National University of Computer and Emerging Sciences, Lahore Campus

Course:	Computer Programming	Course Code:	CS103
Program:	BS(Computer Science)	Semester:	Fall 2017
Duration:	60 Minutes	Total Marks:	30
Paper Date:	2-Nov-17	Weight	15%
Section:	ALL	Page(s):	2
Exam:	Midterm-II	Roll No:	

Instruction/Notes: Solve on answer sheet

Question # 1: [Marks: 25 + 5]

Here is defined the class called **Farm** to implement basic operations on agricultural farms. There are maximum five types of crops which can grow on a farm (Barley, Corn, Rice, Sugarcane, and Wheat). A farm will have some area in Acres, cultivated crops and yields of all crops in unit of (Tons).

```
class Farm{
   float Area;    //Stores in Acers
   char *Crops;   //Stores initial character of names of all Crops, which grow on a Farm.
   float *Yield;  //Stores Yield (Tons) of each crop corresponding to crops name stored in Crops array
   int size;      //Size of both arrays
}
```

Part A:

Consider the following driver program. Add all necessary methods to this class, so that driver program works properly, without any compile, run time or logical errors. Specifically: provide the necessary constructors and operators. Read the comments in the driver program to get a hint that how the methods work. Do not add useless getter /setters unless or until they are required.

```
int main(){
    char * crops[3] = {'R','S','W'};
    Farm F1(4.6, crops, Null, 3);  //Create farm of area 4.6 Acres with three crops (Rice, Sugarcane, Wheat) and set yield of all crops to 0.

    char * carr[4] = {'B','C', 'R','W'};
    float * yield[4] = {50.4, 34.89, 234.8, 90.67};

    Farm F2(8.5, carr, yield, 4);  //Create farm of area 8 Acres with four crops (Barley, Corn, Rice, Wheat) and yield of all crops will be set correspondingly.

    F2 = F2 + 5;  //increment yield of all crops by 5% of their existing yields

    Farm F3 = F1 + F2;  //Sum the Area of both farms and also sum the yield of those crops which are present in both farms, but if some crops are missing in one farm add that crop in resultant Farm, e.g. Sugarcane is missing in F2 but it will become part of resultant Farm.

    F1 = F3;          //check carefully for memory allocation and deallocation.
    F1 = F1 - 'C';    //Remove the crop of Corn and its yield from farm F1.
                      //Must update arrays correspondingly.
```

```
    cout<< F2 << F3 << F1+6;  //Prints data of farm including Area, Complete crops names and their corresponding yield.
    return 0;
}
```

Part B:

Fill the Table below with exact sequence of all functions called during the main program execution of following lines of code.

Code	Functions Called
`Farm F3 = F1 + F2;`	
`F1 + 5;`	
`cout<<F2<<F3<<F1+6;`	