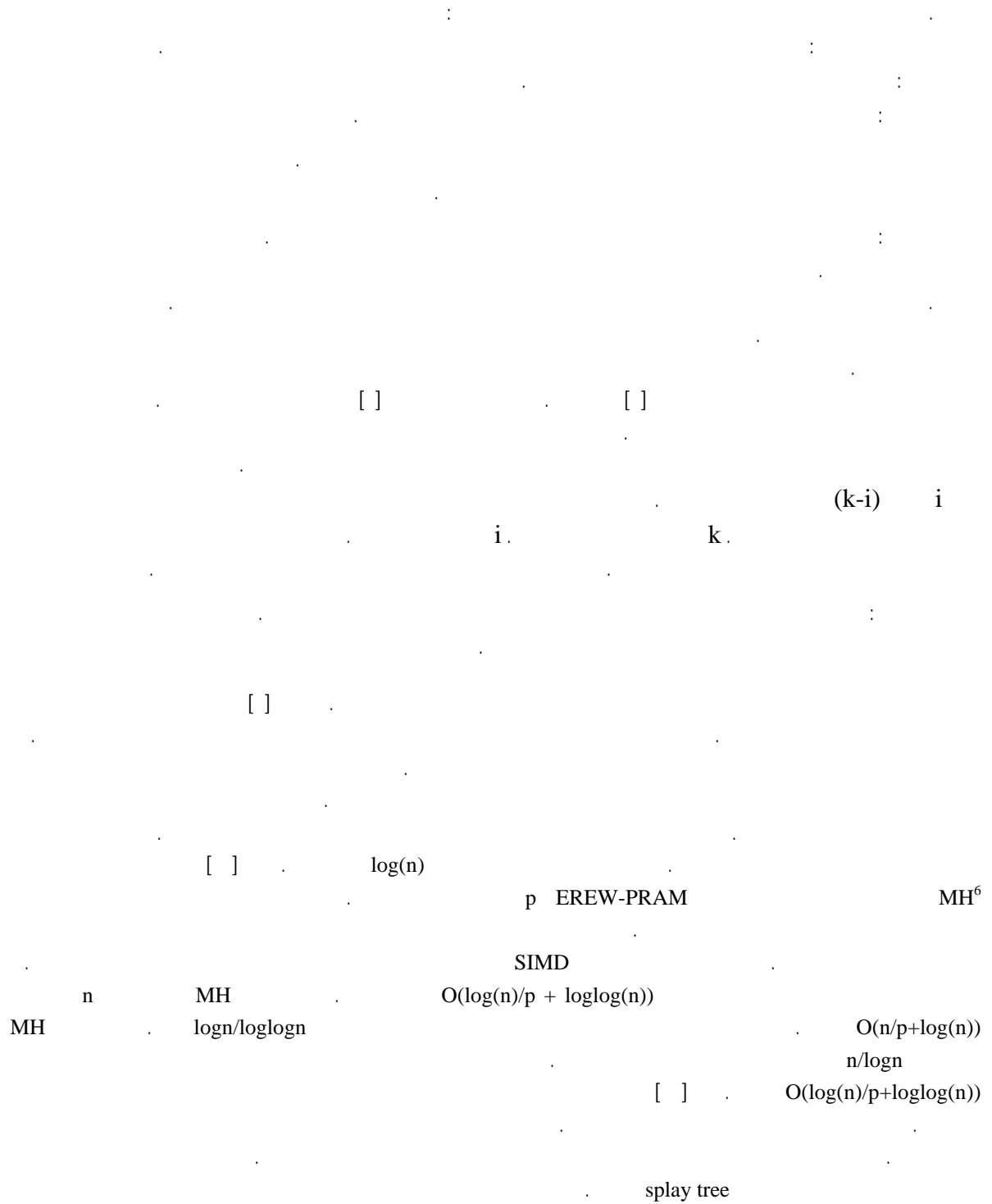




# Pipeline




---

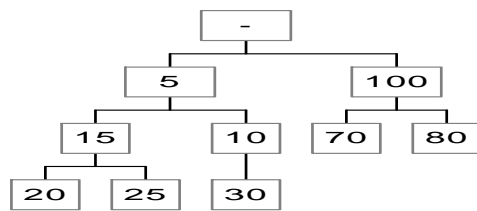
<sup>3</sup> Min Heap  
<sup>4</sup> Max Heap  
 pipeline  
 Min-path Heap



log(n)

log(n)

log(n)



( )

$$\log(n) + \log(n)/2$$

:( )

:( )

