Scheduling Disciplines Learning Tool

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May 15th, 2010

Project Goals

- Animated learning tool
  - Visual
  - Interactive
- Simulation of Process scheduling
  - The order in which processes run on the CPU
  - Key to OS performance
  - Short-term scheduler
  - Simulate the fundamental scheduling disciplines

Scheduling Disicplines

- First Come First Served
  - Processes are scheduled in order of arrival
- Round Robin
  - Processes are given a fixed time slice to run for
- Shortest Job First
  - The process with the shortest expected burst time is chosen
  - Burst times are estimated using exponential averaging
- Shortest Remaining Time First
  - Preemptive variant of SJF
- Priority Queue
  - Processes are scheduled based on an assigned priority

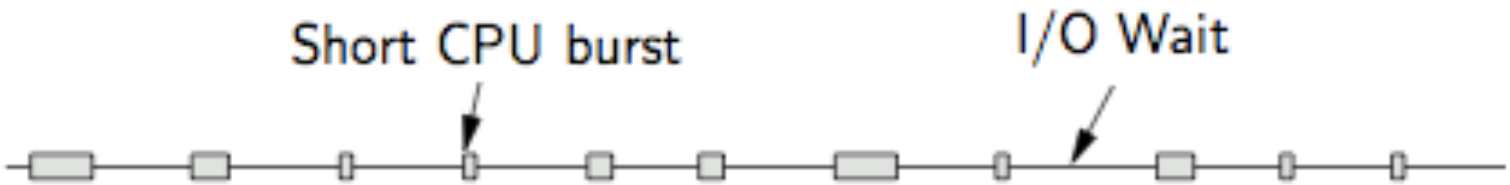
Parameters

- Turnaround
- Normalized Turnaround
- Response Time
- Waiting Time
- Queue Size
- CPU Statistics
  - Utilization
  - Idle Time
  - Throughput

