## Project report: Stage 1 COMP3100 Distributed Systems, S2, 2022 SID: 46225854, Name: Kris Paul Babu

### **Section 1: Introduction**

In this report I will go into detail about my solution to stage 2 of the Major Assessment. In stage 2, a connection is created between a simulated DS server and a client server. Which involves sending handshakes, server scouting and job scheduling. The purpose of this is to demonstrate how a real life client-server job scheduling would take place. On top of enabling a handshake, I will also be using my very own job scheduling algorithm and compare its efficieny / baseline performance with various other job scheduling algorithm like best-fit, worst-fit, first-fit, largest-round-robin etc., The goal is to design an algorithm that performs well or at the very least averages the following criterions: turnaround time, resource utilisation, execution costs etc.,

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### Section 2: Problem definition

The ds-server is a simulated version of a list of servers in a data center. The goal of the job client is to schedule jobs efficiently so that it's use of various resources and turnaround time is minimised. The server and client establish a connection with each other through use of custom commands, and there is a back and forth between both the client and the server with the client requesting information like the list of servers present, jobs to be scheduled etc., To maximise efficiency, there are various forms of scheduling algorithms that could potentially be used, like the best-fit algorithm which assigns jobs to servers based on a minimising function, the servers resource capacity and currently waiting or running jobs. The best-fit is just one of the algorithms that can be used to schedule jobs efficiently, other algorithms that schedule jobs with varying efficiency are:

- First Fit
- Worst Fit
- Largest Round Robin
- Best Fit

For this project I will be implementing an algorithm of my own, the performance of which will be compared to the baseline performance of the above mentioned algorithms. The algorithm is designed in such a way that it performs well enough or just good enough so that the factors like average turnaround time, resource utilisation and cost of use are all minimised.

When running the above scheduling algorithm it was discovered that the best-fit algorithm seemed to perform just good enough in the required criterions. So naturally, I designed my algorithm to operate / look more or less like the best-fit algorithm, with a different approach in how the calling / requesting of information was handled.

Specifically, the variations are clear when looking at how server informations were requested. In the best-fit algorithm, server information was requested periodically using the **GETS Capable** command. And if a server had running or working job, the **LSTJ** command was used to query the server for the jobs that it was currently busy with. This information is then used to conditionally select the best possible server present in the list of

servers available.

In contrast, in my own algorithm, I used the **GETS All** command, which returned the entire list of servers present in a given config file. After this, The GETS Avail or GETS Capable commands are used periodically to query the server for servers that were either available or capable of running the given jobs.