$\log(n)$

$$\log(n) \quad \log(n) + \log(n)/2$$

		min/max
		$\log(n)$
min/max	$\log(n)$	$\log(n) + \log(n)/2$

		min/max
min/max		$\log(n) + \log(n)/2$

		min/max
		$\log(n)$
min/max		$\log(n)$

		min/max
min/max		log(n)

$$\log(n/p) =$$

$$\log(n) - \log(p)$$

p

n

n mod p

p p/4

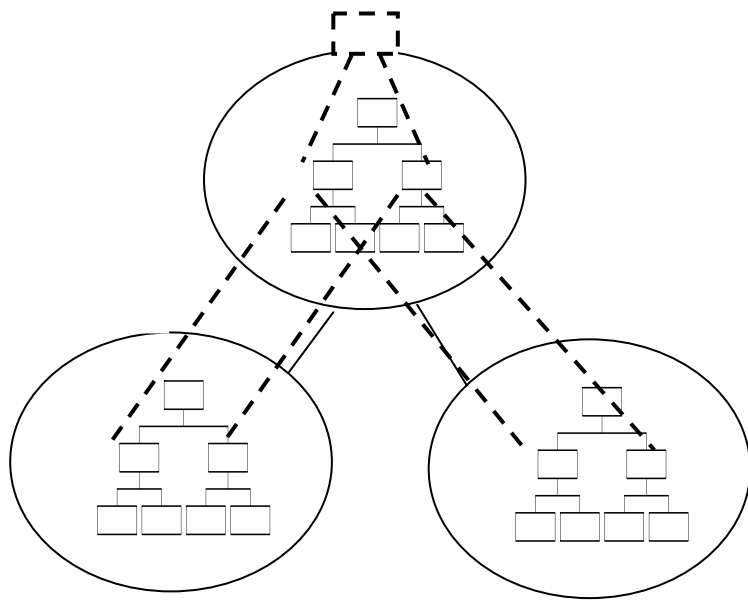
s

n mod (p+s)

p=16

(0, 5, 10, 15, 4, 9, 14, 3, 8, 13, 2, 7, 12, 1, 6, 11)

s=1



:

:

:

•  
•

:

:

:

•  
•

:

( )

( )

( )

( )

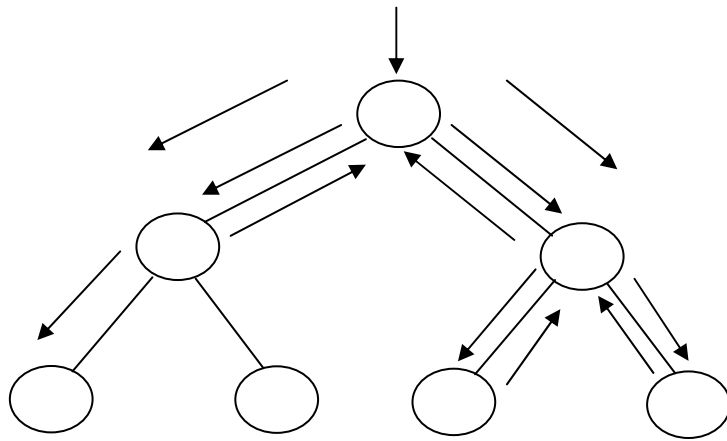
( )

( )

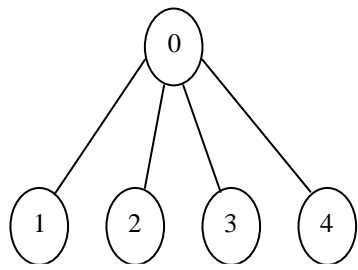
( )

•  
•  
•  
•

( )



:



:

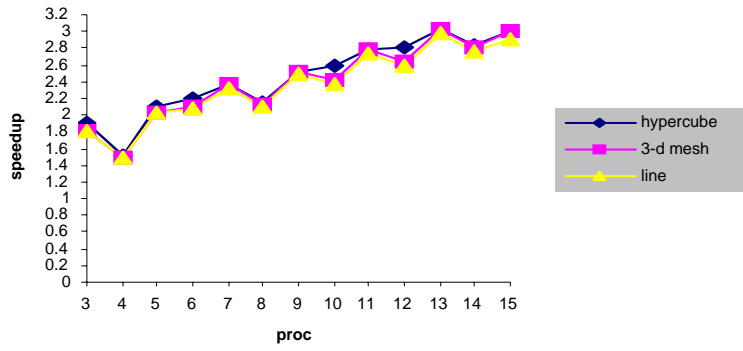
( )

