Midterm Exam

Held on 5th March, 2010   *5 March, 2010*

Name   :
Course No   :   **CSCE150E**

Instructions:

1. This is open book, open note, but not open neighbor.

2. If you have a question about the meaning of an exercise, ask! Getting things wrong because of misunderstandings can be aggravating for me as well as you.

3. Both sections are taking midterm exams today. You are on your honor not to reveal anything to members of the other section (assuming you are attending the 12:30 section).

1. (10 points) Keeping in mind that a logical array is utilized quite differently from a numeric array, consider the follow snippet of code:

```
>> x = [3 5 1 7 6 2 4]
x =
     3     5     1     7     6     2     4
>> y = x > 3
y =
     0     1     0     1     1     0     1
```

What is the result of entering the following two expressions?

```
>> x(y)
>> x(x)
```

2. (10 points) What is output by the following fragment of code? What common operation is simulated by the code?

```
a = [0 0 0 5 2 3 8 6 4 7 1 7 7 5];
b = [0 0 0 3 8 5 3 9 0 9 9 8 7 3];
s = a+b;
c = s > 9;
while any(c)
   s = mod(s, 10);
   s(1:end-1) = s(1:end-1) + c(2:end);
   c = s > 9;
end
s
```

3. (10 points) What is the final value of count in the following code segment? How did you figure this out?

```
count = 0;
for a = 1:4
   for b = 1:6
      for c = 1:2
         for d = 1:5
            for e = 1:3
               count = count+1;
            end
         end
      end
   end
end
```

4. (10 points) What is output by the following fragment of code?

```
for a = 1:4
   for b = a:4
      for c = 4:-1:b
          fprintf('%1d %1d %1d\n', a, b, c)
      end
      fprintf('cha cha cha!\n')
   end
   fprintf('mango!\n')
end
```

5. (10 points) Consider the following function definition. Now picture yourself at the command window, needing to use only that function to calculate the average of 25 and 35. What do you need to type?

```
function x = multiOp(a, b, op)
switch op
   case '+'
      x = a + b;
   case '-'
      x = a - b;
   case '*'
      x = a * b;
   case '/'
      x = a / b;
   otherwise
      x = 0;
end
```

6. (10 points) The way you typically see an fprintf is with an opening string constant that represents the format for the following items. Note that in many instances whether you use 3.14159 (a numeric literal) or pi (a numeric variable, though in this case it is predefined) interchangably. This is also true of string literals (in quotes) and string variables. Knowing this, what will be printed by the following? Are the correct answers being produced? If not, show how to fix the code.

```
f = ['The number %d is odd \n'; 'The number %d is even\n'];
for ii = 1:5
   fprintf(f(mod(ii,2)+1), ii);
end
```

7. (10 points) Rewrite the code in the previous exercise so that the loop uses 'while' instead of 'for'.

8. (10 points) Cross off any redundant (unneeded) portions of the following code. (The resulting code should always yield the same results.) There is more than one way to do this!

```
grade = input('Enter the grade from 0 to 100: ');
if grade > 90 && grade <= 100
    disp('Nice A')
elseif grade > 80 && grade <= 90
    disp('Not a bad B')
elseif grade <= 60 && grade >= 0
    disp('Sorry - you blew it')
elseif grade > 60 && grade <= 70
    disp('Discouraging D')
elseif grade > 70 && grade <= 80
    disp('Average C')
elseif grade < 0 || grade > 100
    disp('Invalid input')
end
```

9. (10 points) Short circuiting logical expressions means that the part of the expression to the right of the logical operator is ignored if (and only if) the result can be definitively determined by evaluating only the part of the expression to the left of the operator. Matlab operators && and || enable short circuiting. Operators & and | force both sides to always be evaluated.

   Which of the following are short circuited (so that the last part is not executed?) What does each evaluate to?

   (a) $8 < 7 || 5 > 2$
   (b) $5 == 5 \&\& 2 > 1$
   (c) $2 > 1 | 4 == 5$
   (d) $5 == 5 || 2 > 71$
   (e) $3 > 6 \& 5 > 2$

10. (10 points) Provide a joke that is suitable for repeating in class. If you can't think of any in this short space of time, just write "I love this class!" (Now should I consider that as a joke????)

Question	Points	Score
1	10	
2	10	
3	10	
4	10	
5	10	
6	10	
7	10	
8	10	
9	10	
10	10	
Total:	100	