# Section 3: Algorithm description

Below is an example usage log of my algorithm with the config file present in the ds-sim package called ds-sample-config01.xml.

```
# ds-sim server 28-Feb, 2023 @ MQ - client-server
# Server-side simulator started with './ds-server -c /media/shared/majorAssessmentStage2/ds-sim/
    configs/sample-configs/ds-sample-config01.xml -v all -n'
    # Waiting for connection to port 50000 of IP address 127.0.0.1
    RCVD HELO
    RCVD AUTH kris
    # Welcome kris!
# The system information can be read from 'ds-system.xml'
    SENT OK
    RCVD REDY
10
    SENT JOBN 37 0 653 3 700 3800
11
    RCVD GETS All
    SENT DATA 5 124
    RCVD OK
    SENT juju 0 inactive -1 2 4000 16000 0 0
    juju 1 inactive -1 2 4000 16000 0 0 joon 0 inactive -1 4 16000 64000 0 0 joon 1 inactive -1 4 16000 64000 0 0
17
    super-silk 0 inactive -1 16 64000 512000 0 0
^{20}
    RCVD OK
    SENT
21
    RCVD REDY
22
    SENT JOBN 37 0 653 3 700 3800
23
    RCVD GETS Avail 3 700 3800
24
    SENT DATA 3 124
26
    RCVD OK
    SENT joon 0 inactive -1 4 16000 64000 0 0 joon 1 inactive -1 4 16000 64000 0 0
27
    super-silk 0 inactive -1 16 64000 512000 0 0
29
    RCVD OK
30
    SENT
    RCVD SCHD 0 joon 0
33
                 37 job
                              O (waiting) on # O of server joon (booting) SCHEDULED
    SENT OK
34
    RCVD REDY
35
    SENT JOBN 60 1 2025 2 1500 2900
36
    RCVD GETS Avail 2 1500 2900
    SENT DATA 4 124
    RCVD OK
    SENT juju 0 inactive -1 2 4000 16000 0 0
40
    juju 1 inactive -1 2 4000 16000 0 0 joon 1 inactive -1 4 16000 64000 0 0
41
    super-silk 0 inactive -1 16 64000 512000 0 0
    RCVD OK
    SENT
    RCVD SCHD 1 juju 0
46
                 60 job
                              1 (waiting) on # 0 of server juju (booting) SCHEDULED
47
    SENT OK
48
    RCVD REDY
    SENT JOBN 96 2 343 2 1500 2100
    RCVD GETS Avail 2 1500 2100
    SENT DATA 3 124
    RCVD OK
53
    SENT juju 1 inactive -1 2 4000 16000 0 0
54
    joon 1 inactive -1 4 16000 64000 0 0
55
    super-silk 0 inactive -1 16 64000 512000 0 0
    RCVD OK
58
    SENT
    RCVD SCHD 2 juju 1
59
                              2 (waiting) on # 1 of server juju (booting) SCHEDULED
                 96 job
60
    SENT OK
61
    RCVD REDY
                 97 job
                              O on # O of server joon RUNNING
    SENT JOBN 101 3 380 2 900 2500
    RCVD GETS Avail 2 900 2500
65
    SENT DATA 2 124
66
    RCVD OK
67
    SENT joon 1 inactive -1 4 16000 64000 0 0
    super-silk 0 inactive -1 16 64000 512000 0 0
70
    RCVD OK
    SENT
    RCVD SCHD 3 ioon 1
72
               101 job 3 (waiting) on # 1 of server joon (booting) SCHEDULED
```

```
74
     SENT OK
75
     RCVD REDY
     t: 120 job 1 on # 0 of server juju RUNNING
SENT JOBN 137 4 111 1 100 2000
RCVD GETS Avail 1 100 2000
76
 77
 78
     SENT DATA 2 124
 79
     RCVD OK
     SENT joon 0 active 97 1 15300 60200 0 1
     super-silk 0 inactive -1 16 64000 512000 0 0
 82
     RCVD OK
83
     SENT
 84
     RCVD SCHD 4 joon 0
 85
                137 job
137 job
                               4 (running) on # 0 of server joon (active) SCHEDULED
     t:
     t:
 87
                               4 on # 0 of server joon RUNNING
     SENT OK
 88
     RCVD REDY
89
     t: 156 job 2 on # :
SENT JOBN 156 5 8 3 2700 2600
                               2 on # 1 of server juju RUNNING
90
91
     RCVD GETS Avail 3 2700 2600
 93
     SENT DATA 1 124
94
     RCVD OK
     SENT super-silk 0 inactive -1 16 64000 512000 0 0 RCVD 0K
95
96
97
     SENT
98
     RCVD SCHD 5 super-silk 0
99
                 156 job 5 (waiting) on # 0 of server super-silk (booting) SCHEDULED
     SENT OK
100
101
     RCVD REDY
     t: 161 job 3 on # 1 o

SENT JOBN 198 6 1074 4 4000 7600

RCVD GETS Avail 4 4000 7600
                               3 on # 1 of server joon RUNNING
102
103
104
     SENT DATA 0 124
105
106
     RCVD OK
     SENT
107
     RCVD GETS Capable 4 4000 7600
108
     SENT DATA 3 124
109
     RCVD OK
110
111
     SENT joon 0 active 97 0 15200 58200 0 2
     joon 1 active 161 2 15100 61500 0 1
112
113
     \verb"super-silk" 0 booting 236 13 61300 509400 1 0
     RCVD OK
114
     SENT .
115
     RCVD SCHD 6 joon 0
116
               198 job
                              6 (waiting) on # 0 of server joon (active) SCHEDULED
117
     SENT OK
118
     RCVD REDY
SENT JOBN 225 7 442 2 500 2100
119
120
     RCVD GETS Avail 2 500 2100
121
     SENT DATA 1 124
122
     RCVD OK
123
     SENT joon 1 active 161 2 15100 61500 0 1
125
     RCVD OK
126
     SENT
     RCVD SCHD 7 joon 1
127
                            7 (running) on # 1 of server joon (active) SCHEDULED 7 on # 1 of server joon RUNNING
                 225 job
225 job
     t:
t:
128
129
     SENT OK
130
131
     RCVD REDY
     t: 236 job 5 on # 0
SENT JOBN 249 8 926 1 100 800
RCVD GETS Avail 1 100 800
                               5 on # 0 of server super-silk RUNNING
132
133
134
     SENT DATA 1 124
135
     RCVD OK
136
137
     SENT super-silk 0 active 236 13 61300 509400 0 1
138
     RCVD OK
     SENT .
139
     RCVD SCHD 8 super-silk 0
140
                 249 job 8 (running) on # 0 of server super-silk (active) SCHEDULED 249 job 8 on # 0 of server super-silk RUNNING
141
     t:
     t:
142
     SENT OK
143
144
     RCVD REDY
     t: 257 job 5 on #
SENT JCPL 257 5 super-silk 0
                              5 on # 0 of server super-silk COMPLETED
145
146
     RCVD REDY
147
                 303 job
                               4 on # 0 of server joon COMPLETED
148
     SENT JCPL 303 4 joon 0
149
     RCVD REDY
SENT JOBN 308 9 2010 2 600 1500
150
151
     RCVD GETS Avail 2 600 1500
152
     SENT DATA 1 124
153
     RCVD OK
154
     SENT super-silk 0 active 236 15 63900 511200 0 1
156
     RCVD OK
157
     SENT
     RCVD SCHD 9 super-silk 0
158
                 308 job 9 (running) on # 0 of server super-silk (active) SCHEDULED 308 job 9 on # 0 of server super-silk RUNNING
159
     t:
160
     SENT OK
161
     RCVD REDY
     t: 575 job 7
SENT JCPL 575 7 joon 1
163
                               7 on # 1 of server joon COMPLETED
164
     RCVD REDY
165
```

```
642 job 2 on # 1 of server juju COMPLETED
166
    SENT JCPL 642 2 juju 1
167
168
    RCVD REDY
             1073 job
                           8 on # 0 of server super-silk COMPLETED
169
    t. :
    SENT JCPL 1073 8 super-silk 0
170
171
    RCVD REDY
                           1 on # 0 of server juju COMPLETED
    SENT JCPL 1215 1 juju 0
173
174
    RCVD REDY
             1232 iob
                          3 on # 1 of server joon COMPLETED
175
    t:
    SENT JCPL 1232 3 joon 1
176
177
    RCVD REDY
178
    t:
             1337 job
                           0 on # 0 of server joon {\tt COMPLETED}
179
              1337 job
                           6 on # 0 of server joon RUNNING
    SENT JCPL 1337 0 joon 0
180
    RCVD REDY
181
             1778 job
                          9 on # 0 of server super-silk COMPLETED
182
    SENT JCPL 1778 9 super-silk 0
183
184
    RCVD REDY
             1897 job
                          6 on # 0 of server joon COMPLETED
185
186
    SENT JCPL 1897 6 joon 0
187
    RCVD REDY
    SENT NONE
188
    RCVD
         QUIT
189
190
    SENT QUIT
191
    # 2 juju servers used with a utilisation of 100.00 at the cost of $0.09
192
193
    \# 2 joon servers used with a utilisation of 100.00 at the cost of \$0.32
    # 1 super-silk servers used with a utilisation of 100.00 at the cost of \$0.34
194
    # ====== [ Summary ] ========
195
    # actual simulation end time: 1897, #jobs: 10 (failed 0 times)
    # total #servers used: 5, avg util: 100.00% (ef. usage: 100.00%), total cost: $0.75
```

