CS100M (CIS 121) Spring 2008   Prelim 1   Feb 21 7:30–9:00pm

Name: _____
(Legibly print last name, first name, middle name)

NetID: _____

Statement of integrity:
I did not, and will not, violate the rules of academic integrity on this exam.

_____ (Signature)

Q1: (10) _____ ____

Q2: (15) _____ ____

Q3: (25) _____ ____

Q4: (25) _____ ____

Q5: (25) _____ ____

Total: (100) _____ ____

Circle your lecture time: 9:05   or   11:15

Circle your section number/instructor's name:

	Tuesday		*Wednesday*	
10:10			5 Ainur Yessanlina	
11:15			6 Ainur Yessanlina	
12:20	1 Anton Morozov	22 Chris Scheper	7 Sucheta Soundarajan	24 Ainur Yessanlina
1:25	2 Anton Morozov	23 Kenny Tsung	8 Sucheta Soundarajan	25 Chris Scheper
2:30	3 Anton Morozov		9 Chris Scheper	
3:35	4 Sucheta Soundarajan		10 Aaron Lenfestey	
7:30			20 Aaron Lenfestey	
8:35			21 Aaron Lenfestey	

Instructions:
- This is a 90-minute, closed-book exam; no calculators are allowed.
- The exam is worth a total of 100 points, so it's about one point per minute!
- Read each problem completely, including any provided code, before starting it.
- Raise your hand if you have any questions.
- Use the backs of pages or ask for additional sheets of paper as necessary.
- Clarity, conciseness, and good programming style count for credit.
- If you supply multiple answers, we will grade only *one*.
- Use only MATLAB code. No credit for code written in other programming languages.
- Assume there will be no input errors.
- **Do not use arrays. Do not write user-defined functions.**
- Do not use `switch`, `try`, `catch`, or `break` statements.
- You may find the following MATLAB predefined functions useful:
  `abs, sqrt, rem, rand, floor, ceil, input, fprintf, disp`

  Examples: `rem(5,2)` → 1, the remainder of 5 divided by 2
  `rand` → a random real value in interval (0,1)
  `floor(6.9)`, `floor(6)` → 6, rounds down to the nearest integer
  `ceil(8.1)`, `ceil(9)` → 9, rounds up to the nearest integer

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Question 1: (10 points)

Part (a): (3 points)

What are the final values of variables x and y?

```
x= 5;
y= 2*x;
x= 8;
```

x

y

Part (b): (3 points)

What are the final values of variables x and y?

```
x= 12;   y= 1;
if x>5
    x= x-y;
elseif x>10
    x= y;
else
    y= x;
end
```

x

y

Part (c): (4 points)

What is the output produced by this script?

```
x= 1;
for k= 8:-2:3
    x= x+k;
    disp(x)
end
```

Question 2: (15 points)

Part (a): (6 points)

Write a fragment to simulate one flip of an unfair coin: heads appears three times as often as tails. Assign to variable **c** the value 1 to indicate heads, the value 0 to indicate tails.

Part (b): (9 points)

Write a fragment so that it behaves like the one below. *Do not* use any logical or bitwise operators (~, &&, ||, &, |) or arithmetic operators (+, *, etc.). Assume that variables **a**, **b**, and **c** are initialized.

```
if a>b && b>c
    x= 2;
elseif b>a || a==8
    x= 4;
end
```

Question 3: (25 points)

Simulate a guessing game that involves a fair coin. A player starts by guessing how many flips of the coin will be made. Then the player flips the coin until he or she gets at least five heads or five tails, and the number of heads and the number of tails differ by no more than two. A message should be displayed at the end to indicate whether the player guessed correctly, e.g., "You are right!" or "Wrong!" Complete the script below to simulate one game.
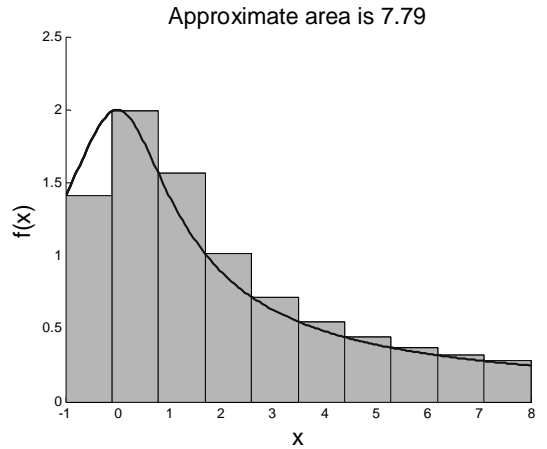

```
% Coin game

guess= input('How many flips do you think you will need? ');

% Start flipping...
```

Question 4: (25 points)

Complete the script below to approximate the area under the function $f(x) = \dfrac{2}{\sqrt{x^2 + 1}}$ for some interval of x. You will sum the area of N rectangles drawn side-by-side within the specified x interval with the *top left corner* of each rectangle at the function value. See diagram. Assume the availability of function **drawRect**:

Approximate area is 7.79


```
drawRect(-1,0,10,5,'g')
```

draws a green rectangle with width 10, height 5, and the lower left corner at (-1,0). Your code should draw only the rectangles, not the curve. The curve is shown in the diagram only for clarity.

___

```
% Numerical integration--area of rectangles "under" a curve

L= input('Left end of the x interval: ');
R= input('Right end of the x interval: ');
N= input('Number of rectangles for approximation: ');

figure
axis([L R 0 2.5]); xlabel('x'); ylabel('f(x)')
hold on

% Code to draw the rectangles and approximate the area.  Remember to
% write on the blank near the bottom the variable name for the area.
```

```
title(sprintf('Approximate area is %.2f', _____ ))
hold off
```

Question 5: (25 points)

Complete the script below to print in the *Command Window* a slanted U-figure (parallelogram without the top edge) formed by asterisks (*) and blanks. Each side of the U-figure has **n** asterisks. You must use **fprintf** statements to print the figure to the *Command Window*. An example is shown below for **n** = 5. You may assume that **n** is greater than 2.

```
*     *
 *     *
  *     *
   *     *
    *****
```

```
% Print a slanted U
n= input('Enter an integer greater than 2:  ');
```