* Breadth First Search can in on dilected undirected graph and we ignore iny meights. me will onsume en underline adjancey list representation. me start from a newtex, and exploit them in the order of the number of links they are away ex: i-e all nertices that are I link away, thin 2 etc until all reachable are finished. * Simple Implementation: BFS (Start Vertex) Reset (naph () Reset (maph () ton VEV start Verlex. disconered = time V. disso neved = Falp_ y=new grene () Q. enqueue (startvertex) while I not Q. is Empty) u= g. degnine () tox each v s.t u > v if (not v. disconered) v. disconered = True bbo goenquere(v) what it does is marks all the reachable merter for same graph me can get a different BFS built depending on what node you pick as Start Vertex.

Detailed Implementation: * Reset (raph () ton VEV BFS (start/ertex) V. disconced = False Rejet Craph () Start Verlex. disconered = Time v.dist = 0 start Vertex, dist = 0 V. T = nil g=new grevel) G. enqueue (start Verter) while (not Q. is Empty) u = Q. dequere toh each v s.t u -> v if (not v. disconered) and special special v. disconeled = Tene v.dist = u.dist +1 , v.T = U g. enqueue (V) BFS gives the snortest path FindPath (startVertex, V) if (v == start vertex) return new list (), add (v) if (v. T == nil) return nil. return FindPath (startvertex, v. TI), add (v) union of all the paths gives the BFS bree. the mole the connected the graph it, more burny its BPS trees tends to look

	January A ware to ado do the
*	Another approach to discovered not discovered is
	Another approach to discovered not discovered is when vertex colors - white for undiscovered,
ST W	gray discovered but not yet finished (in the grene).
	gray discovered but not yet finished (in the queue), black - after its finished.
	Lairenter D as montheres :
*	Analysis
1	Reset graph taxos OllVI).
San M	Let V', E' be the nextices and edges reach able
	from the start newtex.
1	• O(1V1) → nertices disconered, enque med and dequad
	· Θ(1E'1) → edges explosed by dequened vertion
	The state of the s
	Total suntime O((VI+1E'1) 610 0 (1VI+1E1)
*	what does it achieve?
-	marks as dis conved
-	colculates min dist from start Vertex
	calculates path/parent.
	tor all reachable mertices. (disconerable)
The same	

*	
Λ	Correctness Argument:
Aur	Server and the Manual and an entire of the property of the statement of
• 22	Set of nertius in Q never has more than 2
- W - Z	distinct distances, one apart. Values enter and
,	exit 9 in non-decleasing distance usder.
	(Induction on Quentents)
	Lighton Lighton
•	All reachable nertices will be dis conered.
da,	enqueued, marked awith conect minimum link
	distances and ratid predecessor nodes (except
ゆ も	the start nectex), which are never changed
1112	again of ad birdy, a supply - [131]
	(Induction on edge count from start node)
	(17) + W Dens (19) HIMB ENHANCE LIV .