“Introduction to C++ Programming” Online Course

Final Exam (100 points possible)

Indicate True/False (1 point each)

___ 1. A function prototype is strictly optional.

___ 2. Good programming practice dictates that we supply parameter names along with the data types in a function prototype.

___ 3. If age is defined to be a char, then the following can be used to input a person’s age.
   
   cin >> age;

___ 4. If grade is a char and is input with an extraction operator, then we can do the following
   
   switch (grade) {

___ 5. If we are switching on grade as defined above, then a valid case statement is
   
   case A:

___ 6. Assume that we have defined the following enum.
   
   enum DeptNo {Accounting = 10, Automotive, Appliances = 42};
   
   Then, the following is correct?
   
   DeptNo acct = 10;

___ 7. Based on the above enum, the following is correct?
   
   DeptNo auto = Automotive;

___ 8. Based on the above enum, the value of Automotive is 11.

___ 9. Based on the above enum, the following is valid.
   
   DeptNo auto = Automotive
   
   cout << auto;

___ 10. Based on the above enum, the following prototype is valid.
   
   DeptNo Lookup (DeptNo array[], int num, int findThis);
Multiple Choice (2 points each)

Assume the `qty` is defined as follows, that a `long` uses 4 bytes of memory, and that the first byte of the array begins at memory address 100.

```c
long int qty[10] = {11, 22, 33, 44, 55, 66, 77, 88, 99, 110}
```

1. What is the value of `qty`?
   A. 22  
   B. 11  
   C. 10  
   D. 100 
   E. none of these

2. What is the value of `qty[0]`?
   A. 22  
   B. 11  
   C. 10  
   D. 100 
   E. none of these

3. What is the value of `qty[1]`?
   A. 12  
   B. 22  
   C. 101 
   D. 104 
   E. none of these

Assume the array `letters` is defined as follows:

```c
char letters[6] = "ABCDE";
```

4. Which pair of statements will produce this output: **ABCDEABCDE**
   A. `cout << letters << letters;`
   B. `cout << setw(5) << letters << setw(5) << letters;`
   C. both of these
   D. none of these

5. Which statement will produce this output: **A**
   A. `cout << letters;`
   B. `cout << letters[0];`
   C. both of these
   D. none of these
6. Which statement will produce this output: **ABC**
   A. cout << letters;
   B. cout << setw(3) << letters;
   C. both of these
   D. none of these

7. Which statement will produce this output: **E**
   A. cout.put(letters[4]);
   B. cout << letters[4];
   C. both of these
   D. none of these

8. Assume the following definitions.
   ```
   char prodName[21], oldProdName[21];
   ```
   Assume that **prodName** has been input, which statement would correctly copy its contents into **oldProdName**?
   A. oldProdName = prodName;
   B. strcpy (oldProdName, prodName);
   C. none of these
   D. all of these
   E. none of these

9. Assume that both **prodName** and **oldProdName** were correctly assigned values as given above, which statement would correctly compare the two values?
   A. if (strcmp (oldProdName, prodName) == 0)
   B. if (oldProdName == prodName)
   C. both A and B
   D. none of these
Assume that array `tally` is defined as follows:

```c
int tally[3][4] = {{10,20,30,40},
                  {50,60,70,80},
                  {90,100,110,120}};
```

Assume that the array begins at memory address 200 and that an `int` occupies 2 bytes.

10. What is the value of `tally[1][2]`?
   A. 30
   B. 40
   C. 70
   D. 80
   E. none of these

11. What is the value of `tally[2][1]`?
    A. 80
    B. 70
    C. 100
    D. 110
    E. none of these

12. The array `tally` is to be passed to a function called `Sum`. What is the correct prototype?
    A. int Sum (int tally);
    B. int Sum (int tally[]);
    C. int Sum (int tally[][]);
    D. int Sum (int tally[][4]);
Short Coding Questions (2 points each)

Assume the following definitions.

```c
struct EMPLOYEE {
  long idNumber;
  char firstName[21];
  char lastName[31];
  char payType;
  double rate;
};
```

```c
EMPLOYEE emp1;
EMPLOYEE emp2;
```

1. Copy emp1's first name into emp2.

2. Copy emp2’s pay type into emp1.

3. Copy “Smith” into emp1’s last name.

4. Place an ‘h’ into emp2’s pay type.

5. Make emp1's pay rate the same as emp2's pay rate.

6. Write a prototype for an `InputEmployee` function whose task is to input a set of employee data from the passed input stream.

7. Write a prototype for a function that is to output an employee record to a file. Call it `OutputEmployee`.
Longer coding questions (5 points each)

Assume the following input set of data:

<table>
<thead>
<tr>
<th>id</th>
<th>name</th>
<th>qty</th>
<th>cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>123</td>
<td>pots, pans, and mats</td>
<td>5</td>
<td>1.23</td>
</tr>
<tr>
<td>123</td>
<td>plates</td>
<td>1114</td>
<td>1023.53</td>
</tr>
</tbody>
</table>

where cols 4 and 5 are blanks, the product could be 20 characters long, and the quantity begins in col 26. Assume the following definitions.

```cpp
int id;
char descr[21];
int qty;
double cost;
```

1. Write a set of `cin` statement(s) that could input a set of data.

2. Write a set of `cout` statement(s) that would produce a line of data that looks like the above lines.

3. Write a structure definition called `WeatherRec` that contains the rain fall, high and low temperatures for the day, the dew point, and wind speed. Each of these data members should be a float.

4. Write a function called `LoadWeatherRecs` that inputs all of the data into the passed array, returning the number of records in the array. In case of errors, display an appropriate error message on `cerr` and exit the program.

```cpp
int LoadWeatherRecs (istream& infile, WeatherRec array[], int maxRecs) {
```

}
Write the complete program to solve the following problem. (30 points)

Write a program to calculate test score results. The input consists of a file of student id numbers and their raw scores. Both are integer data. First, call a function (LoadArrays) to load an array of ids and scores, returning the number in the array. If errors occur, display an appropriate error message to cerr and exit the program. Allow for a maximum of 100 students. Then write a function called FindMaxMin that is passed the array of scores and the number in it. It must find and return the highest and lowest scores in the array. Then write a function CalcAvg that returns the average score which should be a double. Finally, main displays this line

Number: nnn Highest: nnn Lowest: nnn Average: nnn.nn