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كلية التربية
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تاريخ الامتحان: 11 / 1 / 2016

نموذج اجابة –ورقة كاملة
المـــــــادة: مقدمة في برمجة الحاسوب
اسم استاذ المادة: الدكتور/ عبدالحميد محمد عبدالحميد –
جامعة بنها – كلية العلوم – قسم الرياضيات

Department of Mathematics   Final Exam-Second Year   Time: 2 Hours

Fac. of Education, Benha Univ.   Introduction to Computer Science   11 January 2016

Please answer all the following questions. Total Marks = 100 points:-

(**1**) Given the arrays

```
x = [1 2 3 -1], y=[1 0 4 -1 2 5]   and A = [0 1 0;1 3 0;eye(1,3)].
```

What is the result for each of the following statements?

1) z = y(end:-1:2)	2) x(1:3).*y(4:6)	3) A(1:2:3,:)	4) diag(x)
5) b = A*x(1:3)'	6) A(:,2:3) = []	7) A.^2	8) size(A)
9) length(y)	10) [d,n] = max(A(:))	11) min(x)	12) mean(y)
13) sum([x,y,-2])	14) A(2,:) + [1 2 3]	15) A+2*eye(3)	16) who
17) whos	18) v = sort(y,'descend')	19) [A; x(1:3)]	20) x~=y(1:4)
21) linspace(0,1,5)	22) find(y>2)	23) all(y)	24) any(x)
25) z = (y(3:6)>1) & (x < 1)	26) xor((x==1),(y(3:6)>=1))		[52 Marks]

(**2**)

a) Write the steps and the syntax to perform the following polynomial

$$p(x) = x^6 + x^4 - x^2 + 3,$$

using Matlab software then write the syntax to evaluate the roots and its value at $x = 2$.

b) Write the steps and the syntax to plot the following functions on the same figure

$$y = e^x, \quad z = x^3, \quad 0 \le x \le \pi$$

with green-dashed line and red-star line.

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c) What are the values of y and z after executing the following segment code?

```
x = 0.1:0.5:2;
for i = 1:length(x)
        y = x(i) + 3;
        if(y<=3.6)
                z(i,:) = y + x;
        elseif(y>3.6 & y<4.5)
                z(i,:) = y*x;
        else
                z(i,:) = y - x;
        end
end
```

[24 Marks]

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(3)

a) Given $t = 351/7$, complete the following sentences:

```
1) >> format short,    t = ....          2) >> format long,    t = ....
3) >> format short g,  t = ....          4) >> format bank,    t = ....
5) >> floor(t) = ....                     6) >> round(t) = ....
7) >> ceil(t) =  ....                     8) >> rem(fix(t),3)  =  ....
```

b) Write a Matlab program to compute the sequence:

$$\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \cdots + \frac{1}{128}.$$

c) Write a Matlab program that gives 12×12 multiplication table.

[24 Marks]

With My Best Wishes

Dr. Abdelhameed Nagy

(1)

```
x = [1 2 3 -1], y=[1 0 4 -1 2 5]   and A = [0 1 0;1 3 0;eye(1,3)].

1) z = y(end:-1:2)
z =

    5    2    -1    4    0


2) x(1:3).*y(4:6)
ans =

    -1    4    15


3) A(1:2:3,:)
ans =

    0    1    0
    1    0    0


4) diag(x)
ans =

    1    0    0    0
    0    2    0    0
    0    0    3    0
    0    0    0    -1


5) b = A*x(1:3)'
b =

    2
    7
    1


6) A(:,2:3) = []
A =

    0
```

```
       1
       1

7) A.^2
ans =
     0    1    0
     1    9    0
     1    0    0

8) size(A)
ans =
     3    3

9) length(y)
ans =
     6

10) [d,n] = max(A(:))
d =
     3
n =
     5

11) min(x)
ans =
    -1

12) mean(y)
ans =
     1.8333

13) sum([x,y,-2])
ans =
```

```
        14

14) A(2,:) + [1 2 3]
ans =

     2    5    3


15) A+2*eye(3)
ans =

     2    1    0
     1    5    0
     1    0    2


16) who
Your variables are:

        A   x   y
17) whos
 Name        Size            Bytes  Class
  A           3x3               72   double
  x           1x4               32   double
  y           1x6               48   double


18) v = sort(y,'descend')
v =

   5    4    2    1    0   -1


19) [A; x(1:3)]
ans =

     0    1    0
     1    3    0
     1    0    0
     1    2    3


20) x~=y(1:4)
```

```
ans =
      0   1   1   0
```

21) `linspace(0,1,5)`
```
ans =
      0   0.25   0.5  0.75   1
```

22) `find(y>2)`
```
ans =
      3   6
```

23) `all(y)`
```
ans =
      0
```

24) `any(x)`
```
ans =
      1
```

25) `z = (y(3:6)>1) & (x < 1)`
```
z =
      0   0   0   1
```

26) `xor((x==1),(y(3:6)>=1))`
```
ans =
      0   0   1   1
```

(2)
(a)

```
>> p=[1 0 1 0 -1 0 3];
>> r = roots(p);
>> v = polyval(p,2);
```

(b)

```
>> x = 0:pi/10:pi;
>> y = exp(x);
>> z = x.^3;
>> plot(x,y,'g--')
>> hold on
>> plot(x,z,'r*')
```

c)

```
x = 0.1:0.5:2;
length(x) = 4
i = 1   ---> y = x(1) + 3 = 3.1;
              z(1,:) = y + x

                  =

                    3.2   3.7   4.2   4.7
i = 2   ---> y(2) = x(2) + 3 = 3.6
              z(2,:) = y + x

                  =

                    3.2   3.7   4.2   4.7
                    3.7   4.2   4.7   5.2
i = 3   ---> y(3) = x(3) + 3 = 4.1
              z(3,:) = y*x

                  =

                    3.2   3.7   4.2   4.7
                    3.7   4.2   4.7   5.2
                    0.41  2.46  4.51  6.56
i = 4   ---> y(4) = x(4) + 3 = 4.6
              z(3,:) = y - x

                  =

                    3.2   3.7   4.2   4.7
                    3.7   4.2   4.7   5.2
                    0.41  2.46  4.51  6.56
                    4.5   4.0   3.5   3.0
```

The values of y and z after executing the code are:

```
y = 4.6
z =
    3.2   3.7   4.2   4.7
    3.7   4.2   4.7   5.2
    0.41  2.46  4.51  6.56
    4.5   4.0   3.5   3.0
```

(3)

(a)

```
1) >> format short,    t = 50.1429
2) >> format long,     t = 50.142857142857146
3) >> format short g,  t = 50.143
4) >> format bank,     t = 50.14
5) >> floor(t) = 50
6) >> round(t) = 50
7) >> ceil(t) =  51
8) >> fix(t)  =  2
```

(b)

```
function S = sum_sequ(n)
    S = 0;
    for i = 1:n
        S = S + 1/(2^i);
    end
end
```

To execute the program and obtain the required result, we run the program in command window as follows:

```
>> S = sum_sequ(6)
```

c)

```
function y = multi_tab(n,m)
  for i = 1:n
      for j = 1:m
        y(i,j) = i*j;
      end
  end
end
```

Again, to execute the program and obtain the required result, we run the program in command window as follows:

```
>> y = multi_tab(12,12)
```