CPS 5401 Fall 2015 Name ___________________________________
Homework 1
Due Tuesday, September 22

C Exercises

1. The intent of the function swap shown below is to switch the values stored in the variables passed in as arguments. Does the function work as intended (try the program and see)? If not, fix the program so that it works as intended and turn in a correct version.

```
void swap(int a, int b) {
  int tmp = a;
  a = b;
  b = tmp;
}

int main()
{
   int a = 1;
   int b = 2;
   printf("before swap a = %d\n", a);
   printf("before swap b = %d\n", b);
   swap(a, b);
   printf("after swap a = %d\n", a);
   printf("after swap b = %d\n", b);
}
```

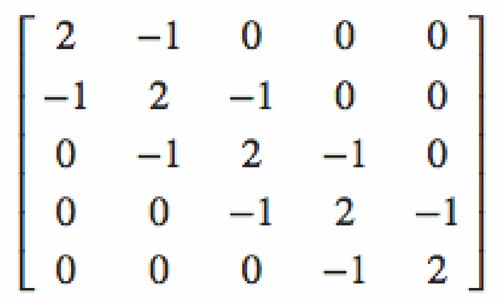
2. The intent of the function swap below is to switch the x and y values in the point structure. Does the function work as intended. If not, fix the program so that it works as intended and turn in a correct version.

```
struct point {
  int x;
  int y;
  float val;
};

void swapxy(struct point input) {
   int tmp = input.x;
   input.x = input.y;
   input.y = tmp;
}

int main()
{
   struct point p;
   p.x = 1;
   p.y = 2;
   printf("before swap p.x = %d\n", p.x);
   printf("before swap p.y = %d\n", p.y);
   swapxy(p);
   printf("after swap p.x = %d\n", p.x);
   printf("after swap p.y = %d\n", p.y);
}
```

3. Write a program to read in the dimension n and create an nxn matrix of the form shown below for n = 5 and then output the matrix. (n = 5 is just an example; your program should work for arbitrary n). Use calloc to dynamically allocate the space for the matrix. You may use either integers or real numbers for the matrix elements.



$$\begin{bmatrix} 2 & -1 & 0 & 0 & 0 \\ -1 & 2 & -1 & 0 & 0 \\ 0 & -1 & 2 & -1 & 0 \\ 0 & 0 & -1 & 2 & -1 \\ 0 & 0 & 0 & -1 & 2 \end{bmatrix}$$