( ) Deap :

		min/max
min/max		

:





speedup

p

p

		min/max
		p
min/max		p

multi-pascal

**AKU Cluster**

[ ] AKU Cluster

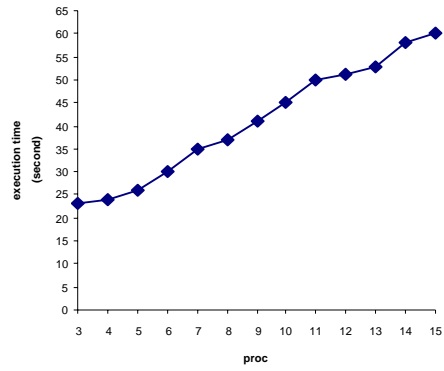
[ ] MPI

AKU Cluster

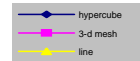
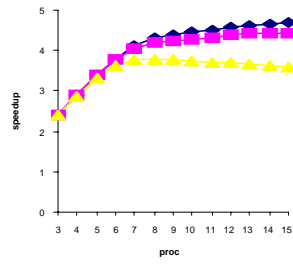
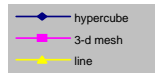
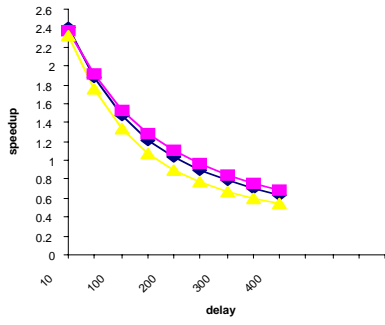
k

i

AKU Cluster



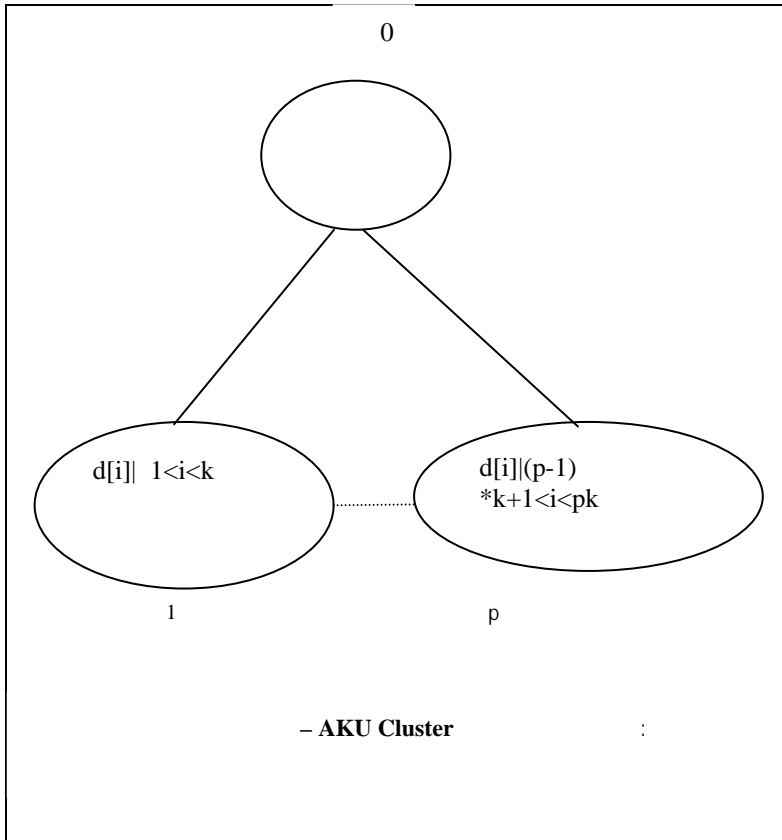
AKU :  
Deap Cluster



speedup

:

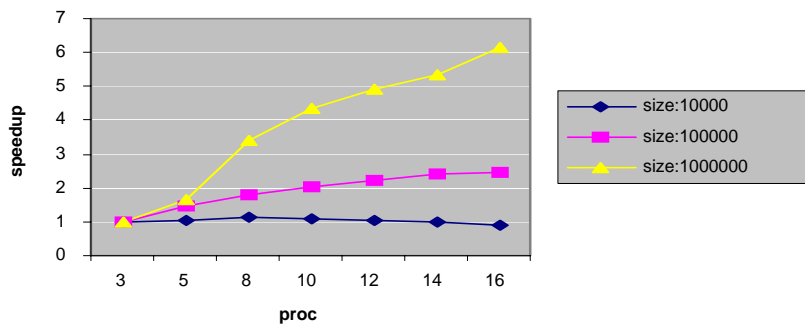
:



