.....Student Name:..... .... NID:.....

COP 3223 Sec 1: Fall '13 C Programming Prac Test 3 (50 points)

1. (8 points)
   Write the output for the following program. Assume input is aBcD!0
   Use this scale below if it is useful to you.

```
0  1  2  3  4  5  6  7  8  9  10  11  12  13  14  15  16  17  18  19 20 21 22 23 24 25
A  B  C  D  E  F  G  H  I  J   K   L   M   N   O   P   Q   R   S   T  U  V  W  X  Y  Z
```

```
                                                  WRITE YOUR OUTPUT HERE
                                                 |
                                    Out Line 1   |
                                                 |
                                                 |
                                    Out Line 2   |
```

```
#include <stdio.h>
#include <ctype.h>
int main() {
  char c;
  while ((c = getchar()) != '0') {
    if (isupper(c))
       putchar(('A' + 15-(c-'A')));
    else if (islower(c))
       putchar(('a' + 5 +(c-'a')) );
    else
       putchar(c);
  }
  return 0;
}
```

2. (15 points) Write down what the printed output of this program is:

```
#include <stdio.h>
int f1(int *a, int b);
int f2(int a, int *b);
int main(void) {
  int a=5, b=2, c=7, d=9;
  c = f1(&d, a);
  printf("a=%d b=%d c=%d d=%d\n",a,b,c,d);
  a = f2(c-d, &a);
  printf("a=%d b=%d c=%d d=%d\n",a,b,c,d);
  b = f1(&c, 8);
  printf("a=%d b=%d c=%d d=%d\n",a,b,c,d);
  d = f2(b, &a);
  printf("a=%d b=%d c=%d d=%d\n",a,b,c,d);
  return 0;
}
int f1(int *a, int b) {
  *a = b -8;
  b = b*2 - (*a);
  printf("In f1: a=%d b=%d\n", *a, b);
  return b - *a;
}
int f2(int a, int *b) {
  a = *b+a;
  *b = 37 - *b;
  printf("In f2: a=%d b=%d\n", a, *b);
  return a;
}

Answers q1:
fOhM!
```

3. (10 points)
Write down what the printed output of this program is:

```
                                                    WRITE YOUR OUTPUT HERE
                                                   ------------------------
                                                   |
                                  Out Line 1       |
                                                   |
                                                   |
                                  Out Line 2       |
```

```
1.   #include <stdio.h>
2.   int f(int c, int b, int a);
3.
4.   int main() {
5.
6.     int a = 2, b = 3, c=5;
7.     printf("a=%d b=%d c=%d\n", a, b, c);
8.
9.     a = f(b, a, b+c);
10.    printf("a=%d b=%d c=%d\n", a, b, c);
11.
12.    return 0;
13.  }
14.
15.  int f(int c, int b, int a) {
16.
17.    int sum;
18.    sum = a + b + c;
19.    if (sum > a*c)
20.      return a*c;
21.    if (sum <= b*c)
22.      return b*c;
23.
24.    return a*b;
25.   }
```

4. (12 points) Write down what the printed output of this program is:

```
#include <stdio.h>
int f1(int *a, int c);
int main(void) {
  int a=2, b=3, c=4, d=5;
  a = f1(&c, b);
  printf("a= %d b= %d c= %d d= %d\n",a,b,c,d);
  return 0;
}
int f1(int *a, int c) {
  *a = c - 2;
  c = c*2 - (*a);
  printf("a= %d c= %d\n", *a, c);
  return c - *a;
}
```

THIS OUTPUT WILL BE GRADED

Out Line 1 |

Out Line 2 |

Out Line 3 |

5. (14 points) Write down what the printed output of this program is:

```
#include <stdio.h>
int f1(int *a, int c);
int main(void) {
  int a=2, b=3, c=4, d=5;
  a = f1(&c, f(&b,d));
  printf("a= %d b= %d c= %d d= %d\n",a,b,c,d);
  return 0;
}
int f1(int *a, int c) {
  *a = c - 2;
  c = c*2 - (*a);
  printf("a= %d c= %d\n", *a, c);
  return c - *a;
}
```

THIS OUTPUT WILL BE GRADED

Out Line 1 |

Out Line 2 |

Out Line 3 |

6. (11 points)
Write down what the printed output of this program is:

ONLY THIS OUTPUT WILL BE GRADED

Out Line 1

Out Line 2

Out Line 3

```
1.      #include <stdio.h>
2.      int f(int c, int b, int a);

3.      int main() {

4.           int a = 1, b = 2, c=2;

5.           a = f(b,  f(a, c, b+c), a+c);

6.           printf("a=%d b=%d c=%d\n", a, b, c);

7.           return 0;
8.      }

9.      int f(int c, int b, int a) {

10.       int sum;
11.       b = a + c;
12.       sum = a + b + c;
13.       printf("a=%d b=%d c=%d\n", a, b, c);
14.       if (sum > a*c)
15.         return a*c;
16.       if (sum <= b*c)
17.         return b*c;
18.       return a*b;
19.      }
```