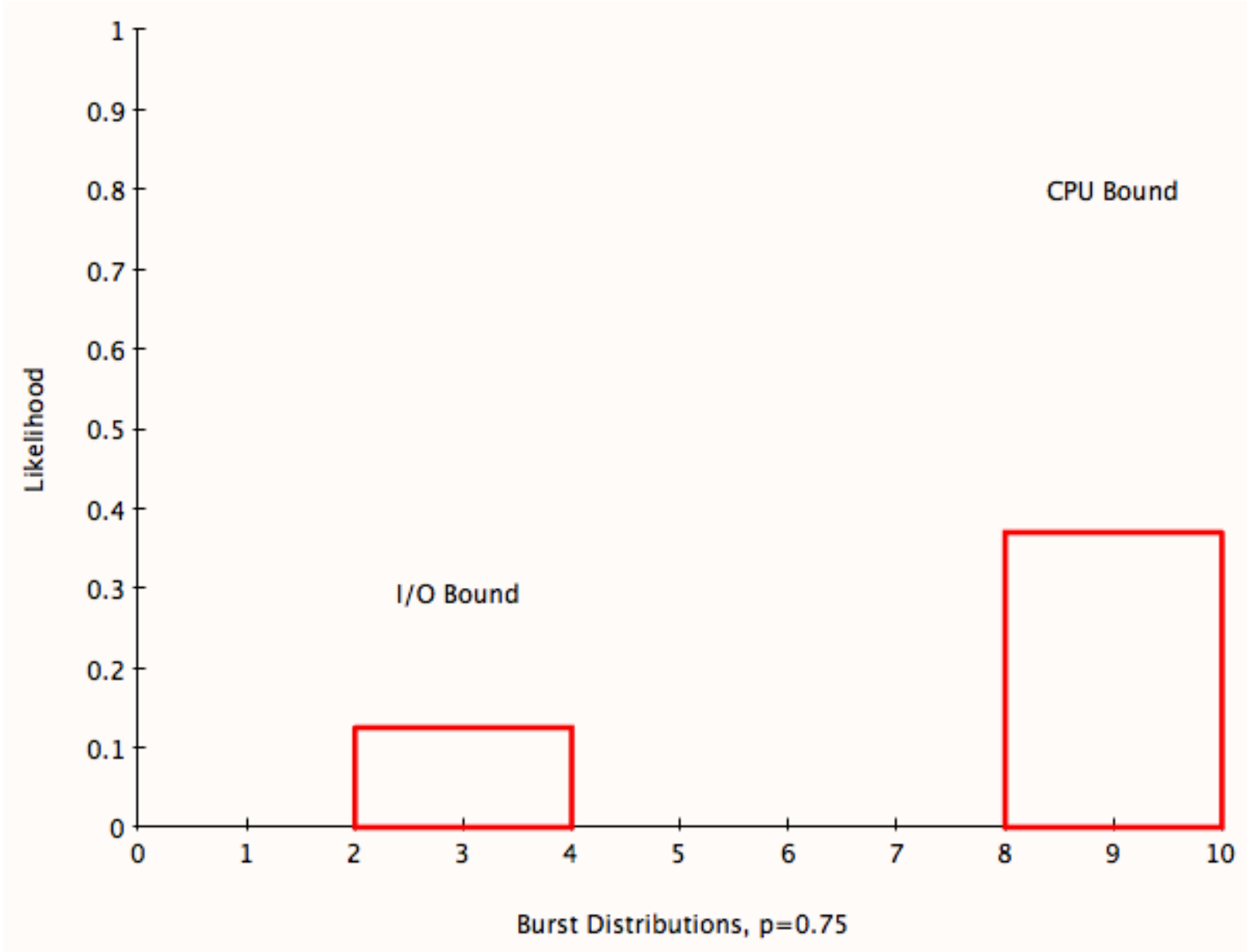
Processes

- Entities which may be executed on a processor
- CPU Bound - long CPU bursts

- I/O Bound - frequent I/O bursts

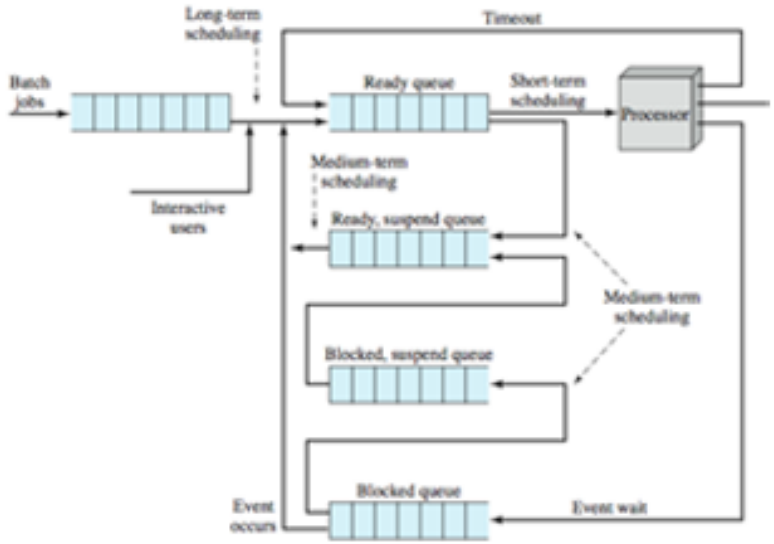


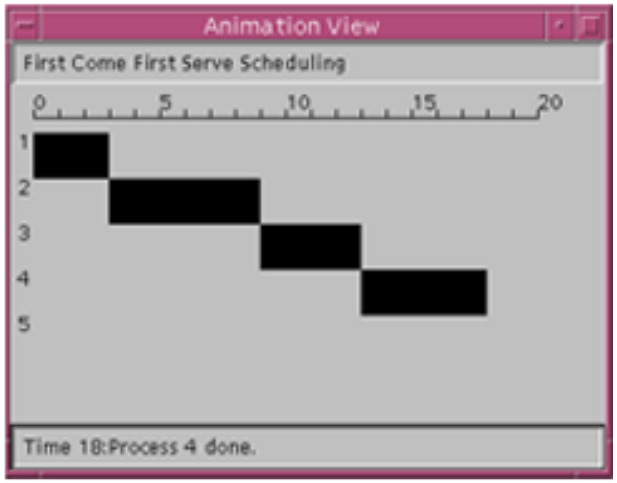
CPU and I/O Bound



Design

- Queuing Diagram
  - One coherent visualization of the whole queuing system
  - Chosen over gantt chart etc

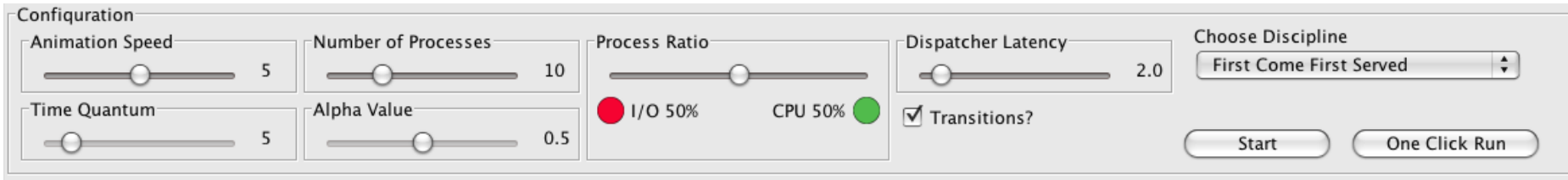




- Poisson Arrivals
  - Discrete probability distribution, natural way to model
  - Process inter-arrival times are exponentially distributed

