Khushi ITE-2 031

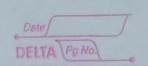
Foundation Of Computer Science ASSIGNMENT-3 For m= 1 $m^2 + 2m = 1 + 2 = 3$ 3 is divisible by 3. So, that the statement is true for m=1. For any integer k, k≥1 $m^3 + 2m = k^3 + 2k$ = 3m, where "m' is an integer for mzk+1 $m^3 + 2m = (k+1)^3 + 2(k+1)$ = KS+3K2+3K+2K+2+1 $z(k^3+2k)+3(k^2+k+1)$ =3m+3(k2+k+1) 2 3 (m+ k2+k+1) Which is divisible by 3. The Statement being true for n=k, implies the statement is true for n=k+1 and as we have shown if to be true for n=1, the proof of the statement Jollows by induction. Use mathematical induction to prove that * m EN 1+1/4+1/9+ + 1/m2 = 2-1/m For m= 2 LHS = 1+1 = 5

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	RHS . 3
	2
	LHS < RHS, so the statement is true for
1	m = 2
18	For any integer k≥2
	$S(k) = 1 + 1 + 1 + \dots + 1 \le 2 - 1$
1	
	For, m = k+1
	S(k+1) = 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1
1	4 9 12 (1)2 1+1)
	100 100 100 100 100 100 100 100 100 100
	145: 2-1+1
	FUS: 2-1+1 k (x+1) ²
	2-1 (k+1-1) (k+1) (k k+1)
	(K+1) (K K+1)
	= FE13K+3K+2++1
	$2-1/k^2+k+1$ < $2-1$
-	$\frac{2-1}{(k+1)} \left(\frac{k^2+k+1}{k(k+1)}\right) < 2-\frac{1}{k+1}$
	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
	The statement being true for m=k. implies the Statement is two for n=k+1 and as we have shown it to be true for n=2, the proof of
	for n= k+1 and as we have shown it to be true for n= 2, the proof of
is but	the statement follows as induction.
	for no bel and as he trace who in he be true for n. I
7	Show that if n is an integer greater than 1, then n can be written as
3,	Show that if n is an integer greater than 1, then n can be written as
	2 Lan a fall to be prime and the statement becomes
As	If n=2 or n=3, then a falls to be prime and the statement becomes
	Now assuring that the Statement is the fol all integers from
	Now assuming that the statement is true for all integers from 2 upto k This implies that (k+1) is either prime or a product of primes.

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	If (k+1) is prime, there are integers CLD such that << <d<(k+1) (i.e.,="" and="" by="" divisible="" i="" is="" itself)<="" m="" numbers="" other="" th="" than=""></d<(k+1)>
	(i.e., m is divisible by numbers other than I and itself)
	By induction hypothesis, since $2 \le C \le D \le k$, we know that $C \not = D$ are elther prime or are product of primes.
	are elther prime or are product of primes.
	Company of the state of the sta
	But then k+1=CD, so k+1 is a product of primes. Hence il the
	But then $k+1=CD$, so $k+1$ is a product of primes. Hence, if the statement is true for all integers greater than 1 up to k , then it is also true for $(k+1)$. Hence, it is true for all $n \in \mathbb{Z} > 1$.
	true for (k+1). Hence, it is true for all n = >1
4.	Find an explicit formula for the recurrence relation delined to
	Find an explicit formula for the recurrence relation defined by: $a_{n} = 5a_{n-1} - 6a_{n-2}$ with the initial conditions $a_{1} = 2$ and $a_{3} = 1^{n-2}$. $a_{n} = 5a_{n-1} - 6a_{n-2}$ $a_{1} = 2$ $a_{2} = 1$
Aus	$a_n = 5 a_{n-1} - 6 a_{n-2}$ $a_{12} = 0 = 1$
	$a_n = 5 a_{n-1} - 6 a_{n-2}, a_{1} = 2, a_{3} = 1$
	Characteristic equation: $R^2 - 5r + 6 = 0$
= 0, a, =	$Vetuminant : (-5)^2 - 4(1)(6) = 1$
	$h^2 - 57 + 6 = 0$
	$(\lambda^2 - 5\gamma + 6 = 0$ $(\lambda - 2) (\lambda - 3) = 0$
	anz dn2h+dk1h
	a122d1+3d222
	a3 2 8d, + 27 a2 = 1
	Thought of equation Arthorne 2 2 2 2 1
	So, 4121.7 and 522-0-467
	BY ARREST STATE OF THE PROPERTY OF THE PARTY
	i. an z 1-7 (2 ⁿ) - 0-467(3 ⁿ)
7	Vancous Die 102 forten to the 10 to 11-17 in the 180 to 180 to 180 to
5.	Consider the Securance relation
[3]	ant2 = 2ant, + Man - 8an-1
30-17	Find an explicit formula.
Aus	angtz = 2 angt 1 + 4 am - 8 am - 1 = .
	am +2 - 2am + - 4am + 8am -1 = 0