7. (15 points)
Write down what the printed output of this program is:

```
#include <stdio.h>
int f(int *a, int c, int b);
int main(void) {
  int a=1, b=3, c=2;
  a =   f(&c, f(&b,a,c),a);
  printf("a= %d b= %d c= %d\n",a,b,c);
  return 0;
}

int f(int *a, int c, int b) {
  *a = *a - 1;
  c = c*2 + (*a);
  b = b - 1;
  printf("a= %d, b= %d, c= %d\n", *a, b, c);
  return c - *a + 1;
}
```

ONLY THIS OUTPUT WILL BE GRADED

Out Line 1 |

Out Line 2 |

Out Line 3 |

8. (14 points) Write down what the printed output of this program is:

```
#include <stdio.h>
#include <ctype.h>
int main() {
  char first[30], last[30];
  char wholename[60];
  scanf("%s", first);
  scanf("%s", last);
  if (strcmp(first, last) < 0)
    printf("Your first name comes first alphabetically.\n");
  else if (strcmp(first, last) == 0)
    printf("You're weird.\n");
  else
    printf("Your last name comes first alphabetically.\n");
  printf("first = %s, last = %s\n", first, last);
  strcat(first, last);
  printf("first = %s, last = %s\n", first, last);
  strcpy(wholename, first);
  printf("first = %s, wholename = %s\n", first, wholename);
  printf("Your whole name is %d characters.\n", strlen(wholename));
  return 0;
}
```

```
THIS OUTPUT WILL BE GRADED
          |
Out Line 1|
          |
          |
Out Line 2|
          |
          |
Out Line 3|
          |
          |
Out Line 4|
          |
          |
Out Line 5|
```

9. (15 points) Suppose the main function is written in a manner with which we are already familiar, what are the values written out by writeoutpic? The values of numRows and numCols are each 3. Assume that all the global declarations and definitions are as in your Assignment 4. The picture being read in has the values:

```
3  4  2
1  3  2
8  4  2
```

```
                                    WRITE YOUR OUTPUT HERE
                                   ------------------------
                                   |
                                   |
                                   |
                                   |
                                   |
                                   |
                                   |
                                   |
```

```
int main()
{
        char fileName[BUFFER_SIZE];
        int i,j,rows,cols;
        char ci;
        printf("Enter image filename: ");
        scanf("%s", fileName);
        img = readpic(fileName);
        printf("Successfully read image file '%s'\n", fileName);
        changepixels(img);
        printf("Enter image filename for output: ");
        scanf("%s", fileName);
        writeoutpic(fileName,img);
        free(img);
        img = NULL;
        return(EXIT_SUCCESS);
}
void changepixels(int** imgtemp)
{
        int i,j;
        for (i=0;i<numRows;i++)
        { for (j=0;j<numCols;j++)
                {
                  imgtemp[i][j] += (i - j);
                }
        }
}
```

10. (10 points) Suppose all is as in question above. what are the values written out by writeoutpic, if changepixels is defined as:

WRITE YOUR OUTPUT HERE

```
void changepixels(int** imgtemp)
{
        int i,j;
        for (i=0;i<numRows;i++)
               imgtemp[i][ numCols/2] = 255;
        for (j=0;j<numCols;j++)
               imgtemp[ numRows/2][j] = 255;
}
```

11. (10 points) Suppose all is as in question above. what are the values written out by writeout pic, if changepixels is defined as:

WRITE YOUR OUTPUT HERE

```
void changepixels(int** imgtemp)
{
        int i,j;
        for (i=0;i<numRows;i++)
        { for (j=0;j<(numCols/2);j++)
                {
                  pic [i][numCols/2 + j] = pic [i][j];
                }
        }
}
```

12. (10 points) Suppose all is as in question above. what are the values written out by writeout pic, if changepixels is defined as:

WRITE YOUR OUTPUT HERE

```
void changepixels(int** imgtemp)
{
        int i,j;
        for (i=0;i<numRows;i++)
        { for (j=0;j<(numCols/2);j++)
                {
                  pic [i][numCols/2 + j] = pic [j][i];
                }
        }
}
```

13. (10 points) Suppose all is as in question above. what are the values written out by writeout pic, if changepixels is defined as:

WRITE YOUR OUTPUT HERE

```
void changepixels(int** imgtemp)
{
    int i,j;
    for (i=numRows-1;i>0;i--)
     ( for (j=0;j<numCols;j++)
        {
          imgtemp[i - numCols/2][j] = imgtemp[i][numCols -j -1];
        }
     }
}
```

14. (5 points)
Write the output for the following program. Assume input is Eb*C9
Use this scale below if it is useful to you.

