NOTRE DAME UNIVERSITY

Faculty of engineering
ECCE Department

Exam 2
ENG 202 – Computers and engineering
Date: 19/05/2010
Duration: 50min

You were able to do well

Name: _____

ID No.: _____

Grade	P 1-1	P1- 2	P1- 3	P2-1	P2-2	P2-3	P2-4
36	08	06	0 ½	6	04	6	5

Answer all questions on question sheet. Use back of paper when necessary

Note: this exam contains 9 pages including this

$x = [0:0.1:10]$
$y_1 = 5.*x.^2+3$
$y_2 = -7.$

PART ONE: MATLAB

Problem #1-1: (20 pts)

Let x be a vector of values : $0 \leq x \leq 1$ with a step of 0.1
Let $y1 = 5x^2+2$ for every value of x
and $y2 = 20x-5$ for every value of x

create a matlab program that :
1. defines x, y1, y2
2. plots the two functions
3. displays for how many values of x is y1>y2 and for how many values of x is y2>y1
4. then gives the interval of x where the two curves intersect.

1. $x = [0:0.1:1]$ 2   → Should put a "dot".
   $y1 = 5*x^2 + 2$ ×
   $y2 = 20*x - 5$ 2

2. plot(x ; y1)   plot(x ; y2) 1

3. How_many $= x(y_1 > y_2)$
   How_many $= x(y_2 > y_1)$ 3

4.

1

Solution:

```
k=1;
x = input('input a value for x : x =')
STAR = x;
while STAR <= 10000
    y(k) = input('input a value for y : y =')
    STAR = STAR * y(k);
end
disp('the value of x, y, STAR are :')
disp(x)
disp(y)
disp(STAR)
```

<u>**Problem #1-2:**</u> (20 pts)

create a matlab program that:

1. asks you to enter a value, X
2. then asks you to enter a second value, Y
3. multiplies X*Y, puts the result in a variable, STAR
4. then asks you to enter Y again,
5. then multiplies STAR *Y
6. the program repeats steps 4 and 5 until the resulting product exceeds 10000
7. at the end, displays the statement: "the values of X, Y and STAR are: " then displays the value of X, all the values of Y, and the value of STAR.

1. x = input('please give me the value of x")
   y = input('please give me the value of y"   2
2. name = STAR
   STAR = x*y   1

Solution

7. disp("the values of x, y and STAR are:")

2

Problem #1-3: (10 pts)

Write a Matlab function, call it Life. The function calculates the following
L=T+2*E+A^3
I=E*A*T
F=A+R+T
E=H/E*A/T
The function has all variables to the left as outputs and all variables to the right as inputs.
Explain what happens to the variable E in this case.

function → input

Solution

Function $(L, I, F, E) = Life(H, E, A, R, T)$

$L = T + 2*E + A.^3;$
$I = E.*A.*T;$
$F = A + R + T;$
$E = H./E.*A./T;$

PART TWO : EXCEL

Problem #2-1: (12 pt)

Consider the following excel sheet:

1. the numeric result in the cell B15 is : $\dfrac{3+8}{2} = \boxed{\dfrac{11}{2}}$
2. the numeric result if the function in B15 is copied to

B16: $\dfrac{A6+B6}{\$A\$15} = \dfrac{5+16}{2} = \boxed{\dfrac{21}{2}}$

C14: $5 \quad \dfrac{A4+B4}{\$A\$15} = \dfrac{4+14}{2} = \dfrac{18}{2} = \boxed{9}$

C13: $5 \quad \dfrac{A3+B3}{\$A\$15} = \dfrac{2+7}{2} = \boxed{\dfrac{9}{2}}$

	A	B	C	D
1				
2				
3	2	7	5	
4	4	14	5	
5	3	8	5	
6	5	16	5	
7	4	9	5	
8	6	18	5	
9	5	10	5	
10	7	20	5	
11	6	11	5	
12	8	22	5	
13				
14				
15	2	=(A5+B5)/$A$15		
16		A6+B6/$A$15		
17				
18				

4

Problem #2-2: (20 pt)

	A	B
	Sample	Diameter (in)
1	1	3.502
2	2	3.497
3	3	3.495
4	4	3.500
5	5	3.496
6	6	3.504
7	7	3.509
8	8	3.497
9	9	3.502
10	10	3.507
11	11	3.497
12	12	3.504
13	13	3.498
14	14	3.499
15	15	3.501
16	16	3.500
17	17	3.503
18	18	3.494
19	19	3.499
20	20	3.508

1. Write excel functions that would give the range (interval of values), the mean and the standard deviation of the data above. Use as many cells as you find necessary.

C1= _____ = range (B5:B24) ✗

C2= _____ = mean (·   )

C3= _____ = stddev (   )   ✗

2. Fill in necessary cells needed in order to draw the histogram of the data. A histogram is required with 5 intervals of equal width starting from minimum to maximum values.

