1. What is the role of a prototype program in problem solving?

Program that simulates the behavior of portions of the desired software product

2. What stages in the software life cycle are influenced by the testing stage?

Testing, refining, production, and maintenance.

3. What are the main advantages associated with object-oriented programming?

Variables can remain private. The code is easily modified and reusable, as well as easily implemented. Not to mention easier to read and follow along as an observer.

4. Where do C++ programs begin to execute?

At the "main()" function

5. What is a variable?

a symbol that stands in for a value that may or may not change depending on the program.

6. Where are variables declared in a C++ program?

in the very beginning of the program. Before the main() starts.

7. What is the main difference between a while and a do...while statement?

The statements within the block of the do while loop will always be executed at least once regardless of the conditions. Whereas the while loops may never be executed if the conditions are not met.

8. What is typically included in a class definition?

A constructor, functions, and variables that are accessible to by that class, and possibly other classes depending on how they are done.

9. What is the difference between a data member and a local variable inside a member function?

local variables can only be used within the function, where as data members can be set to public access and can be used throughout

10. What is the difference between a constructor and a function?

A constructor is used to create an object that can be employed in the main function of a program. This may or may not execute code along with it. A function is a set of code that executes when called, but does not create a new object.

11. When does C++ create a default constructor?

C++ will create a default constructor when no other constructor is present.

12. How many constructors can be created for a class?

as many as you need

13. What is the difference between a function prototype and a function definition?

a prototype does not include any actual code where the function has all the code that is executed in the program.

14. What is the role of a header-file?

“Instruct” the compiler on how to interface with library and user-written components.

15. What does a function signature include?

Name of the function and the types of it's arguments

16. What is the scope of global variables?

can be accesed by any classes that have and object of that variables class in it

17. How does the compiler handle inline functions?

You declare your inline function in the header or before your int main(). You then can call that function at anytime in your main program quickly and easily.

18. What is the main advantage associated with function arguments that are passed by reference?

It is often more efficient to pass references, rather than large objects, to functions. This allows the compiler to pass the address of the object while maintaining the syntax that would have been used to access the object.

19. How are overloaded functions differentiated by the compiler?

They differentiated by the compiler by the conditions/inputs used for one of the overloaded functions.

20. How are overloaded functions differentiated by the compiler?

overloaded function simply invovles haing a method with the same name within the class. is used to implement a method for subclass which overrides in other words replaces the implementation of the super class. Overloading the concept of providing different meaning to a object based on the context of its presence. Overloading is one type of polymorphism and this is also a feature in programing.

21. When defining a recursive function, what are possible causes for infinite recursion?

function is never allowed to reach the 'base case'

22. What are the similarities between iteration and recursion?

they are used to solve the same type of problems. they do a task over and over again until a cirtain conditional statement is reached (its called the base case in recursion).

23. What are the two different ways of specifying the length of an array?

one way of specifying of array is A[10] ; other way of specifying array is a[arraysize] = [1,2,3,4,5,6,7,8,9,10}

24. What is the main difference between strings declared using the type string versus strings declared using an array of characters?

the type string has several built-in functions not available when using a char array, but the individual characters in an array or more directly accessible than the characters in a string type string.

25. How are arrays passed to functions?

by reference only

26. What is the difference between an array declared as static, and one that is not?

the static array exists for the duration of the program

27. How many dimensions need to be specified when passing a multi-dimensional array as an argument to a function?

all dimensions, excluding the first one.

28. In one sentence, what is the main idea implemented by insertion sort?

Insertion sort is an algorithm where the first element of the array is in the sorted list, all the other pick one by one and taken from the unsorted array, to the sorted array.

29. In one sentence, what is the main idea implemented by selection sort?

Select the smallest number in the list and move it to the front of the list and then advance to the next number.

30. What is the number of operations for insertion sort under a best-case scenario, and what is the best-case scenario?

the best case scenario for insertion sort is a list that is already sorted. the number of operations would be the same as the number of elements

31. What is the base case for a recursive implementation of merge sort?

array of length 1

32. What is a pointer?

a variable with a memory address as the value

33. What does the star (*) operator return?

returns a synonym for the object to which its pointer operand points.

34. How can an array be addressed in pointer/offset notation?

Using either the name of the array as a pointer or using a separate pointer that points to the array.

35. What does the sizeof operator return?

The byte size of the date stored ina variable.

36. What are the different ways to pass a pointer to a function?

Nonconstant pointer to nonconstant data, nonconstant pointer to constant data, constant pointer to nonconstant data, and constant pointer to constant data.

37. What is a function pointer?

Points to the memory address of a function. Kind of like breaking a branch off of a tree object and hitting other objects with it.

