



Benha University
Faculty of Science

Subject : Algorithms
Code : 353 mc
Date : 29/12/2018
Time : 2 hours
Examiner: Dr. Gamal Mosa

جامعة بنها - كلية العلوم - قسم الرياضيات

المستوى الثالث

يوم الامتحان: السبت 29 / 12 / 2018 م

المادة : خوارزميات 353 رس

الممتحن: د . / جمال احمد موسى

مدرس بقسم الرياضيات بكلية العلوم

الامتحان + نموذج إجابته

ورقة كاملة



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Answer the following questions:

Q1: (20 Marks)

- 1) Write an **algorithm** and **flowchart** for linear search in two dimensions.
- 2) Write an **algorithm** and **flowchart** for compute the sum of decreasing factorial series

$$sum = \left(\frac{88}{82}\right)^5 + \left(\frac{80}{74}\right)^5 + \left(\frac{72}{66}\right)^5 + \dots + \left(\frac{16}{10}\right)^5$$

Q2: (20 Marks)

- 1) Write an **algorithm** and **flowchart** to find the largest number.
- 2) Write an **algorithm** and **flowchart** for solve the following equation

$$y = \begin{cases} x^2 - 3 & ; x < 0 \\ 0 & ; x = 0 \\ 3x^3 + 5 & ; x > 0 \end{cases}$$

Q3: (20 Marks)

- 1) Write an **algorithm** and **flowchart** for Bubble sort ,
(Ascending)
- 2) Write an **algorithm** and **flowchart** to test if the number is prime?

Q4: (20 Marks)

Write an algorithm and **flowchart** for Insertion sort.

GOOD LUCK

Dr – Gamal Mosa



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الاجابة

Q1: (20 Marks)

1) Write an algorithm for Linear search in two dimensions .

1. start
2. there the array A(r,c)
3. inter t
4. l=0
5. l=l+1
6. Is l>r GOTO 13
7. J=0
8. J=J+1
9. Is J>c GOTO 5
10. Is t \neq A_{l,j} GOTO 8
11. Print target found at (l,J)
12. GOTO 14
13. Print target not found
14. Stop

2) Write an algorithm for compute the sum of decreasing factorial series

$$sum = \left(\frac{88}{82}\right)^5 + \left(\frac{80}{74}\right)^5 + \left(\frac{72}{66}\right)^5 + \dots + \left(\frac{16}{10}\right)^5$$

1. Start
2. Let Sum =0
3. Let i=88



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4. Let $x=i-6$
 5. Let $k=i/x$
 6. $\text{Sum} = \text{sum} + k^5$
 7. $i=i-8$
 8. Is $i \geq 16$ then goto 4
 9. Print sum
 10. Stop

Q2: (20 Marks)

1) Write an algorithm to find the largest number.

1. start
2. $\text{max}=0$
3. enter A
4. is A character go to (8)
5. is $\text{max} > A$ go to (3)
6. $\text{max}=A$
7. go to (3)
8. print max
9. stop

2) Write an algorithm for solve the following equation

$$y = \begin{cases} x^2 - 3 & ; x < 0 \\ 0 & ; x = 0 \\ 3x^3 + 5 & ; x > 0 \end{cases}$$

- 1) start
- 2) enter x
- 3) is $x > 0$ go to (7)
- 4) is $x < 0$ go to (9)
- 5) $f(x)=0$



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6)go to (10)

7) $f(x) = x^2 - 3$

8)go to (10)

9) $f(x) = 3x^3 + 5$

10)print f(x)

11)stop

Q3: (20 Marks)

1) Write an algorithm for Bubble sort , (Ascending)

1) start

2) there is exist array a(n)

3) $j=n$

4) $i=1$

5) is $a_i \leq a_{i+1}$ go to (9)

6) $x=a_i$

7) $a_i =a_{i+1}$

8) $a_{i+1} =x$

9) $i=i+1$

10) is $i < j$ go to (5)

11) is $j=2$ go to (14)

12) $j=j-1$

13) go to (4)

14) print a

15) stop



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2) Write an algorithm to test if the number is prime?

- 1) start
- 2) enter num
- 3) $i=2$
- 4) $p="prime"$
- 5) is $num=2$ go to(12)
- 6) is $num<1$ go to(2)
- 7) is $\sqrt{num} \bmod i \neq 0$ go to (10)
- 8) $p="not\ prime"$
- 9) go to (12)
- 10) $i=i+1$
- 11) is $i<\sqrt{num}$ go to (7)
- 12) print p
- 13) stop

Q4: (20 Marks)

Write an algorithm and **flowchart** for Insertion sort.

- 1)start
- 2)there is exist unsorted array $a(n)$
- 3) $i=1$
- 4) $i=i+1$
- 5)is $i>n$ go to (14)
- 6) $j=i$
- 7)is $j\geq 1$ and $a_j \leq a_{j-1}$ go to (9)



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8)go to (4)

9)s=aj

10)aj =aj-1

11)aj-1 =s

12)j=j-1

13)go to (7)

14)print

15)stop