Assignment 2 (Part I)
Due: 11:59pm Sept. 28 (Tuesday)

This assignment is done individually or by a group of two students. Each group please submits only ONE copy of the assignment.

PART I (weight: 8%):

1. [25 points] Draw an automaton that accepts the regular expression **(a|b)(c^+d?)**

2. [25 points] (1) Draw the symbol table for the following C program at point 1 using static scoping. (2) What does the program print using static scoping? (3) What does the program print using dynamic scoping?

```
#include <stdio.h>

int a, b ;

int p(void)
{ int a, c ;
  a = 2 ; b = 3 ; c = 2 ;
  return c;
}

void print(void)
{  print(%d\n%d\n , a,b); }

void q(void)
{ int b ;
  /* point 1 */
  a = 4 ; b = 5 ;
  print() ;
}

main()
{ a = p() ;
   q() ;
}
```

3. [25 points] Given the following C program

(1) #include <stdio.h>	(8) printf("%d\n", z);
(2) main()	(9) *y = z;
(3) { int z; int** x; int* y;	(10) **x = 7;
(4) x = (int **) malloc(sizeof(int*));	(11) *x = y;
(5) *x = &z;	(12) printf("%d\n", z);
(6) **x = 4;	(13) *y = 1;
(7) y = (int *) malloc(sizeof(int));	(14) printf("%d\n", z); }

(1) (19 points) Draw **box and circle diagrams** of the variables after line **11 (before executing line 12).**

(2) (6 points) What's the output of the program?

4. [25 points] Give the output of the following program using (1) **call-by-reference;** (2) **call-by-name**.

```
int i, a[3];
void f (int x, int y){ x = (x*y) mod 3; y = y – x;}
main(){ i = 0; a[0] = 1; a[1] = 2; a[2] = 0;
        f(i, a[i]); print("%d %d %d %d\n", i, a[0], a[1], a[2]);
        f(a[i], a[i]); print("%d %d %d\n", a[0], a[1], a[2]);
}
```

PART I Submission Guideline :

You need to submit assignment2.pdf, which contains (1) solutions to Problems 1 – 4 and, (2) name and email address of group members, electronically using brightspace.binghamton.edu.