San Jose State University

Department of Computer Science

Data Structures and Algorithms (CS 149)

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Homework #2 Preview

Process Scheduling Algorithms

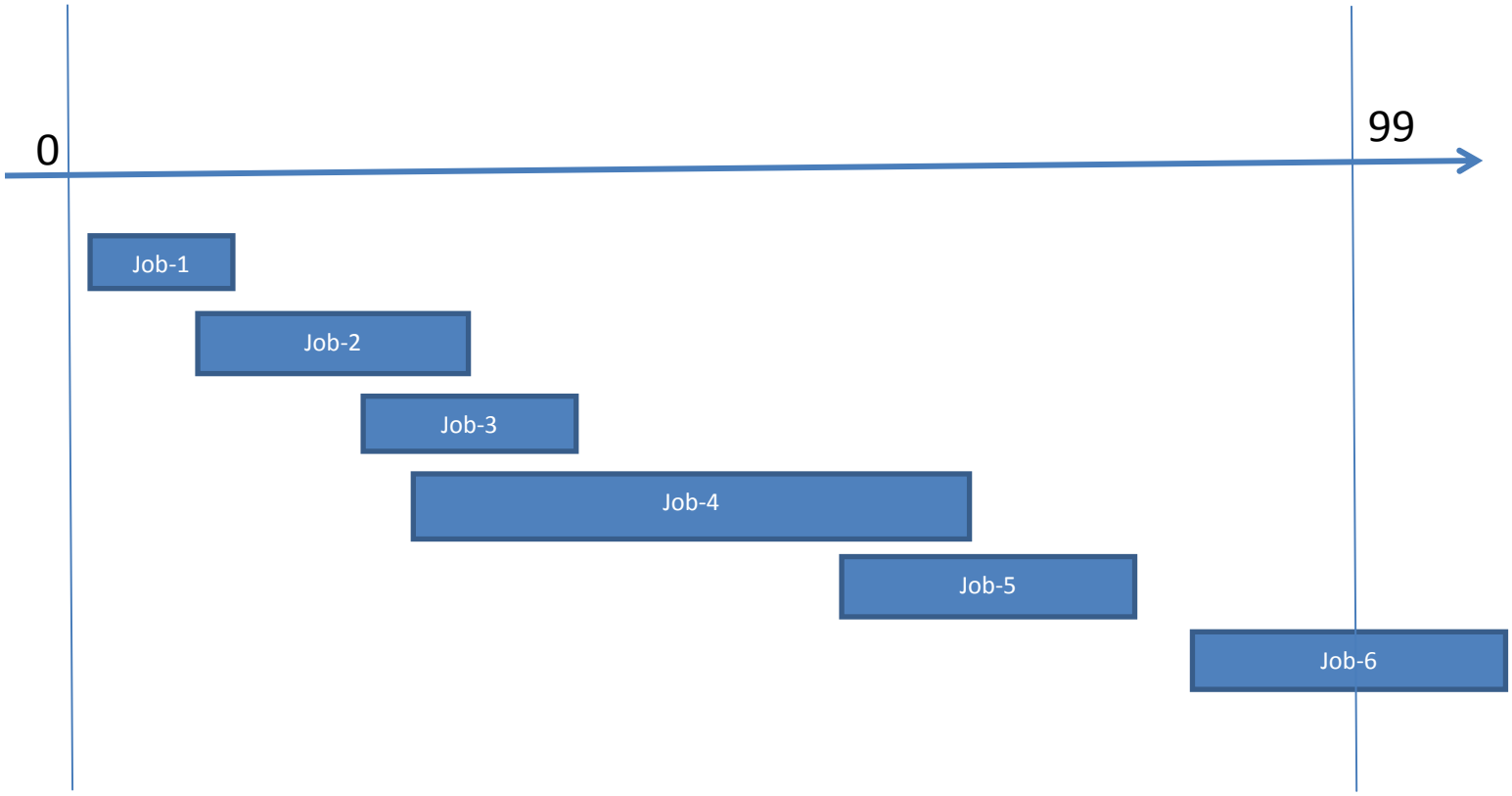
We will build simulation written in C or Java programming language that experiment with different runs using different process scheduling algorithms:

The total simulation time is 100 quantum/time-units.

First generate your workload. A process is represented by
<arrival time, runtime, priority>

- Use specific seed value for your random number generator.
- Unix rand() function returns random number between 0 and RAND_MAX (32767).
- ```
  #include   <stdlib.h>
  int   main()
  {
        int    seed   = time(NULL);
        srand(seed);                          // guarantee consistency when debugging
        int   arrival_time = rand()   % 100;      // will return num between 0 and 99
        int   service_time = (rand() % 11);       // will return num between 0 and 10
        if (service_time = 0)   service_time   += 0.1;     // service_time = 0.1 .. 10
  Alternative:
        if (service_time = 0)   service_time   += 1;     // service_time = 1 .. 10
        int      priority = rand() % 5;
        if (priority = 0)     priority   += 1;              // priority between 1 .. 4
  }
  ```
  ```

- Generate ~10 jobs, sort them based on arrival time. Run and verify that CPU is never idle more than 2 quanta waiting for work to do. Otherwise increase number of jobs.



- No process is allowed if start time > 99, but a job can complete after time = 100 quantum.
- CPU is scheduled at quanta boundary, i.e., if processes completed before end of quanta then CPU will be idle the remaining of this quanta
- Generate 5 sets of workloads. Each algorithm is run 5 times and get average per algorithm.

Definitions:

- Turnarund time: Time required for a particular process to complete, from submission time to completion. It is equal to the sum total of *Waiting time* and *Execution time*.

- Response time: The time taken in a program from the issuance of a command to the commence/beginning of a response to that command (i.e., the time-interval between submission of a request, and the start of execution).