Below is the configuration file used in the above log, ds-sample-config01.xml:

```
<?xml version="1.0" encoding="UTF-8"?>
                  <!-- generated by: Y. C. Lee
                  <config randomSeed="1024">
                              <servers>
                                        < \texttt{server type} = "juju" \ \texttt{limit} = "2" \ \texttt{bootupTime} = "60" \ \texttt{hourlyRate} = "0.2" \ \texttt{cores} = "2" \ \texttt{memory} = "4000" \ \texttt{disk} = "10.2" \ \texttt{disk} = "10
   5

<pr
   6
                                        <server type="super-silk" limit="1" bootupTime="80" hourlyRate="0.8" cores="16" memory="64000"</pre>
                                                            disk="512000" />
                              </servers>
  9
                              <jobs>
                                       <job type="short" minRunTime="1" maxRunTime="300" populationRate="60" />
10
                                      <job type="medium" minRunTime="301" maxRunTime="1800" populationRate="30" />
<job type="medium" minRunTime="301" maxRunTime="1800" populationRate="30" />
<job type="long" minRunTime="1801" maxRunTime="100000" populationRate="10" /</pre>
11
                              <workload type="moderate" minLoad="30" maxLoad="70" />
15
                              <termination>
                                       <condition type="endtime" value="604800" />
16
                                        <condition type="jobcount" value="10" />
17
                              </termination>
18
```

