Performance Modelling — Solution to the Exercise at the end of Lecture 3

Jane Hillston
School of Informatics
The University of Edinburgh
Scotland

26th January 2017

Example

Consider the two-processor version of the multiprocessor with processors A and B.

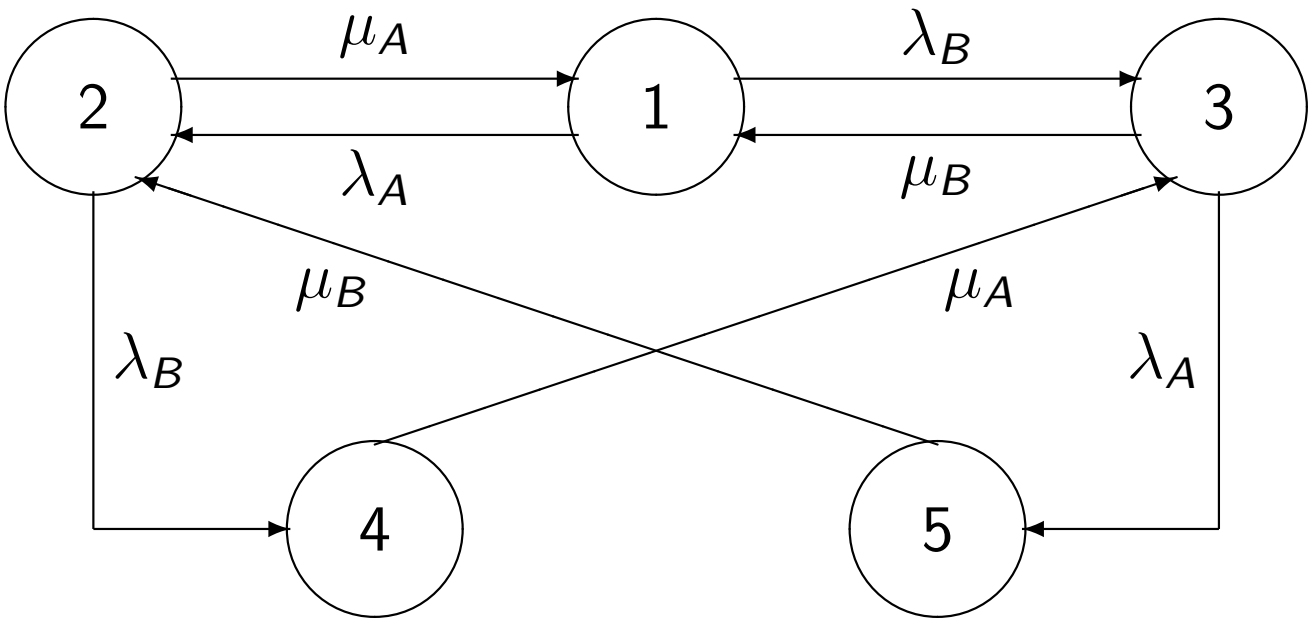
We assume that the processors have different timing characteristics, the private memory access of A being governed by an exponential distribution with parameter λ_A, the common memory access of B being governed by an exponential distribution with parameter μ_B, etc.

Example: state space

Now the state space becomes:

1. A and B both executing in their private memories;
2. B executing in private memory, and A accessing common memory;
3. A executing in private memory, and B accessing common memory;
4. A accessing common memory, B waiting for common memory;
5. B accessing common memory, A waiting for common memory;

Example: state space



Modelling Exercise

- Consider the multiprocessor example, but with three processors, A, B and C sharing the common memory instead of two.
- List the states of the system, and draw the state transition diagram for this case.
- What is the difficulty in doing this and what further information do you need?
- Solution will be presented online later in the week.

States

1. A, B and C all executing in private memory

States

1. A, B and C all executing in private memory
2. A accessing common memory, B and C executing in private memory
3. B accessing common memory, A and C executing in private memory
4. C accessing common memory, A and B executing in private memory

