1. In the True/False questions if the answer is False, explain why.

(a) (2 pts) The elements of an array are related by the fact that they have the same ____________.

(b) (3 pts) An m-by-n array contains ____________ rows, ____________ columns, and ____________ elements.

(c) (12 pts) For the following, write a single statement that performs the indicated task. Assume the following declarations:

float number1 = 7.3, number2;
char *ptr;
char s1[100], s2[100];

i. Declare the variable fPtr to be a pointer to an object of type float.

ii. Assign the address of variable number1 to pointer variable fPtr.

iii. Print the value of the object pointed to by fPtr.

iv. Assign to the object pointed to by fPtr the value of the variable number2.

v. Print the value of number1.

vi. Assume strings s1 and s2 have been assigned values. Print EQUALS if the string s1 is the same as the string s2.

(d) (2 pts) Structure members are accessed via the ____________ operator in conjunction with an object of the struct type.

(e) (3 pts) Unlike arrays, entire structures of the same type may be compared using the logical operator ==. ____________

(f) (3 pts) It is possible to have arrays of any type including arrays of pointers and arrays of structures. ____________

(g) (3 pts) Like a structure, the declaration of a class creates a new data type but does not create variables of that type. This is done in a separate declaration similar to what is done with a structure. ____________

(h) (2 pts) Members of a class specified as ____________ are accessible only to member functions of the class and friends of the class.

(i) (2 pts) A ____________ function is a special member function used to initialize the data members of a class.

(j) (3 pts) Correct any errors (assuming proper include statements) in the following statements:

```
int k; cin >> k;
double* B = new int[k];
```
(k) (3 pts) Suppose `salary.data` is a file of floats. Correct any errors in the following statements (assuming proper include statements and assuming that the file is opened without any problems).

```cpp
ifstream fin("salary.data");
float nextSalary = 0;
cin >> nextSalary;
```

(l) (4 pts) Consider the function prototype with a call-by-reference parameter

```cpp
void bar(int& a);
```
and the function call

```cpp
int b; bar(b);
```
Rewrite both lines of code, using (i) a single parameter that is called by value in the function prototype and (ii) pointers, to get an effect equivalent to the code above.

2. (18 pts) Consider the following program.

```cpp
#include<iostream.h>

double* test(double A[], int n);

main()
{
    double Number[] = {0.2, 2.2, 13.1, -1.5, 4.6, 7.3};

double *ptr = test(Number,6);

cout << "Test = " << *ptr << endl;
}

double* test(double A[], int n)
{
    double *mAddr = &A[0],
    *endAddr = &A[n];

    for (double *iAddr = &A[1]; iAddr < endAddr; iAddr++)
        if (*iAddr > *mAddr) mAddr = iAddr;

    return mAddr;
}
```

(a) The type of the variable `Number[2]` is ________________________________.

(b) The type of the variable `ptr` is ________________________________.

(c) The type of the variable `endAddr` is ________________________________.

(d) The type of the constant `&A[1]` is ________________________________.
(e) What output is produced by this program?

(f) Give an overall, gestalt description of the task performed by the function `test()`.

3. (15 pts) Write a program that reads strings (until an EOF) and prints each string that begins with the three characters `You`. Assume that each string contains at most 50 characters.

4. (15 pts) Below is a declaration for the structure `Automobile`. Using it, write a function

```c
int countAutos( Automobile A[], int n, Style bs, Year y )
```

that returns a count of the number of automobiles in the array A of \( n \geq 0 \) automobiles that have body style `bs` and year `y`. For example, a call like the following

```c
countAutos( A, 100, CONVERTIBLE, 2003 )
```

would return the number of 2003 convertibles among the 100 cars \( A[0], A[1], \ldots, A[99] \).

```c
enum Make {CHEVROLET, FORD, HONDA, ROLLSROYCE, YUGO};
enum Color {BLUE, RED, SILVER, TEAL, WHITE};
enum Style {CONVERTIBLE, SEDAN, SPORTS, WAGON};

struct Automobile
{
    Make make;
    int year;
    Style body;
    Color clr;
    int doors;
    int licenseNo;
    int cost;
};
```

5. (10 pts) Consider the following program

```c
#include <iostream.h>
#include <string.h>

class BankAcct{
    public:
        BankAcct(char firstN[] = "", char lName[] = "", double bal = 0.0);
        char* getfirstName();

    private:
        char firstName[21];
        char lastName[21];
        double balance;
};

BankAcct::BankAcct(char firstN[], char lastN[], double bal){
    strcpy(firstName, firstN);
    strcpy(lastName, lastN);
```
balance = bal;
}

char* BankAcct::getFirstName(){
  return firstName;
}

Write a main() program that creates

(a) a variable one of type BankAcct with default initialization;
(b) a variable of type BankAcct with name Monica Henzinger and a balance of $500;
(c) a variable three of type BankAcct with name Barry Trager and a balance of $0.00; and then
(d) prints the first name for each account created.

Uses the fewest args possible in declaring the variables.