Worksheet #23: Analyzing Parallelism in an Actor Pipeline

Consider a three-stage pipeline of actors (as in slide 5), 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

\[ \ldots d_9d_8d_7d_6d_5d_4d_3d_2d_1d_0 \]

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. }

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