Engineering 12 - Spring, 2000

1. (18 points) What will be displayed by the following program? Pay attention to formatting in the printf statement.

```
#include<stdio.h>
#include<math.h>
main()
{ /* begin main */

   int  a = 3, b = 2, c = 4, d = 7, e, f, g;
   double  alfa = 2.0, beta = 4.0, gamma = 5.0, delta, epsilon, theta;

   delta = (d/sqrt(c));
   e = d%c;
   epsilon = (b+c) + (gamma*beta/alfa)*b;
   theta = pow(c,b)/beta;
   beta = a/b;
   f = ((a*d)/b)*alfa;
   g = a/b*c+d;

   printf( "\ndelta = %.2f \ne = %d \nepsilon = %.1f"
      "\ntheta = %.3f\nbeta = %f \nf = %d\ng =%d ", delta, e, epsilon, theta, beta, f, g);

} /* end main */
```

delta =

e =

epsilon =

theta =

beta =

f =

g =

2. (20 Points) A data file **a:\data.txt** contains three integer values, each on its own line. Write a C program that will read the three numbers from the file **a:\data.txt**, and write their average to a new file called **a:\result.txt**:

```
#include <stdio.h>

void main(void)
{
```

3 (24 Points) Consider the following program.

```
#include<stdio.h>                                          //01
                                                          //02
/* function prototypes  */                                //03
int  multij( int j, int i );                              //04
                                                          //05
int main()                                                //06
{ /* begin main      */                                   //07
  /* variable declaration  */                             //08
    int  i, j = 4;                                        //09
                                                          //10
  /* get i from user  */                                  //11
    printf( "Please enter an integer ==> " );             //12
    scanf( "%d", &i );                                    //13
                                                          //14
  /* i even or odd actions        */                     //15
    printf( "\n\n i = %d  j = %d ", i, j );               //16
    switch( i%2 ) { // start switch..case                 //17
      case 0:  i = multij( i, j );                        //18
      break;                                              //19
      case 1:  j = multij( j, i );                        //20
    } /* end switch..case      */                        //21
    printf( "\n i = %d  j = %d ", i, j );                 //22
                                                          //23
    return( 0 );                                          //24
} /* end main      */                                     //25
                                                          //26
//*************************************                  //27
                                                          //28
int  multij( int i, int j )                               //29
{/* begin multij        */                               //30
    j = i*j;                                              //31
    i = 6;                                                //32
    printf( "\n i = %d  j = %d ", i, j );                 //33
    return( i );                                          //34
}                                                         //35
/* end multij     */
```

(a) (12 Points) What will be displayed by the **printf** statements on lines 16, 33, and 22 if the user enters 4 at the prompt?

printf (line 16): i = _____ j = _____
printf (line 33): i = _____ j = _____
printf (line 22): i = _____ j = _____

(b) (12 Points) What will be displayed by the **printf** statements on lines 16, 33, and 22 if the user enters 3 at the prompt?

printf (line 16): i = _____ j = _____
printf (line 33): i = _____ j = _____
printf (line 22): i = _____ j = _____

4) (18 Points) Please write down the output that will be generated by the two printf statements in the C program listed below.

```
#include <stdio.h>

int SomeFunction(int *m, int n);

int main(void)
{
        int *a, b=1, c=2, d=3, *e;
        a=&d;
        e=&c;
        *a=1;

        printf(" *e=%d  c=%d d= %d \n",*e,c,d);

        b=SomeFunction(&c,d);

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

        return 0;
}

int SomeFunction(int *m, int n)
{
        n=n*3;
        *m= (*m)+1;
        return (*m+n);
}
```

5. (16 Points) The following program represents concepts involved in the howework assignment on matrix addition and multiplication.

```
#include <stdio.h>
#define SIZE 2

main ()
{
    int mata[SIZE] [SIZE], matb [SIZE][SIZE], matc [SIZE] [SIZE], matd [SIZE];

/* SECTION 1 */

        for (i=0; i<SIZE; i=i+1) {
                for (j=0; j< SIZE; j=j+1){
                        mata[i][j]=i+j;
                        matb[i][j]=0;
                        if (i == j){
                                matb[i][j]=1;
                        }
                }
        }

/* SECTION 2 */

        for (i=0; i<SIZE; i=i+1) {
                for (j=0; j< SIZE; j=j+1){
                        matc[i][j]=0;
                        for (k=0; k<SIZE; k=k+1){
                                matc[i][j]=matc[i][j]+mata[i][k]*matb[k][j];
                        }
                }
        }

/* SECTION 3*/

        for (i=0; i<SIZE; i=i+1) {
                matd[i]=0;
                for (j=0; j< SIZE; j=j+1){
                        matd[i]=matd[i]+mata[i][j];
                }
        }
}
```

For the program given on the previous page:

A) (4 points) Write numbers in matrix form that will be stored in mata calculated in Section 1:

mata=

B) (4 Points) Write the numbers in matrix form that will be stored in matb calculated in Section 1:

matb=

C) (4 Points) Write the numbers in matrix from that will be stored in matc calculated in Section 2:

matc=

D) (4 points) Write the numbers in matrix from that will be stored in matd calculated in Section 3:

matd=