ENGR0012 Final Exam
Spring 2001

Name: ______________________________________________________________

Section: (Circle one)  
Vipperman  Budny  Cugini  Budny (IC section)
(3 Points)

Group Members
1 ______________________________________________________________
2 ______________________________________________________________
3 ______________________________________________________________

Please write neatly and show all of your work. Adequate space for your response has been provided following each question. If you need additional room, turn to the backside of the page or ask the instructor for paper. Good luck!!

<table>
<thead>
<tr>
<th>Question</th>
<th>Possible Score</th>
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<tbody>
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<td>Intro</td>
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1) (Total 27 Points)
You wish to store the following information in the variable data

\[
\begin{pmatrix}
2 & 3 & 4 & 7 \\
1 & 1 & 0 & 9 \\
4 & 2 & 3 & 1
\end{pmatrix}
\]

1a) (6 Points) What is the MATLAB command to create the variable data?

1b) (6 Points) Write the Matlab commands that will set the following 3 variables equal to the indicated portion of data:

\[
\begin{align*}
Y &= \begin{pmatrix} 4 \\ 0 \\ 3 \end{pmatrix} & \text{Matlab Command: } & Y= \\
Z &= \begin{bmatrix} 1 & 0 & 9 \\ 2 & 3 & 1 \end{bmatrix} & \text{Matlab Command: } & Z= \\
S &= [2 \ 3 \ 1] & \text{Matlab Command: } & S=
\end{align*}
\]

1c) (3 points) What is sum(Z)?

1d) (6 Points) What is Y * S?

1e) (6 Points) Assume \( X = \begin{pmatrix} 3 \\ 1 \\ 2 \end{pmatrix} \). Answer the following questions.

- What is \( X + Y \)?
- What is \( X \cdot Y \)?
2) (20 points) The following information in the variable data

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For the script below, write the outputs from the code in the table below (The code may not have 15 outputs)

```matlab
C=4
R=3;
for m=1:R
    for n=1:2:C
        if ( m==n )
            disp(data(m,n))
        elseif ( m > n | n==2)
            disp( data((m-1),(n+1)) )
        elseif (m < n & m==1)
            disp( data((m+1),(n+1)) )
        else
            disp( 'help me I am lost' )
        end
    end
end
```

<table>
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<tr>
<th>Output 1</th>
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<td>Output 15</td>
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3) (20 points) The C program shown below is supposed to read several Fahrenheit-scale temperature values from the keyboard, convert each temperature to Celsius, and write the converted Celsius temperatures to a data file called “ctemps.dat.” The process is supposed to continue until the sentinel 9999 is entered from the keyboard.

The program contains five errors. The lines are numbered 1-21 for you convenience. Circle each line number that contains an error, label it, and write the corrected version of each line at the bottom of the page.

```c
/* Fahrenheit to Celsius temperature conversion */
#include <stdio.h>
int main()
{
    double F, C;
    FILE fpt;
    fpt = fopen("ctemps.dat", "r");
    printf("Temperature, in degrees F: ");
    scanf("%lf", &F);
    while (F != 9999) {
        C = (5.0 / 9.0) * (F - 32.0);
        printf("Temperature, in degrees C: %lf\n", C);
        scanf("%lf", &F);
    }
    fclose(fpt);
}
```

Corrected error 1

```c```
Corrected error 2

```c```
Corrected error 3

```c```
Corrected error 4

```c```
Corrected error 5
4) (25 Points) The following program represents concepts involved in one of your homework assignments. Identify the correct output, for the following bits of C code.

```c
#include <stdio.h>
#define SIZE 3

void callone(int mata[][SIZE]);
void calltwotwo(int mata[][SIZE], int matb[][SIZE]);
int callthree(int mata[][SIZE], int i);

int main (void) {
  int i,j,matd;
  int mata[SIZE][SIZE];
  int matb[SIZE][SIZE]= {{1,2,3},{1,1,1},{1,0,1}};
  for (i=0; i<SIZE; i=i+1) {
    for (j=0; j<SIZE; j=j+1) {
      mata[i][j]=i+j;
    }
  }
  /* SECTION 1 */
  printf("mata =\n");
callone(mata);

  /* SECTION 2 */
  printf("matc =\n");
calltwo(mata, matb);

  /* SECTION 3 */
  printf("matd =\n");
  for (i=0; i<SIZE; i=i+1) {
    matd=callthree(mata,i);
    printf("%5d\n",matd);
  }
  return(0);
}

/* SECTION 1 call */
void callone(int mata[][SIZE]){
  int i,j;
  for (i=0; i<SIZE; i=i+1) {
    for (j=0; j<SIZE; j=j+1) {
      printf("%5d",mata[i][j]);
    }
  }
  printf("\n");
}

/* SECTION 2 call */
void calltwotwo(int a[][SIZE], int b[][SIZE]){
  int i,j,k, matc[SIZE][SIZE];
  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]+a[i][k]*b[k][j];
      }
      printf("%5d",matc[i][j]);
    }
  }
  printf("\n");
}
```

int callthree(int a[][SIZE], int i) {
    int j, matd[SIZE];
    matd[i] = 0;
    for (j = 0; j < SIZE; j += 2) {
        matd[i] = matd[i] + a[i][j];
    }
    return (matd[i]);
}

For the above program:
A) Write the output from Section 1:

B) Write the output from Section 2:

C) Write the output from Section 3:

5) (5 Points) In Turbo C, which statement would result from this command:

    f = 2 + 2;
    printf("%.2f", f);

a) 4
b) 4.00
c) 4.0
d) .04