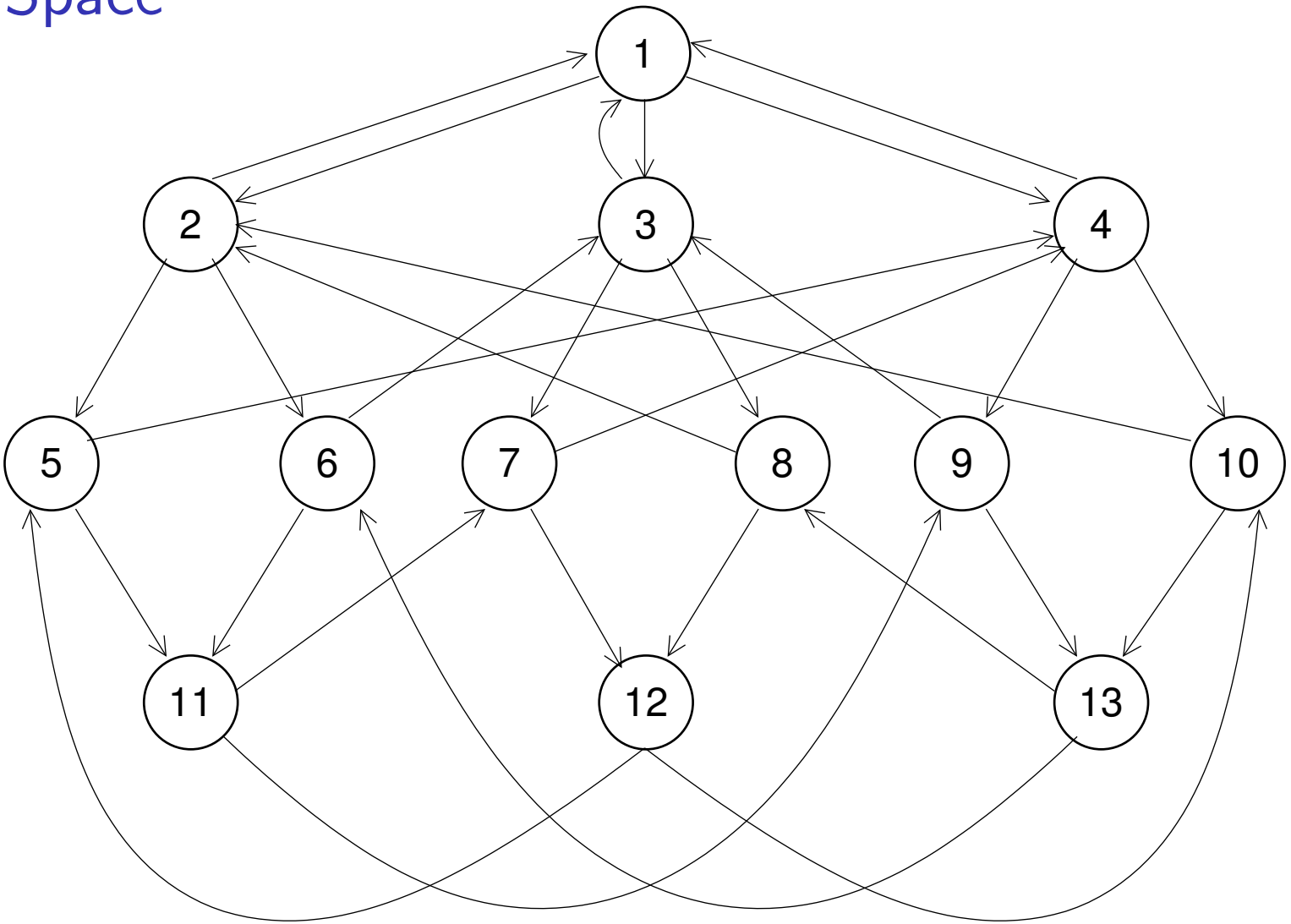
States

1. A, B and C all executing in private memory
2. A accessing common memory, B and C executing in private memory
3. B accessing common memory, A and C executing in private memory
4. C accessing common memory, A and B executing in private memory
5. A accessing common memory, B in private memory, C waiting
6. A accessing common memory, C in private memory, B waiting
7. B accessing common memory, A in private memory, C waiting
8. B accessing common memory, C in private memory, A waiting
9. C accessing common memory, A in private memory, B waiting
10. C accessing common memory, B in private memory, A waiting

States

1. A, B and C all executing in private memory
2. A accessing common memory, B and C executing in private memory
3. B accessing common memory, A and C executing in private memory
4. C accessing common memory, A and B executing in private memory
5. A accessing common memory, B in private memory, C waiting
6. A accessing common memory, C in private memory, B waiting
7. B accessing common memory, A in private memory, C waiting
8. B accessing common memory, C in private memory, A waiting
9. C accessing common memory, A in private memory, B waiting
10. C accessing common memory, B in private memory, A waiting
11. A accessing common memory, B and C waiting
12. B accessing common memory, A and C waiting
13. C accessing common memory, A and B waiting

State Space



State Space