Computing III: Packet 4 & 5

Name_____

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

1) Given the following code, what namespace does display3 belong to? 1) _____

```
namespace ns1
{
    void print( );
    void display1( ){ };
}

namespace ns2
{
    void print( );
    void display2( ){ };
}

void display3( );
int main( )
{
    using namespace ns1;
    using namespace ns2;
    display1( );
    display2( );
    return 0;
}

void display3( )
{
}
```

2) :: is called the _____. 2) _____

3) The statement `using std::cin;` is called a _____. 3) _____

4) The statement `using namespace std;` is called _____. 4) _____

5) The unspecified namespace is named _____. 5) _____

6) The file that contains the definitions of the member functions of a class is called the _____. 6) _____

7) The file that contains the definition of the class is called the _____. 7) _____

8) The C++ code 8) _____

```
template < class T >
```

is called the _____.

9) Using template functions is an example of _____ abstraction. 9) _____

10) When you define a class as a template, then that class can contain _____ data type. 10) _____

11) If you have a class template declared and you instantiate it in your program twice (both times it is instantiated with an integer), how many versions of the class does the compiler create? 11) _____

12) If you have a class template declared and you instantiate it in your program twice (once with an integer, once with a string), how many versions of the class does the compiler create? 12) _____

13) If you need to pass a class template (named myClass) function an object of the class as a value parameter, then the type of the parameter is _____. 13) _____

14) Given a class template named listClass, declare a listClass object named myList that can hold strings. 14) _____

15) Given a class template named listClass, declare a listClass object named myList that can hold doubles. 15) _____

16) When we derive one class from another class, this is known as _____. 16) _____

17) Which is more general, the base class or the derived class? 17) _____

18) The ifstream class is derived from the _____ class. 18) _____

19) When the derived class gets all the member variables from the base class, we say that they are _____ from the base class. 19) _____

20) A constructor of the base class (is/is not) inherited in the derived class. 20) _____

21) If the member variables in a base class are marked as private, can a derived class directly access those variables? 21) _____

22) If the member variables of the base class are marked as protected, who can access those variables? 22) _____

23) Member functions defined as private in the base class (are/are not) inherited in the derived class. 23) _____

24) If two functions (in the same scope) have the same name, but a different function signature, this means that the functions are _____. 24) _____

25) The ability to associate multiple meanings to one function name using dynamic binding is called _____. 25) _____

26) C++ implements polymorphism by waiting until run-time to determine which version of a function to use. This is also known as _____. 26) _____

27) If a base class has declared a function to be a virtual function, then does the derived class need to include the word virtual also? 27) _____

28) A base class pointer variable can point to _____. 28) _____

29) A derived class pointer can point to _____. 29) _____

30) Using virtual functions is also known as _____ the functions. 30) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

31) ADTs should be in separate files because 31) _____
A) this promotes information hiding.
B) this results in faster recompilation.
C) this promotes data abstraction.
D) this promotes software reusability.
E) all of the above

32) All the code between 32) _____

```
#ifndef  MYCLASS_H
```
and
```
#endf
```

is _____ if MYCLASS_H is defined.

A) compiled B) debugged C) skipped D) executed

33) The identifier used in the #ifndef directive should be 33) _____
A) whatever you want it to be.
B) the name of the class in upper case letters.
C) the file name in uppercase letters (with an _ instead of a .).
D) your name in upper case letters.

34) Which file name will end in a .h? 34) _____
A) implementation
B) all input files
C) application
D) interface file
E) A and B

35) Which file name will end in a .cpp? 35) _____
A) implementation file
B) application file
C) interface file
D) all input files
E) A and B

36) If you have a class defined in separate files, and change the way a member function is defined (the body of the function), which files need to be re-compiled? 36) _____

A) all files
B) the application
C) the implementation
D) the interface
E) B and C

37) If you have a class defined in separate files, and change the way a class is defined, which files need to be re-compiled? 37) _____

A) the interface
B) the application
C) the Implementation
D) all files
E) B and C

38) If you have a class defined in separate files, and change the main program, which files need to be re-compiled? 38) _____

A) the application
B) all files
C) the interface
D) the implementation
E) B and C

39) What is the difference between an ADT and a class in C++? 39) _____

A) In an ADT, the user does not have access to the implementation details.
B) A class must always be in a separate file.
C) In an ADT, the user can change the implementation details.
D) There is no difference.

