.bad()
C. stream.fail() X
D. stream.good()
E. stream.eof()

26. Which of the following statements is false?

A. friend functions and classes of a class must be declared inside the class.
B. Private members of a class cannot be accessed from outside of the class.
C. C++ enables you to use the friend keyword to declare friend functions and friend classes for a class so that these functions and classes can access the class?s private members.
D. friend functions and classes of a class must be declared outside the class. X

27. Suppose r is a Rational object, in order to perform 4 + r, the Rational class header file must contain:

A. conversion function int operator()
B. member function Rational operator+(const Rational& r1)
C. conversion constructor Rational(int numerator) and non-member function Rational operator+(const Rational& r1, const Rational& r2) X

28. What will be displayed by the following code?

```
#include <iostream>
#include "Rational.h"
using namespace std;

int main()
{
  Rational r1(1, 2);
  Rational r2(2, 4);
  cout << r1.equals(r2);

  return 0;
}
```

A. false
B. 0
C. 1 X
D. true

29. Which of the following operators cannot be overloaded?

A. ?: X
B. +=
C. +
D. &&
E. >

30. What is the correct signature for the overloaded >> operator?

A. friend istream& operator>>(istream& stream, const Rational& rational);
B. friend istream& operator>>(istream& stream, Rational& rational); X
C. friend istream operator>>(istream& stream, const Rational& rational);
D. friend istream operator>>(istream& stream, Rational& rational);

31. Consider the Rational class defined in Chapter 14. Which of the following statements are true?

A. The vector class is immutable.
B. The string class is immutable.
C. Once a Rational object is created, you can change its numerator or denominator.
D. The Rational class is immutable. X

32. What is the correct signature for the = operator function in the Course class?

A. Course operator==(const Course& course);
B. Course& operator=(const Course& course); X
C. operator=(const Course& course);
D. operator==(const Course& course);

33. Which of the following is wrong to add Rational objects r1 to r2?

A. r1 += r2;
B. r2 += r1;
C. r2 = r2.operator+=(r1);
D. r2 = r1.operator+=(r2); X
E. r2 = r2.add(r1);

34. What is the correct signature for the overloaded postfix ++ operator?

A. Rational operator++()
B. Rational operator++(int dummy) X
C. Rational operator++(int& dummy)
D. Rational operator++(Rational& r)

35. The += operator is implemented incorrectly in the following code. Which of the following statement is false?

```
Rational Rational::operator+=(const Rational&
    secondRational)
{
  this->add(secondRational);
  return this;
}
```

A. You may replace this->add(secondRational) by *this = this->add(secondRational).
B. You may replace Rational::operator+= with operator+=.
C. You may replace return this by return (*this).
D. You may replace the return type to Rational&. X

36.
Which of the following statements creates a default Rational object?

A. Rational r1(1, 2);
B. Rational r1();
C. Rational r1; X
D. Rational r1(1, 2, 3);

37. What will be displayed by the following code?

```
#include <iostream>
#include "Rational.h"
using namespace std;

int main()
{
  Rational r1(1, 2);
  Rational r2(1, 3);
  cout << r1.add(r2).toString() << endl;

  return 0;
}
```

A. 1/3
B. 1/6
C. 5/6 X
D. ½

38. Analyze the following code:

```
#include <iostream>
using namespace std;

class Date
{
  friend void p();

private:
  int year;
  int month;
  int day;
};

void p()
{
  Date date;
  date.year = 2000;
  cout << date.year;
}

int main()
{
  p();
  return 0;
}
```

A. The program has a runtime error since year is private.
B. Since year is private, you cannot access it using date.year in function p().
C. The program will have a compile error if the line friend void p() is deleted. X
D. The program has a compile error because year is a private data field in Date.