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

ONLY THIS OUTPUT WILL BE GRADED

Out Line 1

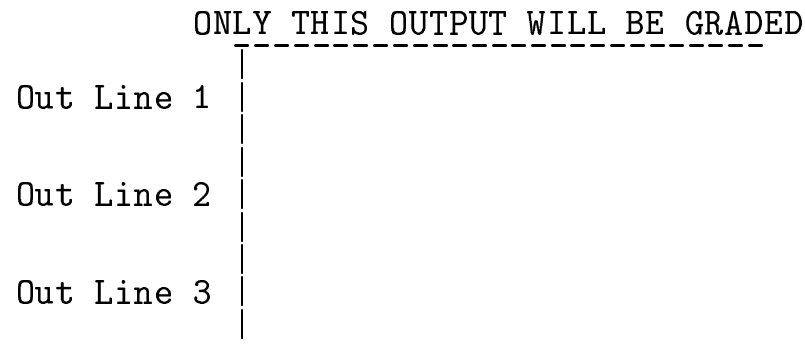
Out Line 2

```
#include <stdio.h>
#include <ctype.h>
int main() {
  char c;
  while ((c = getchar()) != '9') {

    if (isupper(c))

      putchar(('g' + 5-(c-'A')));

    else if (islower(c))
```

```
        putchar(('P' + 1 +(c-'a')) );
      else
        putchar(c);
    }
    return 0;
}
```

Student Name (ALL CAPS):..... P/NID:.....

15. (12 points)
Write down what the printed output of this program is:




```
1.      #include <stdio.h>
2.      int f(int a, int d, int b, int c);

3.      int main() {

4.           int a = 1, b = 3, c=2, d=4;

5.           a = f(d, a, f(a, c, b+c, d), a+c);

6.           printf("a=%d b=%d c=%d d=%d\n", a, b, c, d);

7.           return 0;
8.      }


9.      int f(int a, int d, int b, int c) {

10.       int sum;
11.       b = a + c;
12.       sum = b - c;
13.       d = sum + d;
14.       printf("a=%d b=%d c=%d d=%d\n", a, b, c, d);
15.       if (sum > a*c)
16.         return a*c;
17.       if (sum <= b*c)
18.         return  sum+a;
19.       return a*b;
20.      }
```

Student Name (ALL CAPS):..... P/NID:.....

16. (16 points)
Write down what the printed output of this program is:

```
#include <stdio.h>
int f(int *d, int c, int b, int *a);
int main(void) {
  int a=1, b=3, c=2, d=4, e=5;
  e =   f(&a, f(&b,a,e,&c),e,&d);
  printf("a= %d b= %d c= %d d= %d e= %d\n",a,b,c,d,e);
  return 0;
}

int f(int *d, int c, int b, int *a) {
  *a = *a + 1;
  c = c + (*a);
  b = b + c;
  *d = *a + 2;
  printf("a= %d, b= %d, c= %d d=%d\n", *a, b, c, *d);
  return *d - *a + 2;
}
```

ONLY THIS OUTPUT WILL BE GRADED

```
Out Line 1 |
           |
           |
Out Line 2 |
           |
           |
Out Line 3 |
           |
           |
```

Student Name (ALL CAPS):..... P/NID:.....

17. (17 points)
Suppose the main function is written in a manner with which we are already familiar, what are the 9 values written out by the function writeoutpic? The global values of numRows and numCols are each 3. Assume that all the global declarations and definitions are as in your Assignment 4. (TRACE THIS VERY CAREFULLY!!) The input picture (which has 3 rows and 3 columns) being read in, has the values:

5 4 1
6 2 7
3 9 8

ONLY THIS OUTPUT WILL BE GRADED

```
int main()
{
    char fileName[BUFFER_SIZE];
    int i,j,rows,cols;
    char ci;
    printf("Enter image filename: ");
    scanf("%s", fileName);
    img = readpic(fileName);
    printf("Successfully read image file '%s'\n", fileName);
    changepixels(img);
    printf("Enter image filename for output: ");
    scanf("%s", fileName);
    writeoutpic(fileName,img);
    free(img);
    img = NULL;
    return(EXIT_SUCCESS);
}

void changepixels(int** imgtemp)
{
    int i,j;
    for (i=numRows-1;i>0;i--)
     ( for (j=0;j<numCols;j++)
        {
          imgtemp[i][numCols -j -1] = imgtemp[i - numCols/2][j];
        }
     }
}
```