Quantitative Evaluation of Embedded Systems

Solutions for the set of exercises
Graph 6
Simulate 6 firings

Diagram with nodes labeled D, C, B, A, and edges labeled u and y. Numbers and connections are shown with specific values.
Determine the \((\text{max,+})\) matrix equations

\[
\overline{x}(n+1) = \begin{pmatrix} -\infty & 0 & -\infty \\ 3.3 & -\infty & 6.9 \\ 3.3 & -\infty & 6.9 \end{pmatrix} \overline{x}(n) \max \begin{pmatrix} -\infty \\ 3.3 \\ 3.3 \end{pmatrix} u(n)
\]

\[
\overline{y}(n) = \begin{pmatrix} -\infty & -\infty & 1.1 \end{pmatrix} \overline{x}(n) \max (-\infty) u(n)
\]
Calculate the maximal cycle mean

$MCM = 6.9$
Give a periodic schedule for arbitrary $\mu$
There is one token between input and output, so the latency bound is
\[ 0 + 1.1 + 1 \times \text{MCM} = 8.0 \]
Optimize the per. sched. for arbitrary $\mu$

```
3.6 \max \mu - 3.3
```

```
4.9 \max \mu - 2
```

```
1.1 \max \mu - 5.8
```

```
0
```
Given this optimized schedule, the delayed latency becomes:

\[ 0 + 1.1 + 1 \times \mu - (3.6 \text{ max } \mu - 3.3) \]

\[ = \]

\[ (\mu - 2.5) \text{ min } 4.4 \]

\[ = 3 \text{ since } \mu \geq 6.93 \]

\[ 4.4 \text{ which is independent from } \mu ! \]
Give/plot minimum buffersize A-B