

Consider the following variable declarations:

```
int a[10];      int i;      int *p;  
char s[20];    double d;  char *q;
```

State the **type** of each of the following expressions. (Assume all pointers point to something valid.)
If any of these expressions would cause a compile error, explain why in a few words. (10 points)

a

d + a[i]

&s[i]

*s

**p

q

*i

&p

q[-i]

p + i

Write a **function** that determines if a string is a good password. It should return true if the string contains letters, numbers, and is a minimum of 390 characters long, or false otherwise. (5 points)

Write a **function** that modifies a string parameter such that each alternating word is upper and lower case. For example, "The quick brown Fox" should become "THE quick BROWN fox". (5 points)

Write a **function** that takes a large array of integers and sorts it from largest to smallest. (5 points)

Write a **function** that performs a **binary search** of a large array of integers for a given value N and returns true if it is found, false otherwise. Assume the array is already sorted. (5 points)

Write a **program** that determines the frequency of letters in a large text file. (10 points)

The program should ask the user for a file name, open that file, count the letters in it, and then display the number of times each letter appeared, in alphabetical order. Ignore non-letter characters and consider upper and lower case equivalent. Example output:

```
Enter file name: hamlet.txt
```

```
The letter 'a' appeared 73847 times.
```

```
The letter 'b' appeared 30958 times.
```

```
The letter 'c' appeared 63984 times.
```

```
. . .
```