CS 672 - SPE Example

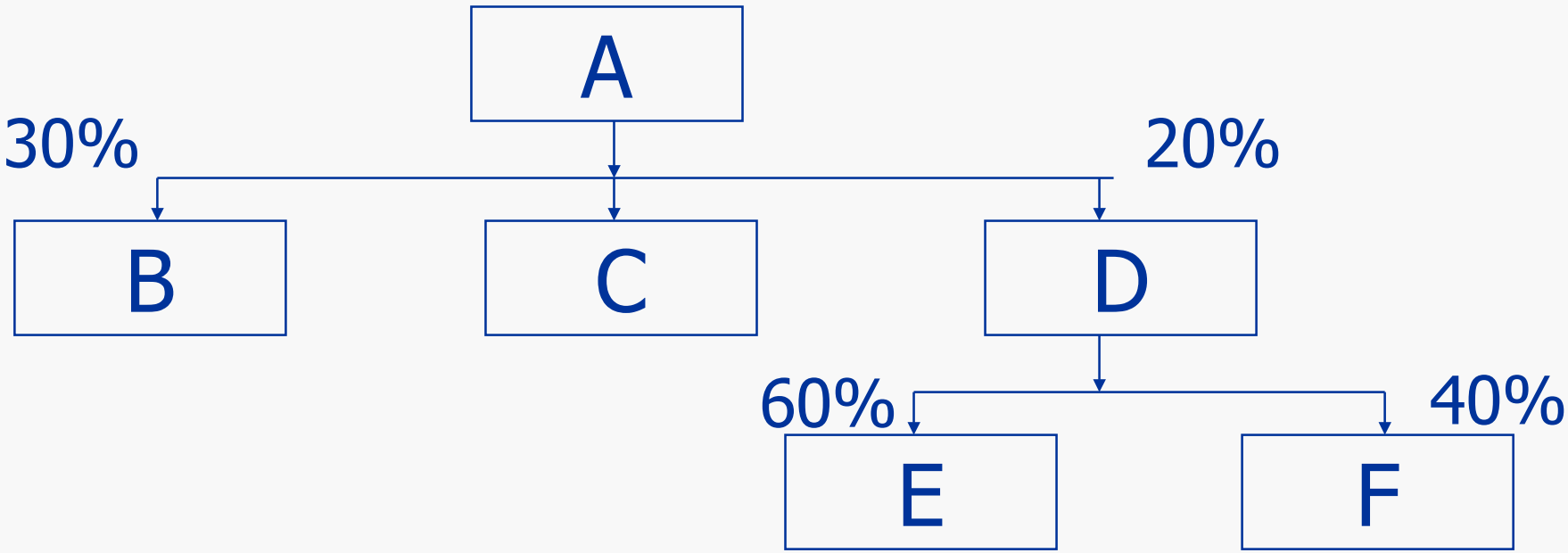
Daniel A. Menascé, Ph. D.

menasce@cs.gmu.edu

www.cs.gmu.edu/faculty/menasce.html

Exercise 1

- A new database application is being developed. It consists of query transactions and a batch DB update that runs non-stop. The query transaction has six main modules (A, B, C, D, E, and F) as illustrated in the figure below.



SPE Example – More Data

Module	Estimated Number of Simple SQL calls	Estimated Number of Complex SQL calls
A	3	3
B	4	2
C	20	10
D	12	8
E	30	10
F	25	9
No. I/Os per simple SQL call	5	
No. I/Os per complex SQL call	30	

SPE Example – More Data

Results of an experiment:

Number of I/Os	CPU time (msec)
1	0.95
2	1.87
3	2.82
4	3.65
5	4.64
6	5.50
7	6.30
8	7.35
9	8.30
10	9.15
11	9.90
12	11.01
13	11.93
14	12.80
15	13.75

Avg. disk time per I/O = 10 msec.

SPE Example – More Data

- The update is a single process that executes an average of 80 complex SQL calls.
- Assume a single CPU and a single disk. Compute the service demands for queries and updates.
- Considering queries only, what is the maximum arrival rate of query transactions?
- Compute the estimated response time and throughput for an arrival rate of query transactions equal to 75% of the maximum.