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Introduction

Our project is to design and implement a new client in java which can dispatch & schedule jobs to servers in a system. My job is to design and implement one new scheduling algorithm that can optimize one of the above constraints. During the designing of this new scheduling algorithm, It is important to remember that the optimization of one of the constraints otherwise can lead to forfeit the optimization of the other constraints.

Problem Definition

Problems:

The main problem in this project is while dispatching or scheduling the new jobs to servers which contain many constraints for instance turnaround ,time resource, utilization time and cost.

Solution:

In my new designed algorithm, I maximized the average resource utilization in response to the fact that the cost of turnaround time has been increased.

Algorithm Description

```
# ds-sim server 18-February, 2021 @ MQ - client-server
# Server-side simulator started with './ds-server -c ds-config01--wk9.xml -n'
# Waiting for connection to port 50000 of IP address 127.0.0.1
# Welcome Tallat!
# The system information can be read from 'ds-system.xml'
t:      32 job      0 (waiting) on # 0 of server medium (booting) SCHEDULED
t:      54 job      1 (waiting) on # 0 of server medium (booting) SCHEDULED
t:      55 job      2 (waiting) on # 0 of server medium (booting) SCHEDULED
t:      92 job      0 on # 0 of server medium RUNNING
t:      92 job      1 on # 0 of server medium RUNNING
t:      92 job      2 on # 0 of server medium RUNNING
t:     108 job      3 (waiting) on # 0 of server medium (active) SCHEDULED
t:     269 job      2 on # 0 of server medium COMPLETED
t:     269 job      3 on # 0 of server medium RUNNING
t:     287 job      4 (waiting) on # 0 of server medium (active) SCHEDULED
t:     406 job      3 on # 0 of server medium COMPLETED
t:    1922 job      0 on # 0 of server medium COMPLETED
t:    2285 job      1 on # 0 of server medium COMPLETED
t:    2285 job      4 on # 0 of server medium RUNNING
t:    4826 job      4 on # 0 of server medium COMPLETED
# -----
# 0 tiny servers used with a utilisation of 0.00 at the cost of $0.00
# 0 small servers used with a utilisation of 0.00 at the cost of $0.00
# 1 medium servers used with a utilisation of 100.00 at the cost of $1.05
# ===== [ Summary ] =====
# actual simulation end time: 4826, #jobs: 5 (failed 0 times)
# total #servers used: 1, avg util: 100.00% (ef. usage: 100.00%), total cost: $1.05
# avg waiting time: 458, avg exec time: 1375, avg turnaround time: 1833
```

```
1 <?xml version="1.0" encoding="UTF-8"?>
2 <!-- generated by: Y. C. Lee -->
3 <config randomSeed="65535">
4   <servers>
5     <server type="tiny" limit="1" bootupTime="40" hourlyRate="0.4" coreCount="1" memory="4000" disk="32000"/>
6     <server type="small" limit="1" bootupTime="40" hourlyRate="0.4" coreCount="2" memory="8000" disk="64000"/>
7     <server type="medium" limit="1" bootupTime="60" hourlyRate="0.8" coreCount="4" memory="16000" disk="128000"/>
8   </servers>
9   <jobs>
10    <job type="short" minRunTime="1" maxRunTime="60" populationRate="30"/>
11    <job type="medium" minRunTime="61" maxRunTime="600" populationRate="40"/>
12    <job type="long" minRunTime="601" maxRunTime="3600" populationRate="30"/>
13  </jobs>
14  <workload type="unknown" minLoad="20" maxLoad="60"/>
15  <termination>
16    <condition type="endtime" value="86400"/>
17    <condition type="jobcount" value="5"/>
18  </termination>
19 </config>
```

Implementation Details/ Data Structures

Used Data Structures:

1. String
2. Integer arrays
3. Socket
4. DataInputStream
5. PrintStream

Evaluation

Advantage:

1. Maximizes resource utilization

Disadvantage:

1. Increases turnaround time

Conclusion

Finally , We have been asked to create and implement a new client in java which can dispatch jobs to servers. So, In my designed algorithm, I maximized the average resource utilization in response to the fact that the cost of turnaround time has been increased to fix this issue.

Reference

Github link <https://github.com/tallat97/distributed-system-assignment2>