- er black in skundigset for for the little from the little state of the little state	Last week we gave knowl algorithms by Knowskel and Prime for constructing a MET
t Chainman chainn ag think de la bhaill a bhail a bhaill ag l	
or PS is a historia of special and a similar decision of the School and School and School and School and School	We then started discussing Single Source Shortest Path problem in which are
	are given a weighted directed graph an a vertex as imput and we have to counte,
والمستور ومن تروي والمراوع والمراوع والمراوع المراوع المراوع المراوع المراوع المراوع والمراوع والمراوع والمراوع	to each vertex, the length of the shortest directed path from the ingert water
men mendadi ing mingapangga pilag salah dalah milah mpaggisak pendadi mendadi salah pendadi mendadi salah mendadi salah sebagai bada salah sebagai s	In portant observation:
	Cotional substructure: It p = < ves s=ve, is a shortest path from vo to ve
	then Youicisk «Vi-vi» is a shartest path from v. to vi
ont with the first that all the state of the	Negative cycles: It to a magnetia cycle than no solution
	Relax(u,v,v): Initialize-Single-Source(GS)
والمتعارض والمتع	1. It will a will a well with the sand ve fiv
erikkuminosikki kilji <u>esti katikatinin ja Cali — o</u> otosa i <u>paksasto kyr</u> j _{el}	2 v.d = u.d + w(u,v) 2 v.d = 0 v.T = N/L
	V. 7 = 4
indrinaen 1996 kilometriaet för til förri tillningsminimisen til 1996 för	
	Bellow-Ford alg: Bellow-Ford (G. W.S)
renteriar est a la faces y populado à las relativas historias planta faces planta est esta esta esta esta esta	2 For 1=1 to [6.VI-1
	3. For each (u,v) E G.E
	Lelax (uv, w)
nd k klassic - esperperior de la fej y y y za	S. For each edge (wiles
omniometris delevision frim free from the first friends of the first friends of the first friends of the first friends of the first free free free free free free free fre	La It v.d > u.d + v luv)
onderstanderlige og det filosofisk det det og filosofisk det skalenderlige og grænde skalenderlige og grænde o	?. Return False (nez cycle exist).
	1. Return True
110 Senimina 1988 (III-ii) in energy paga (III senimina 1985) in energy paga (III senimina 1985) in energy pag	

\2.1	
	were Run flow is O (WIFI)
	Aw lyss
	Main Lemma:
minkys kais esse pos juhanksis varas joja kus kikus esi, kan kung esse us esse john panden.	If p= (vo_,vk) is a shortest goth from vo to vk and we relax edges of p
тими изгления пред температуру и температуру	in the order (volve), -, (vx1, ve) then vk of = 8 (vo.vk) (the distance legth of
e a a a a a a a a a a a a a a a a a a a	the shortest path). This remains true even if other relaxation steps occur.
n ng ghina ka ka ng mga Shanka ng mga Shanka ng mga Shanka na ha shi shi ka ka ma ng mga ng mga ng mga ng mga s	(Assuming no negative cycles).
on the state of th	
	By industria on the Forthern granted this is trible. Also easy to see from:
n agger galadas likas sen en e	The Komme by industrien are over is a sope and by ind. hyp. Vm. d = 8(va, va)
эта арагын тайын айын айын айын айын айын айын айын	Regardless of other relaxations, when we relax (var, vane) we get that indressed outsign)
. түүнө түлүүлүй өдү өзүнө өзүнө өзүнө өзүн буйуу уулуу түйүү бүйгүү бүй байгаа туулуу буйуу туугуу буйуу туугу	= S(vs Van)
	Comment: we should have also argued by induction that vid to 5(vor) families
	Coolley: it no negative cycle, stree each path of length and after no steps of
	relaxing all elges all distances are computed connectly,
	Are not had do see that we get a from at shortest proofle.
a symphological symphological policy and the state of the state of the symphological s	
hings has been been been been been been been bee	Cookings it my cycle exists me will catch HI
	11: it cycle is <00, v; > the \(\frac{\cappa}{2} \) (v; vs.) <0.
ramakas seeme merupakan kalabah sebus sebus sebus kalabah sebus se	it we tail to that it in line 1-7 then
en person perhapsikal dasah kelalah dalah person personah kelalah seringan personah dalah dari bersasa persona	Vi.d & Valid & W(Vinys)
The second state of the second	=> \\ \(\frac{2}{2}\vert_{1,d} \) \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
e galantida de la sega que formado fortamente per promotivado de la fresciona de la composição de la composi	As vo=va we get a contralista
and the state of processing about the state of the state	

