SOLUTION NOTES

Digital Communication II 2003 Paper 7 Question 2 (JAC)

a)
work conservation:-
informally: "if there's packets send, don't let line go idle"
formally: sum over flows of rho_i&q_i = C
for rho+i = lambda_i mu_i
lambda_i = ith arrival rate
mu_i = ith service rate
q_i = mean delay in queue due to scheduler
=> C Is capacity in some sense

max-min fairness:-
informally: you can't increase any one flow's share without unfairly decreasing another
formally
M_i = (C - Sum over flows i m_i) / (N - i + 1)
allocation to flow i is capacity left after we allocate all those that fit, and share out all that is left amongst N other flows as their demands arrive...

This was presented in the 2 lectures on scheduling in packet switches in Crowcroft's part of course at some length

b)
max min fair: WFQ and WRR or DRR or similar -
WRR is round robin, but weight by packet size in each flow
WFQ is round robin, but weight by time used in virtual clock in previous round

not fair: FIFO, Priority Queue, or similar -
FIFO - FCFS
Priority - FIFO on top priority till empty, then serve next priority, etc

was presented (and in handouts) as above...

c) Costs are:
signalling - i.e. flow state setup to classify/recognize packets in flows
+
per flow state - need to have a data structure which is indexed for each packet

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and possibly updated....

was in the interface to QoS (API) 2 lectures...


all above material is in syllabus under items 2,3 and 5
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