40) A namespace is 40) _____

A) used to distinguish between identical names.
B) using std.
C) a collection of name definitions.
D) all of the above
E) A and C

41) cin and cout are defined in the _____ namespace. 41) _____

A) standard B) global C) std D) iostream

42) A using directive that appears inside a set of braces applies 42) _____

A) from that point to the end of the file. B) only to that block.
C) everywhere. D) only if the namespace is std.

43) A using directive that is at the start of the file 43) _____

A) applies only to the first block. B) hides all other namespace directives.
C) is a syntax error. D) applies to the entire file.

44) In order to create a namespace called student, you use 44) _____

A)
```
{
    student namespace
    //code goes here
}
```

B)
```
student namespace
{
    //code goes here
}
```

C)
```
namespace student
{
    //code goes here
}
```

D)
```
{
    namespace student
    //code goes here
}
```

45) If you want to only use cin and cout (but no other names) from the std namespace, you would write: 45) _____

A)
```
using std::cin;
using std::cout;
```

B) not be able to do it.
C) cin and cout are not in the std namespace.
D) always have to write std::cin and std::cout.
E) either A or D

46) In order to hide functions that are defined in the implementation file, they should be part of the _____ namespace. 46) _____

A) std B) global C) class D) unnamed

47) Why will the following code not compile? 47) _____

```
namespace ns1
{
    void print( );
    void display1( );
}

namespace ns2
{
    void print( );
    void display2( );
}


int main( )
{
    using namespace ns1;
    using namespace ns2;
    display1( );
    display2( );
    print( );
    return 0;
}
```

A) We have not included the iostream library.
B) The call to print is ambiguous.
C) We have not used namespace std.
D) It will compile.

48) Writing a template class 48) _____
A) is illegal.
B) allows us to skip the implementation of that template class.
C) means we never have to write non-template classes again.
D) allows us to write one class definition that can hold different data types.

49) Which of the following describes a class that would be a good candidate for conversion to a template class? 49) _____
A) a class which defines a new type of array
B) a class which defines customers for a store
C) a class which defines rational numbers
D) all of the above

50) Which of the following are valid template prefixes? 50) _____
A) template < class Me >
B) template < class T, class Me >
C) template < class T >
D) all of the above
E) none of the above

51) Given the following template function definition, which of the choices is not a valid invocation of the function? 51) _____

```
template < class T >
void swap(T& left, T& right)
{
    //implementation goes here, not relevant to the question
}
int int1, int2;
float flt1, flt2;
char ch1, ch2;
string s1, s2;
```

A) swap(int1, ch2);
B) swap(s1, s2);
C) swap(int1, int2);
D) swap(ch1, ch2);

52) What should you list in the pre-condition of a template function? 52) _____
A) what happens after the function is executed
B) what must be true before the function executes
C) any functionality that the instantiating class must implement (like <)
D) all of the above
E) B and C

53) When would you want to make a function a function template? 53) _____
A) when two different functions have different implementation details
B) All functions should be function templates.
C) only when two functions have the same type of parameters
D) when the implementation details of the function are independent of the data type(s) of the parameters

54) In the following function template, what must be true in order to use the function with a given data type? 54) _____

```
template < class T >
int smallest( T array[ ], int size)
{
    int small = 0, i;
    for(i = 0;i < size;i ++)
{
    if(array[i] < array[small])
        small = i;
}
    return small;
}
```

A) The data type must be numeric.
B) The data type must be a pre-defined data type.
C) The data type must have a < operator defined for it.
D) The data type must be character based.

55) Why can you not use the swap template function to swap two complete arrays? 55) _____

```
template < class T >
void swap(T& left, T& right)
{
    T tmp = left;
    left = right;
    right = tmp;
}
```

A) tmp should be an integer.
B) You cannot pass an array to a function.
C) The swap function does not return anything.
D) The = operator does not work for an array.

56) Given that you have two versions of a function that are the same except that one expects some integer parameters, and the other expects a float and an integer parameter, which parameters would you change to a T in order to make this a template function? 56) _____

A) the parameter that always stays an integer
B) the parameter that is an integer in one function and a float in the other function
C) both parameters change
D) neither parameter changes

57) Given a search template function that will look for an occurance of target in an array of items, what is necessary for the instantiating data type to implement? 57) _____

A) the > operator B) the == operator C) the = operator D) the < operator

58) Given a class template, how many different times can you instantiate the class? 58) _____

A) 1 for each different data type
B) as many as you need, of any data types
C) 1
D) as many as you need, but only one data type
E) 0