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	Given equation is homogeneous in nature
	The state of the s
	Characteristic equotion:
0353	18-2x2-4x+8=0
	(2+2) (2-42+4)=0
	$(\lambda+2)(\lambda-2)(\lambda-2)=0$
Then.	Lett they to the to be but for product of primer faces
It lialso	Roots of equation $\Rightarrow r_1 = -2$, $r_2 = r_3 = 2$
	The second of th
	Therefore,
1 /41	$a_n = A1(-2)^n + A2(2^n) + A3.n.(2)^n$
1 1 1 2 2	and say to bear the initial conditions are 2 and
	This is the required explicit formula
6-	Explicit formula for the recurrence relation defined by:
	$a_{k+} - 7a_{k-1} + 10a_{k-2} = 2k^2 + 2, \text{ with the Initial conditions } a_0 = 0, a_1 = 1.$ $a_{k-} - 7a_{k-1} + 10a_{k-2} = 2k^2 + 2$ $a_{k-} - 7a_{k-1} + 10a_{k-2} = 2k^2 + 2$
4	$a_k - 1a_{k-1} + 10a_{k-2} > 2k^2 + 2$
	Given equation is non-homogenous in nature
(4)	Characteristic equation!-
	$\Lambda^2 - 71 + 10 = 0$
	(1-5)(1-2) = 0
	Roots of equation: N=5, N=2
	Therefore, anz A1(5)n+ A2(2)n
(ii)	het $a_k = dot d_1k + d_2k^2$
	$9k-1 = d_0 + d_1(k-1) + d_2(k-1)^2$
	$a_{k-2} = dot d_1(k-2) + d_2(k-2)^2$
	The state of the s
	". (do+d, k, +d, k2) - \(\frac{1}{2}\) +do \(\frac{1}{2}\) +do \(\frac{1}{2}\) +do \(\frac{1}{2}\) +do \(\frac{1}{2}\) +do \(\frac{1}{2}\)
	$=2k^2+2$



dot	dik + d2k2 - 7do - 7dik + 7d	1, + (-7d, k2-7d, +14d2k)	
+	10do + lod, k - 2 od, + lod, k2	4 40d2 - 40 kd, 2 2k2 + 2	

(4do-13d, -33d2) + (4d, -26d2) K+ (4(d2))/2 = 2k2+2

Comparing

$$4d, = 2$$
 $d, = 1$
 $4d, -26d, = 0$
 $4d, -26(1) = 0$
 $4d, -12$

and
$$4d_0 - 13d_1 - 33d_2 = 2$$

 $4d_0 - 13(13) - 33(1) = 2$

Thus,
$$a_k = \frac{243 + (13)k + (1)k^2}{16}$$

We know

$$q_{k} = A_{1}(5)^{m} + A_{2}(2)^{m} + 243 + (13)k + (1)k^{2}$$

Considering the following graphs in the given figure (a) and (b). Find the degree of each vertex.

(a)	V1=5	(b) V125	V-23
	V2 = 3	V ₂ = 4	N6 2 3
	V3 = 2	V3 24	
	4.26	Vu = 3	

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	8.	Find all the indegrees and outdegrees of the wodes of the graph given in the figure.
-	115	given in the figure.
1		
of	2.5	Vector Indegree Outdegree
		V ₁ 0 2
		V ₂ 1 2
		V ₃ 2 1
		Vy 3
	9-	Check whether the following graphs are isomorphic or not. Condition 9, 92
-	Any	Condition 9, 92
-		Verlèces 5 5
		Edge 6 6
		Degue seg. 3,2,3,2,2 - 3,2,3,2,2
-	10.	Octeniène whether the following graphs are biportte.
	Au (i)	
	ii)	Biportite
	(iii)	
	(iv)	Biportite
	11-	Which of the undirected graphs given below have a euler wrent!
		Which of the undirected graphs given below have a euler circuit? Of those that do not, which have an Euler path?
	Aus	Ghes Euler cercuit: a b e d c e a
-		G3 has Eulupath: a b c de a df
	12-	Verify whether the Hamiltonian Tath is possible in the following. Hamiltonian path is not possible
	ang (a)	Hamiltonian path is not possible
1	(6)	Hamiltonian path is possible: A B CD
1		E LIB III I VIII VIII I VIII I VIII I VIII VI
1		No BY
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1	V=20
	Using hand shaking, E=30
	Using hand shaking, E=30 R+V=E+2
	: R-12
DIV	
(1)	Cut Vertex . Duch in the
(9)	Cut Vertex: A cut vertex is a single vertex whose removal disconnecte a graph.
	graph.
(ll)	Cut Edge = A untal
	distante to
	lut Edge: A unt edge or materobridge is a single edge whose removal disconnects a graph.
(iii)	Cut set: A cut set of a
	Cut set: A cut set of a connected graph 9 is a set 8 of edges with following properties: I removal of all edges in 8 doesn't disconnect 9. Removal of some edges in 8 doesn't disconnect 9.
	=) removal of all law is a
	=> removal of early in S disconnects G.
	of some edges in 5 doesn't disconnect q.
(iv)	Spanning Tree: it is a tree that count all the
	Spanning Tree: it is a tree that connects all the vertices of a graph with the minimum possible member of edges.
	possible member of edges.
(V)	
	Choomatic Number of Graph. The commatic number of a graph is the minimum number of volouse
	needed to poodure a sound of colours
	needed to produce a proper colouring of a groups.
	A seps