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

#NAME?

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

#NAME?

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

#NAME?

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

#NAME?

5. What is a variable?

#NAME?

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

#NAME?

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

#NAME?

8. What is typically included in a class definition?

Data members and member functions

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

Data members are the atributes of the function and can be used outside the function. Local variable can not be used outside the function and the value is lost after the function terminates.

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

A constructor is called whenever a new object of that class is made.

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

When there are no arguments passed.

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

In C++, the constructor can be overloaded in that there can be more than one constructor for a class, each having different parameters.

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

Function prototype is a declaration. Function definitions (w/multiple parameters) often require more than one piece of information. to perform their tasks.

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

Header files separate files in which classes are defined and allow the compiler to recognize classes when used elsewhere.

15. What does a function signature include?

it includes the specific information about the function such as input and output variable types and how many of each.

16. What does a function signature include?

it includes the name of the function, and the types of its arguments. it does not specify the function return type. Function in the same scope must have unqiue signatures.

17. What is the scope of global variables?

can be referenced by any function that follows their declarations or definitions in the source file

18. How does the compiler handle inline functions?

instead of calling the function every time it is invoked, the compiler will replace the function call with a copy of the function body

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

Functions can directly modify arguments that are passed by reference.

20. How are overloaded functions differentiated by the compiler?

it looks at the number, types, and order of arguments in the function call

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

Either omitting the base case, or writing the recursion step incorrectly so the it does not reach the base case can cause infinite recursion.

22. What are the similarities between iteration and recursion?

Both involve a termination test. They use a control statement and repition to solve the problem. They can also result in an infinite loop.

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

In a string you can specify with the strlen(arrayname) command. This gets the length of the string. Another way is with integers where you initiate the size from the start, ex array[40] specifying a possible length of up to 40. Then it is passed by an object the actual ammout in the array. Another way is to declare it in an initializing program.

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

The array of characters has a null character \0 at the end of the array to signify the array's end. The string does not have this.

25. How are arrays passed to functions?

by reference

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

A static array has a set size that cannot change. The data may not need all of the space assigned, or could go beyond the size.

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

both

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

Take a number and choose a pivot point and insert the number in the correct position from the pivot point.

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

Find the lowest value and place it in the front of the list and swap it with that value. Continue moving right.

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

Insertion sort will take n-1 operations if the array is in reverse order.

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

A list or array of only 1 element.

32. What is a pointer?

Contains a variable's memory address as a value.

33. What does the address (&) operator return?

memory address of its operand

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

It is unary operator that returns the value of the variable located at the address

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

*(arrayName + index)

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, constant pointer to constant data.

37. What is a function pointer?

It contains the address of the function in memory.

38. What is a linked list?

A linked list is a chain of nodes that each store a single piece of data and pointer variables that point to other nodes in the list.

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

There is no limit as to how many you create where an array can only hold a given amount of information.

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

Arrays have a set list of values. Meaning you can pick a spot in the array such as a[7] picks the 8th spot in the array. With linked lists you have to keep track with pointers if you want to take specific nodes out, otherwise you must traverse the entire list.

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

A function with access to a linked list's head pointer has access to the entire list. Pass the head pointer to a function as a reference argument

42. What is the difference between a circular linked list and a basic linked list?

In a regular linked list the last object points to NULL. In a circular linked list, the last object points back to the beginning of the list

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

You can traverse the list both forward and backwards.

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

not answered

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

Push which inserts an element on the top of the stack and pop which removes the last inserted element from the stack.

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

Create a int value that stores the "head" of the stack. Increment the top when one element is pushed and decrement after it is popped.

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

you implement a stack with a list by changing the pointer to the first element of the list to the new item and move the pointer from the top of the stack to the next item when removing an item.

48. How are infix expressions evaluated by computers?

Infix expressions are interpreted as postfix expressions by implementing stacks.

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

Iterate through the stack, checking the number against the current element.

50. What is a queue?

A queue is a FIFO data structure.

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

enqueue and dequeue

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

Keep track of the front and rear indexes. Either: 1)Dequeue items by shifting the array left 2)Use wrapped configuration

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

A linked list with Stack principles. The Queue's top element is the element that is always being removed first. Must use nodes to contain each element, with a pointer to the top element, which also could be called the head pointer.

54. What is the stack operation corresponding to the enqueue operation in queues?

enqueue corresponds with push dequeue corresponds with pop

55. What is a tree?

a finite set of one or more nodes such that there is a root node and all other nodes are split into trees of lesser value than the root

56. What is a leaf?

A node with no children.

57. What is a binary tree?

A binary tree is a tree in which all nodes have a maximum of two degrees, or can only have two children each.

58. What is a binary search tree?

a tree that is set up so that it can be easily searched for numbers based on the location compared to the previous nodes.

59. What is the inorder traversal of a binary tree?

a traversal that visits the left branch first, then the parent node, then the right branch, recursively.

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

it takes h comparisons, where h is the height of the tree

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

class definitions include the name of the class and type of parameters

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

public and private

63. How are objects initialized when they are created?

by giving them a value

64. What is a function signature?

function name and parameter are called function signature.

65. What is a recursive function?

A recursive function solves a problem by repeatedly calling itself. the initial problem is broken into successively smaller parts until a much simpler base case is reached. the solutions to each piece of the problem are then returned a step at a time.

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

the alternative way to solve a problem that could be solved using recursion is iteration.

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

Values in an array that is not delcared as static will remain constant. When an array is declared const values within the array can be manipulated.

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[]?

the variable of type char[], each character is stored into a different memory address and can be accessed easly, where as in a string of character, its not easy to be able to access each character in the string.

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

smaller parts are easier to compare than comparing the whole, so it divides the problem down in halves until it can easily compare, then works backwards putting it back together to give the solution.

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

Mergesort divides the array into smaller halves and then combines the sorted subarrays into one sorted array.

71. What is a pointer?

variable that contains the memory address of a data object.

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

Big O(h) notation

73. Briefly, how does selection sort work?

selection sort works by pulling all of the values off to the side, leaving one value in the list. It will then insert a value into the list. if the value is bigger it will go to the right, if smaller if will go to the left.

74. What is the advantage of linked lists over arrays?

linked lists do not have a memory constraint other than total memory

75. What is a queue?

A queue is a linear, first-in first-out data structure. Data must be accessed in the same order it was put into the queue, so only the oldest item in the queue is accessible at any time. Main functions defined are enqueue and dequeue.

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

Push() Pop() Full() IsEmpty()

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

to traverse going down to the left then go to the right of last children and back to the top.. kind of like going around the tree

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

You search the tree for the node using recursion. When you find the node, you determine whether it is a leaf or a internal node. If it is a leaf, you just delete it and set the parent pointer to that node to NULL. If it is a node, you replace the node with either of the children nodes.