59) What changes need to be made to the following class in order to change it to a template class? 59) _____

```
class containerClass
{
public:
    containerClass( );
    containerClass(int newMaxSize);
    containerClass(const containerClass& source);
    ~containerClass( );
    int getItem( );
    int getCount( );
    int getSize( );
    void addItem(int item);

private:
    int *bag;
    int maxSize, count;
};
```

A) add the template prefix
B) change all occurrences of int to T
C) change the return type of getItem to T
D) change the parameter type of addItem to T
E) A and C and D

60) Given the following function template, which of the choices are NOT valid calls to larger? 60) _____

```
template < class T >
T larger(const T& left, const T& right)
{
    if(left > right)
        return left;
    else
    return right;
}
```

A)
```
char x = '3', y = '4';
cout << larger(x,y);
```

B)
```
float x = 3, y = 4;
cout << larger(x,y);
```

C)
```
char x[ ] = "3", y[ ] = "4";
cout << larger(x,y);
```

D)
```
int x = 3, y = 4;
cout << larger(x,y);
```

61) If you define some list class template in your program, and then declare a list of integers, 2 lists of doubles and 1 list of strings, how many different versions of the template class will the compiler provide? 61) _____

A) 1 B) 4 C) 3 D) 2

62) Given the following search function declaration, what would be the corresponding declaration for a templated search function? 62) _____

```
int search( int array[ ], int start, int target, int size);
//pre: start is > 0, and < size
//the position of the first occurance of target at or after start is returned, or -1 is returned.
```

A)
```
template < class T >
   T search(T array[ ], int start, T target, int size);
```
B)
```
template < class T >
   int search(T array[ ], T start, T target, T size);
```
C)
```
template < class T >
   int search(int array[ ], int start, T target, int size);
```
D)
```
template < class T >
   T search(T array[ ], T start, T target, T size);
```
E) all of the above

63) Given the following class template, what changes need to be made to the getSize function? 63) _____

```
template < class T >
class containerClass
{
public:
    containerClass( );
    containerClass(int newMaxSize);
    containerClass(const containerClass& source);
    ~containerClass( );
    T getItem( );
    int getCount( );
    int getSize( );
    void addItem(T item);

private:
    T *container;
    int maxSize, count;
};

int containerClass::getSize( )
{
    return maxSize;
}
```

A) add the template prefix
B) add the <T> before the scope resolution operator
C) nothing needs to change
D) change the return type to a T
E) A and B

64) Give the following class template, what changes need to be made to the default constructor definition? 64) _____

```
template < class T >
class containerClass
{
public:
      containerClass( );
      containerClass(int newMaxSize);
      containerClass(const containerClass& source);
      ~containerClass( );
      T getItem( );
      int getCount( );
      int getSize( );
      void addItem(T item);
private:
      T *bag;
      int maxSize, count;
};

containerClass::containerClass( )
{
      maxSize = 10;
      bag = new int[maxSize];
      count = 0;
}.
```

A) add the template prefix
B) add the < T > following the class name before the scope resolution operator
C) change the type of the dynamic array allocation to T
D) all of the above
E) none of the above

65) Which would be the correct way to instantiate a containerClass object in your main program? 65) _____

```
template < class T >
class containerClass
{
public:
    containerClass( );
    containerClass(int newMaxSize);
    containerClass(const containerClass& source);
    ~containerClass( );
    T getItem( );
    int getCount( );
    int getSize( );
    void addItem(T item);
private:
    T *container;
    int maxSize, count;
};
```

A) containerClass myContainer; B) containerClass<int> myContainer;
C) containerClass myContainer<int> D) containerClass<T> myContainer;

66) What is another name for a child class? 66) _____
A) sub class
B) derived class
C) descendent class
D) all of the above
E) none of the above

67) A base class may have at most _____ child class derived from it. 67) _____
A) 12 B) 2 C) 1 D) any number

68) Which is the correct way to tell the compiler that the class being declared (ChildClass) is derived from the base class (BaseClass)? 68) _____
A) class ChildClass::public BaseClass B) class ChildClass childOf public BaseClass
C) class ChildClass derived BaseClass D) class ChildClass:public BaseClass

69) Another name for the base class is 69) _____
A) ancestor class.
B) super class.
C) parent class.
D) all of the above
E) none of the above

70) If the member variables in a base class are private, then 70) _____
A) they can be directly accessed or changed in the derived class.
B) you must declare them in the derived class also.
C) the derived class must use any accessor or modifier functions from the base class.
D) making them private causes a syntax error.

71) In the derived class definition, you list from the base class 71) _____
A) only those member functions that were in the public section.
B) only those member functions that need to be redefined.
C) all the member functions every time.
D) only those member functions you want to overload.

