Homework 3

1) Which of the following two ways of declaring a structure and variable is correct:

<table>
<thead>
<tr>
<th>(i) struct PayInformation</th>
</tr>
</thead>
<tbody>
<tr>
<td>{</td>
</tr>
<tr>
<td>float pay;</td>
</tr>
<tr>
<td>float benefits;</td>
</tr>
<tr>
<td>float deductions;</td>
</tr>
<tr>
<td>}</td>
</tr>
<tr>
<td>struct Employee</td>
</tr>
<tr>
<td>{</td>
</tr>
<tr>
<td>string name;</td>
</tr>
<tr>
<td>PayInformation payInfo;</td>
</tr>
<tr>
<td>}</td>
</tr>
<tr>
<td>Employee emp;</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(ii) struct Employee</th>
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<tbody>
<tr>
<td>{</td>
</tr>
<tr>
<td>string name;</td>
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<td>float pay;</td>
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<td>float deductions;</td>
</tr>
<tr>
<td>}</td>
</tr>
<tr>
<td>Employee emp;</td>
</tr>
</tbody>
</table>

a) (i) is correct, but (ii) is not.
b) both (i) and (ii) are correct.
c) both are correct, but (i) is more memory efficient.
d) (ii) is correct, but (i) is not.

2) In solution (i) to question 1 above, which of the following is the correct way to access the data stored in pay?

a) Employee.payInfo.pay
b) Employee.PayInformation.pay
c) emp.payInfo.pay
d) emp.PayInformation.pay
e) emp.pay.

3) Is the following way of declaring a struct variable student valid?

```c
struct studentInfo
{
    string name;
    float GPA;
} student;
```

a) Yes
b) No
c) Maybe – it depends on the compiler.
4) For the following array declaration, which of the following accesses to elements in the array are valid?

```
int studentArray[100];
```

a) studentArray[0]  
b) studentArray[100]  
c) studentArray[50]  
d) a, b, and c  
e) both a and c

5) Which of the following are valid parameter passing mechanisms for arrays?

a) pass by value  
b) pass by reference  
c) a and b  
d) None of the above

6) What is the difference between a two-dimensional array and two parallel arrays?

a) A two-dimensional array is used to represent a grid structure whereas two parallel arrays consist of two 1-dimensional arrays that are related to each other semantically  
b) Both are the same, they are just different terminology for the same thing.  
c) A two-dimensional array must contain the same data type in all of its elements, whereas each parallel array could contain a different type  
d) Both a and c  
e) None of the above

7) Which of the following is the correct function prototype for a function that accepts a 2-dimensional integer array that is of size array[3][3]?

a) `void func(int array[][3]);`  
b) `void func(int array[3][]);`  
c) `void func(int array[][3]);`  
d) `void func(int array[]);`
The next three questions use the following definitions:

```c
struct studentInfo {
    string firstName;
    string lastName;
    int projectMarks[5];
    int hwMarks[4];
};
studentInfo student[50];
```

8) In order to search for a student whose first name is "John", which of the following algorithms should I use?

a) for (int i=0; i<MAX_STUDENTS; i++)
   if (student[i].firstName == "John")
       cout << "Student is enrolled" << endl;
       cout << "Student is not enrolled" << endl;

b) bool flag = false;
   for (int i=0; i<MAX_STUDENTS; i++)
      if (student[i].firstName == "John")
      {
         cout << "Student is enrolled" << endl;
         flag = true;
      }
   if (flag == false)
      cout << "Student is not enrolled" << endl;

c) for (int i=0; i<MAX_STUDENTS; i++)
   {
      bool flag = false;
      if (student[i].firstName == "John")
      {
         cout << "Student is enrolled" << endl;
         flag = true;
      }
   }
   if (flag == false)
      cout << "Student is not enrolled" << endl;

d) All of the above
9) Which code will access the 4th project marks of the 45th student in the class?
   a) student[45].projectMarks[3]
   b) student[44].projectMarks[3]
   c) student[44].projectMarks[4]
   d) studentInfo[44].projectMarks[3]

10) What term is the best way to describe student above?
   a) An array of structures
   b) A structure containing arrays
   c) An array of structures that has other arrays as elements of the structure
   d) An array of an array of structures