12.2	
	Next we are going to see another classical alg. Le do Dijkstra in case when all
	te vijk er mydle
a. propriormentales (1985) de la constitución de la	The busic idea is at each step to resolve the distance to one notex and adjust
	At not stud accordingly
	For example at the first step we are assumed that for some neighbor of s, y
es andrias destributados de la filia d	veda 8(ev)= week ets
	we shall use a num priority-greve again, sorted according to u.d.
والمساور ويستوار والمنافذ المساوري والمشافذ المساورة المساورة المساورة والمائية والمساورة والمساورة والمساورة	Dijkstra(GSW)
$-1.5 \times 10^{-10.00} \times 10^{-10$	1. Tribille-Syl-Correlled
embaterii (n. n. 1. n. 2. n. 2. n. 1. n. 1	7. Se d-CV mingrisit-quale
	3 While Q & C
s summer general comment state to the state of	4. u. Extract-min(Q)
	For each ve G. Adjeus
	and a superior of the second s
	The running time is O((E + V). a V). Forted, we need O((V)) at line 2 and
1.5.6.2554.058-399-199-256-3955555555555555555555555555555555555	En line 1. For each edge we have to decrease key which costs O(1g/V).
pamyan panahingan pinahinka kanahingan kalakapap pinahan pakapatan kalakabah kemi	For each v we also here Extract-min which costs O(G[VI))
	Analysis: At each at iteration all voltices in G.V I a satisfy v.d = 8(0, V) a
	about the each vice visits win har to have to to c. The
4 siyammaminin ka ba	Since at the end Q=0 this proces gives correctness.
and has been been able to the second of the	
eministrika indise a kisembendik di Albilik esin disebelah dibin diangkapi fijih indi emitimmik disebelah	

· AND STATE OF

It we we Fibonacci-Heap can recluse greather to O(My 1/1 + 151)

en var sala sala kala sala sala sala sala sala	All Pains Shortest Poeths (APSD)
	The god is to comple, for every year, the shortest path between them (work, man)
oppopper proprietation in the contract of the	We can you the SSSP aig IN time to pet O(V3) or O(VEIJV) time alg.
	(or the O(1v124V+VE) using Fib. Leap), it all wh 70.
ng gi kalana kanakan k	If this is not the case we must run Bellmon-Find and jet U(NºE)!
- and the second-industry and all special spec	
- ng nangginting ng ng managan na na ng	We will be an ody. Hat does betder.
iintaan oo in ta'ay ka	Here it will be convenient to assume the input is given by adjacency martix
in con-in-in-in-in-in-in-in-in-in-in-in-in-in	W, where Wij = w(ij), when we think of G.V as E1.24 -, 16.01?
an ang ang ang ang ang ang ang ang ang a	It then is ne edge ((i)) we have w(ij)=0.
	The ortpot will be represented by a matrix p when Dij = & (ij) and a
and a state of the	matrix T where Tij = NL it is or there is no ins ; porth and aw
enstan anna Lauren anna anna gceann ag Chaill a Tha Gaill ann an Air ann an Air ann an Air ann an Air ann an A	by its predecessor in a shotest insignath
uning uning series and	
opunpin syr iii 12 111 (1111 (1111 (1111 (1111 (1111 (1111 (1111 (1111 (1111 (1111 (1111 (1111 (1111 (1111 (11	We will present the Floyd-Worshall alg
	The Ula is for every (iij) and is to compute the sop form ini that only
99.299.2295.4195.6666.655.255.255.255.455.455.455.455.455.455.4	yes through vertices in Sq. o, 123. Then we increase k until be get lean.
	The reasoning is that if p is a making path immi using only 11 - her?
	the it must be of the form ins jor ins ker insj
estatuantia nitro del relativa se estatuita de esta si nitros en accidantina de mandra de la relativa de la re	Thus, it can be solved by using the intermethen computed so her.
pauliolaksiooonistooliksiooliksiooliksioonistooliksioonistooliksiooliksiooliksiooliksioonistooliksiooliksiooli	Have :
	CH = Wij
ikuminas priisidadaminis ja ja pieteimaja ja ja pieteimaja ja	dij = wij (w) (w) (w) (w) die dij die die de
-androideadh (b. 1904) Sheisin (b. 1997) a bhainn fhe ghainn an bhainn (b. 1904) Sheisin (b. 1904)	