72) Given a base class with at least one public member function, how many classes can redefine that member function? 72) _____
A) 1 B) 0
C) all of them D) none of the above

73) If you define a function in the derived class that has the same function signature as a function in the base class, this is known as 73) _____
A) a syntax error. B) overloading. C) overwriting. D) redefinition.

74) If a base class has a public member function, and the derived class has a member function with the same name, but with a different parameter list, this function is said to be 74) _____
A) a syntax error. B) redefined. C) overloaded. D) overwritten.

75) Using inheritance allows us to 75) _____
A) make our classes more modular.
B) eliminate duplicate code.
C) use polymorphism.
D) all of the above
E) none of the above

76) Which of the following are not true? 76) _____
A) An object of the derived class may be stored in a variable of the base class.
B) An object of the base class may be stored in a variable of the derived class.
C) An object of a derived class that is derived from another class that is derived from a third class can be stored in a variable of the third class.
D) all of the above
E) none of the above

77) Which of the following are true? 77) _____
A) You must define constructors in both the base and derived classes.
B) You may not call the base constructor from the derived class.
C) Constructors of the base class are inherited in the derived class.
D) all of the above
E) none of the above

78) If the member variables in the base class are listed as protected, then who can access or modify those variables? 78) _____
A) members of the base class
B) members of the derived class
C) friends of the base class
D) friends of the derived class
E) all of the above

79) If a base class has public member functions that are not listed by a derived class, then these functions 79) _____
A) are private to the derived class.
B) are inherited unchanged in the derived class.
C) do not exist in the derived class.
D) are not available to the derived class.

80) When deriving a class, you should 80) _____
A) make every function a virtual function.
B) list all the member functions of the base class.
C) list only base class functions that will be redefined.
D) overload all the base class member functions.

81) If a derived class (Class2) has redefined a function from the base class (Class 1), how can that derived function call the base class function if the function declaration is as follows? 81) _____

void print( );

A) Class1 :: print( );
B) print( );
C) :public Class1::print( );
D) all of the above

82) If you have a copy constructor in the base class, but do not have a copy constructor for the derived class, then 82) _____
A) the default constructor is used.
B) you will have a syntax error.
C) a copy constructor for the derived class is automatically created for you.
D) you cannot use pointer variables.

83) Given a class A that derives from a class B that derives from a class C, when an object of class A goes out of scope, in which order are the destructors called? 83) _____
A) C, B, then A
B) A, B, then C
C) unable to determine
D) It depends on how the code is written for the destructors.

84) Polymorphism refers to 84) _____
A) overriding base class functions.
B) the ability to assign multiple meanings to one function name.
C) overloading functions.
D) none of the above

85) In order to tell the compiler to wait to decide which version of a function to use, you must precede the function declaration in the base class with the keyword 85) _____
A) virtual. B) void. C) operator. D) friend.

86) If you have the following class definitions, which of the following is the proper way to construct an object of the derived class? 86) _____

```
class Pet
{
public:
      Pet( );
      void printPet( );
      string getName( );
      void setName(string newName);
private:
      string name;
};

class Dog:public Pet
{
public:
      Dog( );
      void printPet( );
      void setType(string newType);
      string getType( );
private:
      string type;
};
```

A)
```
Dog::Pet( ):Pet( ),type("MUTT")
   {
   }
```

B)
```
Dog::Dog( )
   {
        name = "Rover";
   }
```

C)
```
Pet::Dog( ):Pet( ),type("MUTT")
   {
   }
```

D)
```
Dog::Dog( ):Pet( ),type("MUTT")
   {
   }
```

87) Which of the following would correctly call the base class (BaseClass) assignment operator from the derived class (DerivedClass) assignment operator? 87) _____

```
DerivedClass& DerivedClass::operator = (const DerivedClass& rightSide)
{
      //what goes here?
}
```

A) leftSide = rightSide;
B) DerivedClass::rightSide = BaseClass::rightSide;
C) rightSide = BaseClass.rightSide;
D) BaseClass::operator = (rightSide);

88) Which of the following should be virtual if a base class uses dynamic memory allocation? 88) _____

A) the print function
B) the destructor
C) the constructor
D) the copy constructor

89) If a base class has a non-virtual member function named print, and a pointer variable of that class is pointing to a derived object, then the code ptr -> print( ); 89) _____

A) calls the base class print function.
B) calls both the derived and base print functions.
C) calls the derived print function.
D) causes a run-time error.