39. The signature for the < operator function for comparing two Rational objects is _____.

A. bool <operator(Rational& secondRational)
B. bool operator<(Rational& secondRational)
C. bool operator(<)(Rational& secondRational)
D. bool operator<(Rational secondRational) X

40. What will be displayed by the following code?

```
#include <iostream>
#include "Rational.h"
using namespace std;

int main()
{
  Rational r1(1, 2);
  cout << r1.doubleValue();

  return 0;
}
```

A. 0.1
B. 1
C. 0
D. 0.5 X

41. What is the correct signature for a function that converts a Rational to double?

A. Rational operator double()
B. double operator()
C. operator double() X
D. double operator double()

42. You can overload the _____ operators.

A. *
B. -=
C. >
D. -
E. < X

43. What is the correct signature for the overloaded >> operator?

A. friend istream operator>>(istream& stream, const Rational& rational);
B. friend istream& operator>>(istream& stream, const Rational& rational);
C. friend istream operator>>(istream& stream, Rational& rational);
D. friend istream& operator>>(istream& stream, Rational& rational); X

44. The signature for the > operator function for comparing two Rational objects is _____.

A. bool >operator(Rational& secondRational)
B. bool operator>(Rational& secondRational) X
C. bool operator>(Rational secondRational)
D. bool operator(>)(Rational& secondRational)

45.
Not all operators can be overloaded.

A. true X
B. false

46. What is the output of the following code?

```
#include <iostream>
#include <string>
using namespace std;

class Person
{
public:
  void printInfo()
  {
    cout << getInfo() << endl;
  }

  string getInfo()
  {
    return "Person";
  }
};

class Student: public Person
{
public:
  string getInfo()
  {
    return "Student";
  }
};

int main()
{
  Person().printInfo();
  Student().printInfo();
}
```

A. Person Student
B. Stdudent Student
C. Student Person
D. Person Person X

47. What will be displayed by the following code?

```
#include <iostream>
#include <string>
using namespace std;

class C
{
public:
  string toString()
  {
    return "C";
  }
};

class B: public C
{
public:
  string toString()
  {
    return "B";
  }
};

class A: public B
{
  virtual string toString()
  {
    return "A";
  }
};

void displayObject(C* p)
{
  cout << p->toString();
}

int main()
{
  displayObject(&A());
  displayObject(&B());
```

```
  displayObject(&C());
  return 0;
}
```

A. ABC
B. AAA
C. CCC
D. BBB
E. CBA X

48. Which of the following statements are true?

A. "class A: B" means A is a derived class of B.
B. A derived class is usually extended to contain more functions and more detailed information than its base class. X
C. "class A: public B" means B is a derived class of A.
D. A derived class is a subset of a base class.

49 Analyze the following code:

```
#include <iostream>
using namespace std;

class A
{
public:
  A()
  {
    t();
    cout << "i from A is " << i << endl;
  }

  void t()
  {
    setI(20);
  }

  virtual void setI(int i)
  {
```

```
    this->i = 2 * i;
  }

  int i;
};

class B: public A
{
public:
  B()
  {
    // cout << "i from B is " << i << endl;
  }

  void setI(int i)
  {
    this->i = 3 * i;
  }
};

int main()
{
  A* p = new B();

  return 0;
}
```

A. The constructor of class A is called and the program displays "i from A is 40".
B. The constructor of class A is called and the program displays "i from A is 0".
C. The constructor of class A is not called.
D. The constructor of class A is called and the program displays "i from A is 60". X

50. Which of the following statements is false?

A. A private function cannot be redefined. If a function defined in a derived class is private in its base class, the two functions are completely unrelated.
B. To redefine a function, the function must be defined in the derived class using the same signature and return type as in its base class.
C. A constructor can be redefined. X
D. Overloading a function is to provide more than one function with the same name but with different signatures to distinguish them.
E. It is a compile error if two functions differ only in return type.

51. What will be displayed by the following code?

```
#include <iostream>
#include <string>
using namespace std;

class C
{
public:
  virtual string toString()
  {
    return "C";
  }
};

class B: public C
{
public:
  string toString()
  {
    return "B";
  }
};

class A: public B
```

```
{
public:
  string toString()
  {
    return "A";
  }
};

void displayObject(C* p)
{
  cout << p->toString();
}

int main()
{
  displayObject(&A());
  displayObject(&B());
  displayObject(&C());
  return 0;
}
```

A. AAA
B. CBA X
C. BBB
D. ABC
E. CCC

52. What is the output of the following code?

```
#include <iostream>
using namespace std;

class ParentClass
{
public:
  int id;

  ParentClass(int id)
  {
    this->id = id;
  }
```

```
  void print()
  {
    cout << id << endl;
  }
};

class ChildClass: public ParentClass
{
public:
  int id;

  ChildClass(int id): ParentClass(1)
  {
    this->id = id;
  }
};

int main()
{
  ChildClass c(2);
  c.print();

  return 0;
}
```