Design

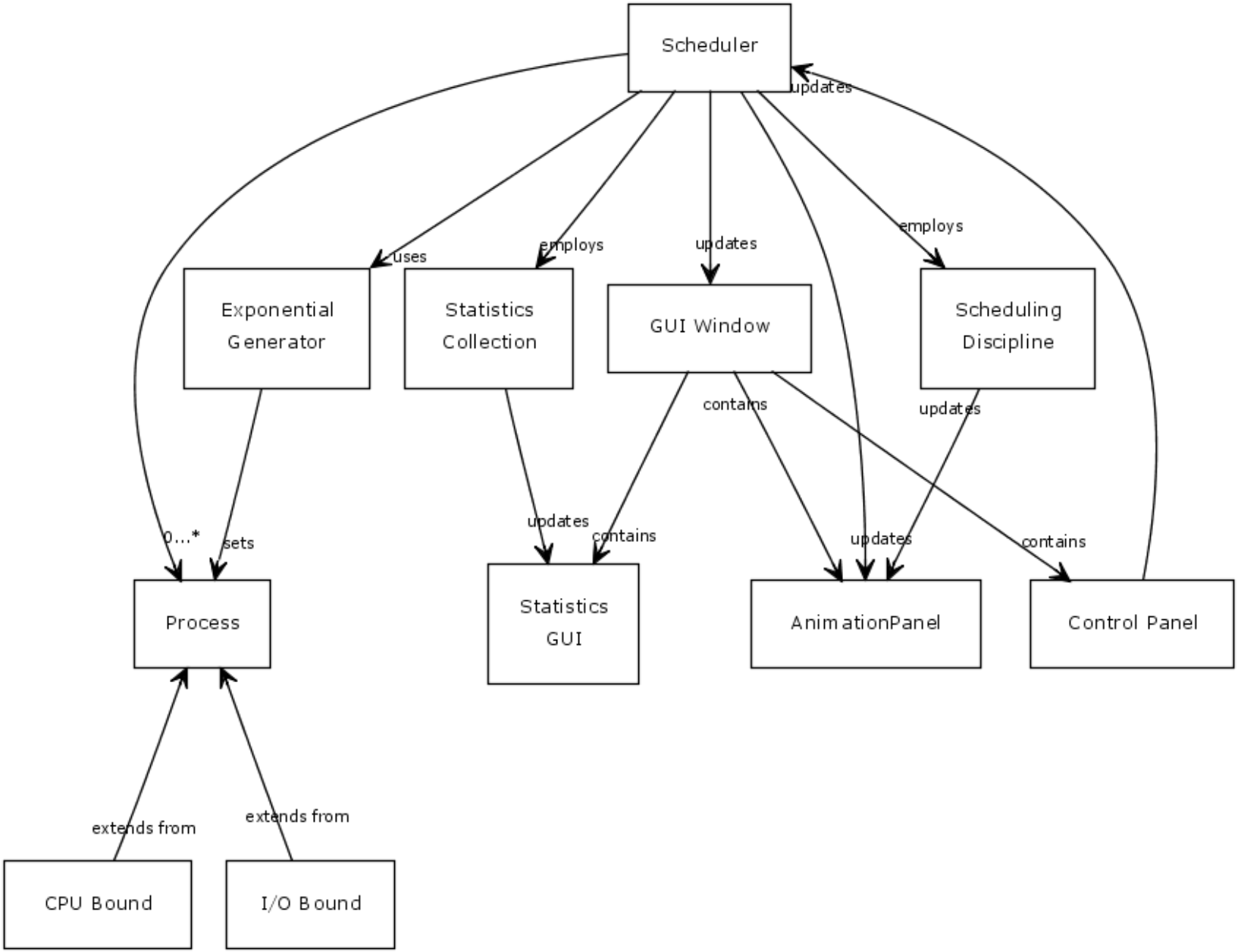
- Process Suspension
- Monte carlo simulation
  - Repetition of pseudo random experiments
  - Higher educational value than deterministic approach
- Control components



Design

- Teaching merit
  - Very important
  - Information tiering
  - Providing ease of use
  - Providing easy understanding

Implementation



Conclusions Reached

- Easy to use, useful tool
- Feature-rich
- Fills a gap
- Good visualization of scheduling and statistics

Future Work

- Simulation of other disciplines
  1. Multi-level Feedback Queue
  2. Highest Response Time Next
- Add additional control components
- Queuing theory
- Multiple CPU's
- Spawn child processes

Demo

- Demo time

Any Questions?

- I would to thank my supervisor, Dr Felix Balado
- Thank you for Listening :-)
- Questions?