Worksheet: Analyzing Parallelism in an Actor Pipeline

Consider a three-stage pipeline of actors, set up so that P0.nextStage = P1, P1.nextStage = P2, and P2.nextStage = null. The process() method for each actor is shown below.

Assume that 100 non-null messages are sent to actor P0 after all three actors are started, followed by a null message. What will the total WORK and CPL be for this execution? Recall that each actor has a sequential thread.

Input sequence

$$\ldots\ d_9 d_8 d_7 d_6 d_5 d_4 d_3 d_2 d_1 d_0 \longrightarrow \boxed{P_0} \to \boxed{P_1} \to \boxed{P_2}$$
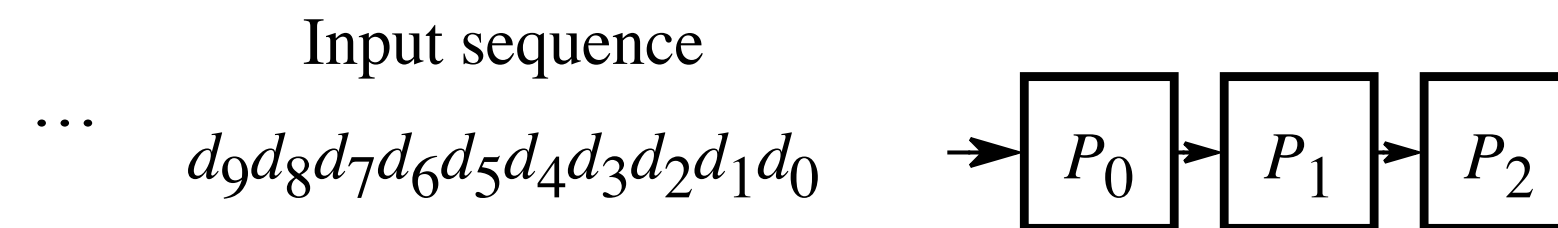
```
1.    protected void process(final Object msg) {
2.        if (msg == null) {
3.            exit();
4.        } else {
5.            doWork(1); // unit work
6.        }
7.        if (nextStage != null) {
8.            nextStage.send(msg);
9.        }
10.    }
```

WORK = 300, CPL = 102