A. 2
B. 0
C. Nothing
D. 1 X

53. Are the destructors inherited by the derived class?

A. No X
B. Yes

54. Which of the following statements is false?

A. A protected data field or a protected function in a base class can be accessed by name in its derived classes.
B. Private members can only be accessed from the inside of the class and public members can be accessed from any other classes.
C. A public data field or function in a class can be accessed by name in any other program.
D. You cannot have a protected constructor. X

55. What will be displayed by the following code?

```
#include <iostream>
#include <string>
using namespace std;

class A
{
public:
  string toString()
  {
    return "A";
  }

};

class B: public A
{
public:
  string toString()
  {
    return "B";
  }
};

int main()
{
  B b;
  cout << static_cast<A>(b).toString() << b.toString() <<
  endl;
```

```
  return 0;
}
```

A. BA
B. AA
C. AB X
D. BB

56. Which of the following statements is false?

A. Assigning a pointer of a base class type to a pointer of its derived class type is called downcasting.
B. Upcasting can be performed implicitly without using the dynamic_cast operator.
C. Assigning a pointer of a derived class type to a pointer of its base class type is called upcasting.
D. Downcasting must be performed explicitly using the dynamic_cast operator.
E. The dynamic_cast operator can cast a primitive type variable to another primitive type. X

57. Analyze the following code:

```
#include <iostream>
using namespace std;

class A
{
public:
  A()
  {
    t();
    // cout << "i from A is " << i << endl;
  }

  void t()
  {
    setI(20);
```

```
  }

  virtual void setI(int i)
  {
    this->i = 2 * i;
  }

  int i;
};

class B: public A
{
public:
  B()
  {
    cout << "i from B is " << i << endl;
  }

  void setI(int i) override
  {
    this->i = 3 * i;
  }
};

int main()
{
  A* p = new B();

  return 0;
}
```

A. The constructor of class A is called and the program displays "i from B is 60".
B. The constructor of class A is called and the program displays "i from B is 40".
C. The constructor of class A is called and the program displays "i from B is 0". X
D. The constructor of class A is not called.

58. Which of the following statements is incorrect?

```
class Fruit
{
public:
  Fruit(int id)
  {
  }
};

class Apple: public Fruit
{
public:
  Apple()
  {
  }
};
```

A. The program will compile and run fine.
B. The program will compile if you replace Apple() by Apple(): Fruit(4).
C. The program has a compile error because Fruit does not have a no-arg constructor. X
D. The program will compile if you delete the constructor in Fruit.
E. The program will compile if you add a no-arg constructor for Fruit.

59. What is the output of the following code?

```
#include <iostream>
#include <string>
using namespace std;

class Person
{
public:
  void printInfo()
  {
    cout << getInfo() << endl;
```

```
  }

  virtual string getInfo()
  {
    return "Person";
  }
};

class Student: public Person
{
public:
  string getInfo()
  {
    return "Student";
  }
};

int main()
{
  Person().printInfo();
  Student().printInfo();
}
```

A. Person Student X
B. Stdudent Student
C. Student Person
D. Person Person

60. Are the constructors inherited by the derived class?

A. No X
B. Yes

61. You can always successfully cast a base class to a derived class.

False

62. Analyze the following code:

```
#include <iostream>
using namespace std;

class A
{
public:
  A()
  {
    t();
    cout << "i from A is " << i << endl;
  }

  void t()
  {
        setI(20);
  }

  virtual void setI(int i)
  {
    this->i = 2 * i;
  }

  int i;
};

class B: public A
{
public:
  B()
  {
    cout << "i from B is " << i << endl;
  }

  virtual void setI(int i)
  {
    this->i = 3 * i;
  }
};
```

```
int main()
{
  A* p = new A();

  return 0;
}
```

A. The constructor of class A is called and it displays "i from A is 40". X
B. The constructor of class A is called and it displays "i from A is 0".
C. The constructor of class A is called and it displays "i from A is 60".
D. The constructor of class A is not called.

63.

You can always successfully cast a derived class to a base class.

A. true X
B. false