Midterm Exam – Chapters 9, 10, 11, & 13

120 min, 100 points, closed book, closed notes. However, you may use one 8 ½ x 11 inch hand written notes sheet.

1. (15 points) Chapter 9: **POINTERS** // See next pages
   a. Pointers to pointers
   b. Array of Pointers

2. (20 points) Chapter 10: **Strings**
   a. C-strings
   b. String objects
      a. 10.7 – 10.10, page 569 // 10.8
      b. 10.16 page 580
      c. 3, 4, 5 page 592
      d. 27, 28, 29 page 593
      e. 43. 45, 46 page 594

3. (20 points) Chapter 11: **STRUCTURES** // skip 11.11 Unions
   // skip 11.12 Enumerations
   a. 11.1 – 11.3, page 610;
      11.4 – 11.10, page 616
      11.11 – 11.14, page 627 // 11.3 or 11.5 or 11.13
   b. 1 – 8 page 645 // 6
   c. 13 – 24, page 640 // 24
   d. 25 – 30, page 646 // 28
   e. 36 – 50, 57 –66, page 648 // 48 or 66

4. (15 points) Chapter 13: **CLASSES**
   a. 13.1 – 13.5, page 735 // 10.5
      13.6 – 13.11, page 745 // 13.10
   b. 1 – 9, page 797; // 2
   c. 51 – 59, page 800
   d. 43, page 799
   e. 73 – 75, page 801 // 75

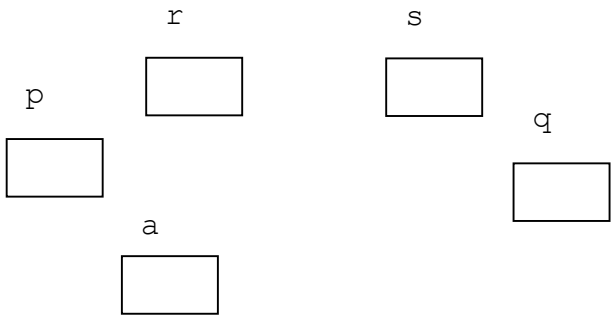
5. (30 points) **Write a function**, such as 11, page 546
OR process an array of structures (such as 6, page 652: write a function to calculate the total points earned by the team, or display the player(s) with the most points)
// See 5D.

1. What is the type of the following expressions?

```
int   num = 10;
int  *p = &num;
int **q = &p;

      a)  &num   //                b)  *p     //
c)  **q    //                d)  &q     //
e)  q      //                f)  *q     //
```

2. In the following program fragment show the configuration of the variables and the output.

```
int  a = 15;
int  *p, *q;
int  **r, **s;

p  = &a;
q  = new int;
*q = 20;
r  = &p;
s  = &q;
cout << *p << " " << **s << " " << **r;
```



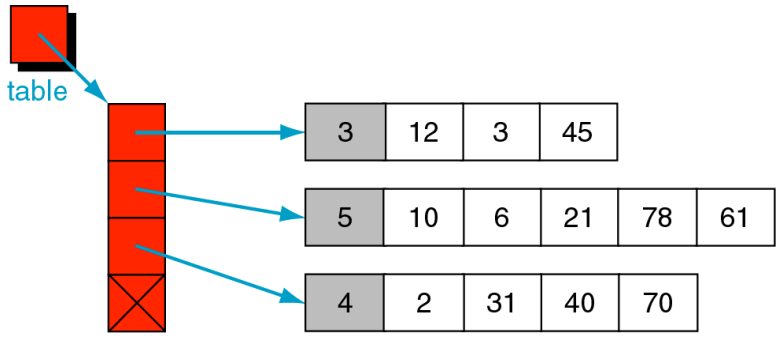
3. Given the following definitions and function calls, write the prototype declarations to match the calling statements. **`funA()`** and **`funB()`** are void functions.

```
int  a = 3, list[10] = {12, 13, 11, 20};
int *p = &list[2];
char x = 'A';
int **ptr;

funA( *p, a );
funB( &x, p, &a );
ptr = funC( list + 1, 3 );
```

4. What is the output?

```
int  a[5] = {10, 20, 30, 40, 50};
int *p[6] = {a + 4, a, a + 2, a + 3, a + 1, NULL};

for (int i = 0 ; p[i] != NULL; i++)
    cout << *p[i] << " ";
```

5. Given the ragged 2D array below,



(A) Write code to print 12 and 31 (use index notation).

(B) Write a for loop (use index notation) to calculate the sum of the numbers in the second row (i.e. 10 + 6 + 21 + 78 + 61); the first number in the list, 5, represents the number of integers stored in the list, except the size.

(C) Write a function to calculate the sum of the numbers in the entire table (except the size).

(D) Write a function that creates and returns an array of pointers. At index 0 the array will store a pointer to the largest element in row 0, at index 1 – a pointer to the larges element in row1, and so on. If there are two or more elements that have the same largest value, choose one of them.

6. The following function swaps two book structures. Rewrite this function (make it shorter).

```
void swap ( Book &a, Book &b )
{
    Book temp;

    temp.ISBN = a.ISBN;
    a.ISBN    = b.ISBN;
    b.ISBN    = temp.ISBN;

    temp.author = a.author;
    a.author    = b.author;
    b.author    = temp.author;

    temp.year = a.year;
    a.year    = b.year;
    b.year    = temp.year;
}
```