38. What is a linked list?

Each component contains a Node - a data item and a pointer to the next item in the list

39. What is the main advantage of linked lists over arrays?

more memory can be allocated on the fly for more items

40. What is the main advantage of arrays over linked lists?

Array-based implementations require less memory than a pointer-based ones

41. How are linked lists passed as arguments to a function?

the head object is passed to the function

42. What is the main advantage of a doubly-linked list over a basic linked list?

In a doubly linked list you can delete a node without having to traverse the list.

43. What is the main disadvantage of a doubly-linked list over a basic linked list?

Need more memory to store "previous" pointers.

44. What is a stack?

A stack is similar to an array, but does not allow for random access. Stacks only allow a user to retrieve the last item put into the stack. Last in, fist out.

45. What are the two main functions defined by a stack?

Push and Pop.

46. How can you implement a stack with an array?

treat the beginning of the array as the beginning of the stack

47. How can you implement a stack with a list?

create a node based list that points to the next list item down.

48. How are infix expressions evaluated by computers?

The infix expression is converted to postfix form

49. What operations would you need to perform to find a given element on a stack?

you need the pop opertation to go throught the stack and find the element.

50. What is a queue?

a data structure that performs operations in the order of first in first out FIFO

51. What are the two main functions defined by a queue?

Enqueue and Dequeue

52. How can you implement a queue with an array?

By having the head pointer point to the first or least current data entered and having the tail point to the most current data entered. A method must be created so that the tail pointer doesn't leave the array.

53. How can you implement a queue with a list?

your queue storage class has a list, and for enqueue, you add the item to the end of the list, and for dequeue you return the first item in the list

54. What is a tree?

A hierarchy of nodes that are sorted in a particular order. Each node has a ancestor (except for the root) and children (except for the leaves).

55. What is the height of a tree?

the height of a tree is the length from the root to the furthest leaf

56. What is a leaf?

a leaf is a node with no children

57. What is a binary tree?

A binary tree is a set of nodes that is either empty or partitioned into a root node and one or two subsets that are binary subtrees of the root. Each node has at most two children, the left child and the right child.

58. What is a binary search tree?

A tree in which the smaller values are located on the left of a parent node and the larger values are located on the right of the parent node.

59. How many comparisons does it take to find an element in a binary search tree?

In a binary search tree of size 'n' it takes log(n) comparisons to find a specified element.

60. What are the elements typically included in a class definition?

Data members, functions and function definitions, variables.

61. What are the access-specifiers that can be used in a C++ class definition?

public: the function or variable can be used outside the class private: the function or variable can only be used with the class

62. How are objects initialized when they are created?

They are initialized with a " . " (dot) between the constructor and the object being created.

63. What is a function signature?

function prototype that contains functions and data members.

64. What is a recursive function?

not answered

65. What is the alternative way to solve a problem that could be solved through recursive functions?

The alternative method is to use loops in the program instead of a function which calls itself.

66. What is the difference between an array that is declared as static and one that is not?

The array that is declared static retains its modified elements so once it is called upon again the latest elements are modified again. An array that is not declared static will keep its original elements.

67. What is the difference between an array that is declared as static and one that is not?

static has a predetermined size that cannot be passed while vis versa.

68. What is the main difference between a string of characters that is read into a variable of type string versus a variable of type char[]?

when the characters are put in a char array, there is also a null terminating character added to the end, '\0'

69. Briefly describe the divide-and-conquer paradigm.

this is shown by the use of .cpp and header files. by splitting the program up into smaller subsections of individual code, it becomes easier to write and keep up with as opposed to having all of your code in one file

70. Briefly describe in one sentence how does merge sort work?

Merge sort takes an array and splits it in half and sends each half back to itself recursively and merges and sorts the two halves when it starts going back up.

71. What is a pointer?

a pointer is a memory address that points to a data member

72. What is the experimental approach for measuring the running time of an algorithm?

trying it with different sets of inputs, and measuring the amount of time that the algorithm actually takes.

73. Briefly, how does selection sort work?

selection sort iterates through the array one element @ a time searching for the right and replacing current value with it.

74. What is a queue?

A data structure in C++ where the the first element in the queue is the first element taken out of the queue.

75. What are the main operations associated with a stack?

Pop, which removes the head, or least recently inserted node from the stack. Push, which inserts a new node at the head of the stack.

76. What is the Euler tour traversal of a tree?

Where you visit the in order according to its data value.

77. How do you delete a node from a binary search tree?

If you delete a node from a tree, you have to link that nodes parents to the children of that node.

78. How many steps does it take to search a node in a binary search tree?

Given n elements, it would take n/2 steps to find the search criteria.