We fill in cells A5 to A24 and cells B5 → B24. Then click on insert → histogram

Problem #2-3: (10 pt)

	A	B	C	D	E
1		Initial Drop	Temperature	Vaporization	
2	Fluid	Size (ml)	Difference (°C)	Time (secs)	
3	Water	0.0335	200	90	
4	Water	0.0335	250	81	
5	Water	0.0335	300	74	
6	Water	0.0335	350	67	
7	Water	0.0335	400	61	
8	Water	0.0335	450	56	
9	Water	0.0335	500	50	
10	Water	0.0335	550	45	
11	Water	0.0265	200	80	
12	Water	0.0265	250	72	
13	Water	0.0265	300	66	
14	Water	0.0265	350	59	
15	Water	0.0265	400	54	
16	Water	0.0265	450	49	
17	Water	0.0265	500	46	
18	Water	0.0265	550	45	
19	Ethyl Alcohol	0.0156	200	25	
20	Ethyl Alcohol	0.0156	250	22	
21	Ethyl Alcohol	0.0156	300	20	
22	Ethyl Alcohol	0.0156	350	18	
23	Ethyl Alcohol	0.0156	400	17	
24	Ethyl Alcohol	0.0156	450	16	
25	Ethyl Alcohol	0.0156	500	15	
26	Ethyl Alcohol	0.0156	550	14	
27	Ethyl Alcohol	0.0121	200	22	
28	Ethyl Alcohol	0.0121	250	19	
29	Ethyl Alcohol	0.0121	300	18	
30	Ethyl Alcohol	0.0121	350	16	
31	Ethyl Alcohol	0.0121	400	15	
32	Ethyl Alcohol	0.0121	450	14	
33	Ethyl Alcohol	0.0121	500	13	
34	Ethyl Alcohol	0.0121	550	12	
35	Benzene	0.0177	200	17	
36	Benzene	0.0177	250	15	
37	Benzene	0.0177	300	13	
38	Benzene	0.0177	350	12	
39	Benzene	0.0177	400	11	
40	Benzene	0.0177	450	10	
41	Benzene	0.0177	500	10	
42	Benzene	0.0177	550	9	
43	Benzene	0.0141	200	15	
44	Benzene	0.0141	250	13	
45	Benzene	0.0141	300	12	
46	Benzene	0.0141	350	11	
47	Benzene	0.0141	400	10	
48	Benzene	0.0141	450	9	
49	Benzene	0.0141	500	9	
50	Benzene	0.0141	550	8	

1. How was this information sorted?

This information was sorted ~~from~~ in order, from the highest to the lowest values.

~~By ~~~~~~~~~~~~~ Column A was sorted by names, ~~and~~ then B was sorted by values (lowest to the highest)

C ? 4

2. What was done to the above data so that it appears as follows?

	A	B Initial Dro	C Temperature	D Vaporizatio	E
3	Water	0.0335	200	80	
4	Water	0.0335	250	81	
5	Water	0.0335	300	74	
11	Water	0.0265	200	80	
12	Water	0.0265	250	72	
13	Water	0.0265	300	66	
19	Ethyl Alcohol	0.0156	200	25	
20	Ethyl Alcohol	0.0156	250	22	
21	Ethyl Alcohol	0.0156	300	20	
27	Ethyl Alcohol	0.0121	200	22	
28	Ethyl Alcohol	0.0121	250	19	
29	Ethyl Alcohol	0.0121	300	18	
35	Benzene	0.0177	200	17	
36	Benzene	0.0177	250	15	
37	Benzene	0.0177	300	13	
43	Benzene	0.0141	200	15	
44	Benzene	0.0141	250	13	
45	Benzene	0.0141	300	12	
53					

- ~~We filtered the data ?~~
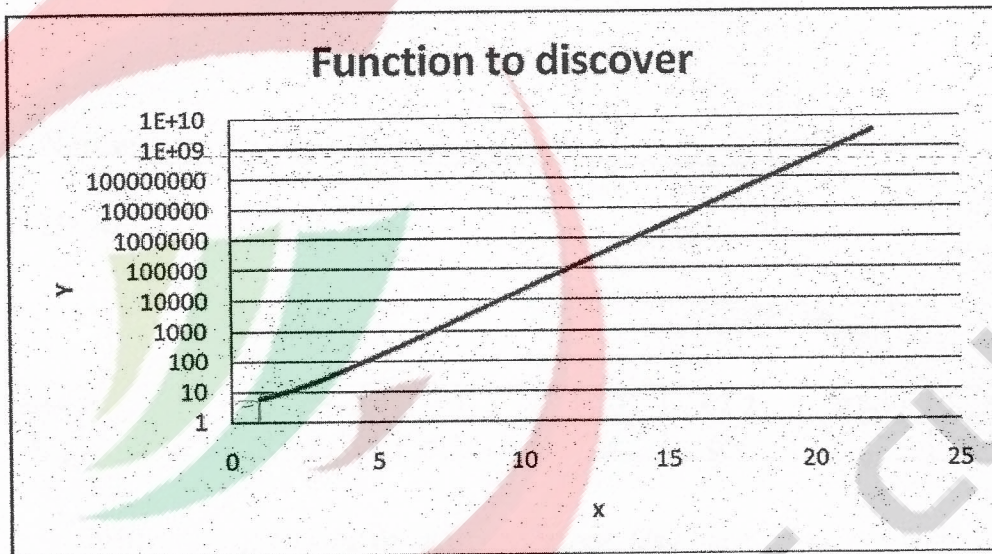- ~~Some rows~~ are deleted (Rows 2, 6→10, 14→18, 22→26, 30→34, 38→42, 46→52).

We filtered the temperature to a maximum value of 300 (range 200→300)

Problem #2-4: (8 pt)

Which one of the following is plotted below? Why?

1. Y= x^2+5
2. Y=exp(x)+3
3. Y=log(x)-5
4. Y=cos(x)^2

Function to discover

2. y = exp(x)+3

because the graphe starts from "1". (y axis).
log scale

Good luck

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