1　Topics and Ideas - CSI 201

1.1　Related to Exam 1

Debugging What is a syntax error? How is that different from a runtime error? What do we mean by a logic error? Give an example of each of these. What are some strategies for finding errors in your code?

Compiling What is main? Describe each of these things that happen when you compile your code: pre-processing, compiling, and linking. What is machine code? How is it different from C++ code? What is one way (that we have seen) to cause a linker error? What does an include line (something similar to #include <iostream>) do?

Variables What is a variable? What are the relationships between these three words: variable, type, value? How do you change the value of a variable? Can you change the type of a variable? What is the difference between declaring and initializing a variable? What types do we use most often?

Operators What do operators do? What categories of operators have we seen? List all of the operators that we have used. What is the difference between = and ==?

Input/Output How do you get data into a program? How do you send data out of a program? What does get input from the user mean? What does print mean? How you do each? How do you check if input is correct? How do we format input?

Conditionals What is the syntax of an if statement? How do you use else if and else? Is it possible to have an else without an if, or an else if without an else? How do you negate a statement? How do you use operators to combine sentences with words like "and" and "or"? Exactly how is an if statement different than a while statement?

Randomness What are all of the different pieces of code that we need in order to use random numbers in our program? How can we get random dice rolls or random numbers in a range? What does it mean to seed the random number generator. What happens if the random number generator is not seeded?

Loops What are the two types of loops that we have learned? Give examples of correct syntax. How can we use a loop to guarantee that user input is valid? How can we use a loop to repeat something a set number of times. How do we use a loop to walk through every element of a vector? How about every element except one?

1.2　Related to Exam 2

Vectors and Arrays What is an array? What is a vector? Show examples of the correct syntax to use for each. What does it mean to blow array or index bounds? What happens with a vector? How about an array? How do I add a new element to a vector? How do I access a particular element of a vector? How do I change a particular element of a vector. How do I walk through all elements of a vector and perform some operation on it? What is an index?

Write code to print out every element of an array/vector. How would I add up all of the numbers in an vector? What if wanted to add up the squares of those numbers?

How do we pass vectors into functions as inputs? What is the syntax?

Functions What are functions? Why do we write them? Couldn't we just write all of our code without them? What would be the disadvantages of that? What do the words "locality" and "scope" mean? How does data enter functions, and how does it leave? What does a return mean? What is void? What is call by value? What is call by reference? What is call by constant reference? What is the difference between them all? When is each used?

Recursion When is a function recursive? What is a recursive case? In what circumstances is recursion used? What is the difference between iteration and recursion? How can one identify a function as recursive? How can one identify a stopping case? What is the difference between a base case and a recursive case? How are stack overflow and recursion related? What is infinite recursion?

1.3 Material after Exam 2

Streams What is a stream? How does file input/output relate to console input/output? What is the difference between them? Show how to open a file for reading. Show how to open a file for writing. Show how to write all output from a program to a file rather than to the console. Show how to read input for a program from a file rather than from the console.

Classes What is a C++ class? What is the syntax to write one? What is the distinction between a class and an object? What is the difference between public and private members of a class? How do we use the classes that we have written in code? What are constructors, and what do we use them for? What do we make data members private? What is one reason that we should put our classes in separate files, instead of in main? What is the dot operator and how is it used?

Pointers What are pointers? How are the heap and stack different? How do we allocate new memory on the heap? How do we deallocate memory from the heap? What is the dereferencing operator and how is it used? What is the arrow operator and how is it used? What is the primary function of pointers in modern C++?