90) If a base class has a virtual function named print, and a pointer variable of that class is pointing to a derived object, then the code ptr -> print( ); 90) _____

A) calls the base class print function
B) calls both the derived and base print functions
C) calls the derived print function
D) causes a run-time error

91) You should make a function a virtual function if 91) _____

A) every class that is derived from this class uses all the member functions from this class.
B) every class that is derived from this class needs to re-define this function.
C) that function is an operator.
D) only in the derived classes.

92) Given the following simplified classes: 92) _____

```
class Pet
{
public:
      virtual void print( );
      string name;
private:
};

class Dog: public Pet
{
public:
      void print( );
      string breed;
};

Dog vDog;
Pet vPet;
vDog.name = "rover";
vDog.breed = "Collie";
```

which of the following statements are not legal?

A) vPet = vDog; cout << vDog.name;
B) vPet = vDog; cout << vPet.name;
C) vPet = vDog; cout << vDog.breed;
D) vPet = vDog; cout << vPet.breed;

93) If the following function is in a base class, which of the following are polymorphic declarations of the same function in the derived class? 93) _____

```
virtual void print( ostream& out);
```

A) virtual void print (ostream& out);
B) void print(ostream& out);
C) void print( );
D) virtual void print( );
E) A and B

94) Given the following classes and code, what is the output of the last statement shown? 94) _____

```
class Pet
{
public:
      virtual void print( );
      string name;
private:
};
class Dog: public Pet
{
public:
      void print( );
      string breed;
};
void Pet::print( )
{
      cout << "My name is " << name;
}
void Dog::print( )
{
      Pet::print( );
      cout << ", and my breed is a "<< breed << endl;
}

Pet* pPtr;
Dog* dPtr = new Dog;
dPtr -> name = "Rover";
dPtr -> breed ="Weiner";
pPtr = dPtr;
pPtr -> print( );
```

A) nothing
B) My name is Rover
C) , and my breed is a Weiner
D) My name is Rover, and my breed is a Weiner

95) Given the following classes and code, what is the output of the last statement shown? 95) _____

```
class Pet
{
public:
    virtual void print( );
    string name;
private:
};
class Dog: public Pet
{
public:
    void print( );
    string breed;
};
void Pet::print( )
{
    cout << "My name is " << name;
}
void Dog::print( )
{
    Pet::print( );
    cout << ", and my breed is a "<< breed << endl;
}

Pet pPtr;
Dog dPtr;
dPtr .name = "Rover";
dPtr .breed = "Weiner";
pPtr = dPtr;
pPtr .print( );
```

A) My name is Rover, and my breed is a Weiner
B) nothing
C) My name is Rover
D) , and my breed is a Weiner

TRUE/FALSE. Write 'T' if the statement is true and 'F' if the statement is false.

96) If you use the keyword virtual in a function declaration, you must also use it in the function definition. 96) _____

97) Destructors are not inherited into the derived class. 97) _____

98) The assignment operator is inherited from the base class. 98) _____

99) The copy constructor from the base class is not inherited into the derived class. 99) _____

100) All member functions in a base class should be listed as virtual functions. 100) _____

101) An object of a derived class can be stored in a base class variable. 101) _____

102) The derived class may define variables and member functions other than those that are in the base class. 102) _____

103) The base class has everything that is in the derived class and more. 103) _____

104) The constructor for a class is inherited. 104) _____

105) A derived class automatically gets all the member variables from the base class. 105) _____

106) All code is in some namespace. 106) _____

107) You may not use multiple namespaces in the same program. 107) _____

108) If a name is defined in an unnamed namespace in a different compilation unit, it may not be accessed outside of that compilation unit. 108) _____

109) All names are defined in some namespace 109) _____

110) Names that are defined outside of a namespace are part of the unnamed namespace. 110) _____

111) In a program with no user defined namespaces, all names are defined in the global namespace. 111) _____

112) The global namespace and the unnamed namespace are the same. 112) _____

113) Classes must always be defined in separate files. 113) _____

114) ADTs should be defined and implemented in separate files. 114) _____

115) In a class template implementation, every use of the class name as the name of the class should be followed by <T>. 115) _____

116) All classes should be converted to templates. 116) _____

117) A class template may not use dynamic memory allocation. 117) _____

118) In a template, all members must be private. 118) _____

119) You may not have overloaded friend operators in a class template. 119) _____

120) If your program defines a class template, then the compiler will generate a class for each different data type for which it is instantiated. 120) _____

121) In a template function definition, all parameters must be of the template class (T). 121) _____

122) If you define a function template, then the compiler will create a separate function definition for every data type that exists. 122) _____