	dssignment -1
11-1-1	e Wallache Carlettanelle Market all hair Danie 18 les
¥.	Define Algorithm, Time Complexity and Space
	Samplescity.
<u></u>	(i) algorithm:
May Tree to the total	In algorithm is any well defined computational.
semiliar of the	pracedure that takes some values or set of
gainsu	Values as input and produce some values or
	Bet of Nalues as crutput.
	In algorithm is thus a secuence of computation
	steps that transform the input into output.
4	The output should be generated in finite time.
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(iii)	Time Complexity:
→ →	The amount of time taken by any algorithm
	The amount of time taken by any algorithm to run is called time complexity.
23.545	MARKET AND THE PARTY OF THE PAR
(iii)	Space Complexity:
· -	The amount of space taken by an algorithm
ion com	The amount of space taken by an algorithm is salled space complexity.
Marral	
2.	Explain why analysis of an algorithm is
	important? Explain: Horst Case, Best Case
	and Axurage Case Complexity with Suitable
A ROMA	example.
	Inalyzing an algorithm has come to mean.
	predicting the resources that the algorithm
'	requires.
the second secon	Resources such as memory, sammunication
	pandwidth or computer hardware are of
Wicion	

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	primary concern, but most often it is
	competational time that we want to measure.
→	By analyzing several candidate algorithms for
1000	a problem, me can identify a most efficient
	one. Importance of Analysis:
→	To predict the behaviour of an algorithm
Same	without implementing it on specific computer
· ·	It is impossible to predict the exact perceious
1000	of an algorithm. There are too many influencing factors.
	factors.
- 10 ->	The analysis is thus only an approximation.
	It is not perfect.
2717 +1	By analyting digirent algorithms, we can compare them to determine the best one for our surpass.
	compare them to determine the best one for
And the second s	
~~~	There are three types of algorithm Analysis
(4)	GIST COSL:
>	Define the input for which algorithm takes
	less time or minuming time on the best case
50/3472	salculate the laws bound of an algorithm.
7	Edample: In the linear dearch when dearch
	- data is present at the first location
	of large data then the best case occurs.
,	1 lough Con
	Worst Case:
-7	Define the input for which algorithm takes a
مد	lang time or max m time.
	In the worst case a calculate the upper bound
٠٠,	of an algorithm.
	Grample: In linear search when search doctor is
Vision	The present at the five worst case occurs

Cilia	drivinge Case:
4	In the average case take all random inputs
Car Jane	and calculate the computation time for all
	inputs and divide by total no of inputs.
. >	The arrage case gives value beto ripper
	bound and laure bound
	bound and laurer bound.
	: Average cost = all
	Example: In linear search when the element
•	is something other than first and
	last present in array is called
	axurage case.
<b>3</b> .	dolar the recurrence:
1.	$Tcn = 7T(n) + n^3$
	2
-7	Here comparing the egg with standard egg
	Here comparing the egr with standard egr of Master theorem
	i.e Tcn: aT(n) + fcn)
•	
	$a = 7; b = 2; f(n) = n^3 : d = 3$
In the contract of	the desire of the second with the
	: a 6 b d
	1.0 7 4 23
	Hence 1
	Ton = O(nd)
	$\frac{T(n) = \theta (n^3)}{\sqrt{n^3}}$
	The state of the s
	A S D MINISTER OF THE PARTY OF

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2.	$T_{cn} = 2T(n) + n$	
***	Here, comparing given ean with standard.  of Master's Theorem i.e.	eqn
	T(n) = aT(n) + f(n)	
Lement.	$\frac{1}{a=2}, b=2, f(n)=n$ $\frac{1}{a=2}$	9
	1:e 2 = 2±	
	Thus, by Master's Theorem	
	Ten = O (not logn)  Ten = O (not logn)	
<b>3</b> .	T(n) = T(n) + n	)
->	Here scamparing gives ear with standard ear of Master's Theorem i.e.	
	T(n)2 aT(B) +f(n)	
	i a=4; b=2; f(n)=p	
	Now, albol ietrot	
vision		

=	
	Thus, from Master's Theorem
34243444-37	Tons = O cod)  Tons = O cod)
	1039 - 103 Ph 105 - 31
	$T(n) = 5T(n) + n^2$
→ -	Here, scamparing the given en with standar
	i.e. Tcn) = aT(n) +fin)
	i a 25 j b - 2 j find = n?  i d = 2
	Now, 52 arbol ile 5722
-	Thus, from Master is Theorem
	Tin) = O (nlog ba) Tin) = O (nlog 25)
	The second secon
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	T(n) = 4T(2) + n
<b>→</b>	Here, comparing the given equith standard
	Le T(n) = aT(n) +f(n)
a tracke	Now, azba
	Now, azbd i.e 4z4±
	Thus, By Master's Theorem.
	$T(n) = \theta (n^{d} \log n)$ $T(n) = \theta (n \log n)$
<i>4</i> . →	Inplain asymptotic notation in détail.  The efficiency of an algorithm can be
<b>→</b>	There are three types of Asymptotic notation.
¥,	Big Oh (O): It distides the defines the repner bound of an algorithm.
<b>→</b>	det fin) and gin be two non negative funt. det no and constant c are two integers such
	12 no denotes some values of input and
Vision	that cro.

-> Inle can curites O(g(n)) = { f(n): there exists positive constant Osfens & gens 4 N/2 203 eg: f(n)=2n+2; g(n)=n2; c=1 det n=1 3 f(1)=4 g(n)=1 n=2 f(2)=6 g(n)=4 n=3 f(3)=8 g(n)=9: no = 3 Omega (-2): It defines the lawer bound of an algorithm -> I fun for is said to be in organ) if for is bounded below by some the constant multiple of gcn Such that. a (gen) = E fen): there exists positive constants of c.gcm & fem 3 eg: fin) = 2n2+5 ; gcn)= 7n; c=1 n=+ f(+)=+ j g(n)=+ n=2 f(2)=13; g(n)=44 n=5 / (3) = 23; g(n) = 24 n=4 f(4)= 3+j g(n)=28 2 VOS 2 vision

	Theta (0): It bounds the fun from abose and below.
->	det fin) and gen) be two non negative funn. There are two tre constants ex and co such that
	an Kin to Complete the South South
	O(g(n)) = { fin): there exists + re constants
	C1, C2 & 20 such that
	0 x c+ g(n) x f(n) x c2 · g(n) 3
	de Contraction
5.	Explain the characteristics of an algorithm.
<b>→</b>	The various characteristics of algorithm are
4.	The various characteristics of algorithm are Input: The algorithm Should externally
15 101	supply zero or more quantities
	i·e (atleast one input)
2-	Output: It should generate at least one
	output
3.	finiteness: The algorithm should terminate
	after some dteps.
4.	Effectiveness: Hhich is in dimple language
	with ess sime and space complexity
5.	Unambiguity: Instruction given by algo Should
	be clear and straight forward
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