AKU Cluster

AKU Cluster

AKU Cluster



Deap AKU Cluster Deap :  
Deap

- [1] A. R. Ornen and J. D. Brock, "Implementing a Dictionary on Hypercube", Proc. of Int. Conf. on Parallel Processing, pp. 707-709, 1987
- [2] W. J. Dally, A VLSI Architecture for Concurrent Data Structures, Kluwer Academic Publishers, 1987.
- [3] M. R. Meybodi, "Concurrent Data Structure for Hypercube Machine", Lecture Notes in Computer Science: Parallel Architecture and Languages, Springer Verlarge, pp. 559-577, 1992

[ ]

- [5] V. Nageshwara Rao and V. Kumar, Concurrent Access of Priority Queues, Department of Computer Sciences, University of Texas at Austin, Austin, Texas, USA, 1992
- [6] Sajal K.Das and F. Sarkar, Distributed Priority Queue on Hypercube Architecture, Department of Computer Sciences, University of North Texas, USA, M.Cristina Pinotti, Istituto Elaborazione dell'Informazione, CNR, Pis, Italy, 1996, IEEE
- [7] S. Olariu and Z. Wen, "Optimal Initialization algorithm for class of priority queue", IEEE Tranzaction on parallel and distributed system, vol 2, no. 4, october 1991
- [8] A. V. Aho, J. E. Hopcrat and J. D. Ullmar. The Design and Analysis of Computer Algorithm, Addison Weley. 1974
- [9] E. Horowitz, S. Sahni, Fundamental of Data Structure in Pascal, third edition, 1990
- [10] H. yong youn and J. Young Lee," An Effitont Dictionary Machine Using Hexagonal Processor Array", 1996 Trans. on Parallel and Distributed System. Vol. 7, No. 3, pp. 226-273
- [11] T. A. Ottman, A. L. Rosemberg, and L. J. stockmeyer, "A Dictionary Machine (for VLSI)", IEEE Trans. on Computers, Vol, 31, No. 9, pp. 892-897, 1982
- [12] H. Beigy and M. R. Meybodi, Complete Binary Search Mesh: A Cocurrent Data Structure for Distributed Memory Parallel Computer, Technical Report 4CE98, Computer Eng. Dept., Amirkabir University, Tehran, Iran, 1998.
- [13] M. R. Meybodi, "Binary Search Mesh: A Concurrent Data Structure for Hypercube Computer", Proc. of ICEE-93, Amirkabir University, Tehran, Iran, pp. 601-607, May 1993
- [14] H. Beigy and M. R. Meybodi, Complete Binary Search Mesh: A Cocurrent Data Structure for Distributed Memory Parallel Computer, Technical Report 4CE98, Computer Eng. Dept., Amirkabir University, Tehran, Iran, 1998.
- [15] Galen C. Hunt, Maged M. Michael, "An Efficient Algorithm for Concurrent Priority Queue Heaps", Srinivasan Parthasarathy, Michael L. Scott, Department of Computer Science, University of Rochester, Rochester, NY, 14627-0226, USA, September 1996
- [16] Maria Cristina Pinotti, Geppino Pucci, Prallel Algorithm for Priority Queue Oparation, Via S.Maria 46, I56100 Pisa, Italy, 1994
- [17] Bernard Mans, Portable Distributed Priority Queues Whit MPI, Department of Computer Science, Jame Cook Univercity of North Queensland, Australia, 1998

- [18] Peter S. Pacheco, A User's Guide to MPI, Department of Mathematics University of San Francisco, March, 1998
- [19] Bruce P. Lester, The Art of Parallel Programming, Maharishi International University, Fairfield, Iowa, 1993
- [20] M. R. Meybodi, "New Design for Priority Queue Machine", Proc. of PARBASE-90, Miami, Florida, pp. 123-131, May 1990
- [21] H. Beigy and M. R. Meybodi, Notes on Binary Search Mesh: A Concurrent Data Structure for Hypercube Computer. Technical Report 3CE98, Computer Eng. Dept., Amirkabir University, Tehran, Iran, 1998.
- [22] Michael J. Quinn, Designing Efficient Algorithm for Parallel Computers, University of Hampshire, 1987
- [23] M. R. Meybodi, "Tree Structured Dictionary Machine for VLSI, Proc. of 23th Annual Modeling and Simulation Conf'., School of Eng., University of Pittsburg, Pennsylvania, pp. 703-724, May 1992.