Instructions: This homework assignment focuses on the basics of C++ strings, searching and sorting. The answers to the following questions can be determined from Chapters 11 through 13 of the lecture notes and sections 3.7 and 13.2 – 13.3 of the text. Assume any #include directives, variable declarations, etc, which are needed to make the given code syntactically correct.

After you have analyzed the questions and decided what answers you believe are correct, you may find it useful to write some short programs to test your logic.

The on-line Opscan form for this quiz provided by the Curator system must be used for this assignment. (No other submissions will be accepted!) Check the course web site for the due date for this quiz.

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For questions 1, 2 and 3, assume the following declarations are in effect:

```cpp
string firstLine  = "A loaf of bread, a jug of wine";
string secondLine = "and thou";
```

and suppose the following statements are executed:

```cpp
cout << firstLine.at(4) << endl;
firstLine = firstLine.insert(0, secondLine);
int HowBig = secondLine.length();
```

1) What is the output of the cout statement??

1) a  
2) o  
3) f  
4) oaf of bread, a jug of wine  
5) af of bread, a jug of wine  
6) f of bread, a jug of wine  
7) none of the above

2) What is now stored in the string firstLine?

1) and thou  
2) A loaf of bread, a jug of wine  
3) A loaf of bread, a jug of wine and thou  
4) and thouA loaf of bread, a jug of wine  
5) none of the above

3) What is the value of the variable HowBig?

1) 0  
2) 30  
3) 8  
4) 31  
5) 9  
6) none of the above
Consider the following array search function:

```c
const int MISSING = -1 ;

int Search(const int values[], int key, int usage) {
    for (int i=0; i < usage; i++)
        if (values[i] == key)
            return i;

    return ( MISSING );
}
```

4) What type of search algorithm is being performed by the above code?

1) linear search  
2) binary search  
3) sentinel search  
4) interpolative search  
5) none of the above

Consider the following array search function:

```c
const int MISSING = -1 ;

int Search(const int values[], int key, int usage) {
    values[usage] = key;
    int i = 0;
    while (values[i] != key) i++;
    if (i != usage)
        return i;
    else
        return ( MISSING );
}
```

5) What type of search algorithm is being performed by the above code?

1) linear search  
2) binary search  
3) sentinel search  
4) interpolative search  
5) none of the above

6) Which of the following search algorithms requires the array to be sorted first?

1) linear search  
2) binary search  
3) sentinel search  
4) interpolative search  
5) none of the above
7) How many different sorted orderings are there for an array of 10 elements?

1) 10  
2) 20  
3) 100  
4) 1000  
5) 1000000  
6) none of the above

8) Which of the following sort algorithms performs the largest number of element swaps?

1) bubble sort  
2) selection sort  
3) quick sort  
4) interpolative sort  
5) none of the above

Consider the following descending array sort function:

```c
void sort(int ray[], int usage) {
    int temp, i, j, c=1;
    for (i = 1;((i < usage) && (c > 0)); i++) {
        j = usage-1, c = 0;
        while (j > i-1) {
            if (ray[j] > ray[j - 1]) {
                tempInt = ray[j];
                ray [j] = ray [j - 1];
                ray [j - 1] = tempInt;
                c++;
            }
            j--;
        }
    }
}
```

9) What type of sort algorithm is being performed by the above code?

1) bubble sort  
2) selection sort  
3) quick sort  
4) interpolative sort  
5) none of the above

10) The quick sort algorithm halts when which of the following conditions becomes true?

1) the array is sorted  
2) the pivot values are all equal  
3) all the partitions are of size 1 or less  
4) the median of a partition cannot be determined  
5) none of the above
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