The algorithm starts of with the regular procedure for establishing a connection between the server and the client. After the client has established a connection with the server, the client uses the **GETS All** command (line 12) to retrieve all the servers present in the config. This information is stored to help us find the initial core count when using GETS Capable.

After the client has run the query to ask for the entire list of servers, the client then gets ready for the first job in the global queue. The client queries the server for a list of servers that can run the given job and are currently available and has enough resource capacity to handle the job using the GETS Avail command (line 24). Since this is the first job, all the servers are available at the moment so the client finds the best fit server (the one with a core count less than the other servers and at the same time has a core count enough to handle the job) and assigns that server the job.

When using the gets avail, it's possible that all servers that can run the given job are busy. In such a case, the GETS Capable command is used, this command returns a list of servers that can eventually run the given job. The issue with using GETS Capable is that, it doesn't return the initial core count of the server, this could lead to the servers returned by GETS Capable not having enough cores to run the job. This where we use the server list that we obtained using the GETS All command. We replace the core count with the initial core count using the list of servers. This enables the algorithm to identify what server to assign the job to (the server that is best fit).

# **Section 4: Implementation**

```
2
    import java.io.*;
3
    import java.net.*;
    public class MyClient {
        public static void main(String[] args) {
            try {
9
                 Socket socket = new Socket("localhost", 50000);
10
                 DataOutputStream dout = new DataOutputStream(socket.getOutputStream());
11
                 BufferedReader dis = new BufferedReader(new InputStreamReader(socket.getInputStream()))
^{12}
13
                 \verb"dout.write(("\textit{HELO}\n").getBytes());
14
                 dis.readLine():
15
16
                 String username = System.getProperty("user.name");
17
                 dout.write(("AUTH " + username + "\n").getBytes());
19
                 dis.readLine();
20
                 \verb"dout.write(("REDY \n").getBytes());
21
                 dis.readLine();
```

The above piece of code represents how the client establishes a connection with the server, using standard ds-sim commands like HELO, AUTH and REDY.

In the above code, the client uses the GETS All command to retrieve all the servers present. This will help us later when we need to find the initial core count of a server. After this, we use a whie loop to start scheduling jobs to the server.

```
while (true) {
                     \verb"dout.write(("REDY \n").getBytes());
4
                     String jobs = (String) dis.readLine();
6
                     if (jobs.equals("NONE")) {
                         break;
                     }
10
                     String[] jobsIndivData = jobs.split(" ");
11
                     int jobId = Integer.parseInt(jobsIndivData[2]);
12
                     int neededCores = Integer.parseInt(jobsIndivData[4]);
13
14
                     String data = "";
15
                     if (!jobsIndivData[0].equals("JCPL")) {
                         dout.write(
                                  ("GETS Avail " + jobsIndivData[4] + " " + jobsIndivData[5] + " " +
18
                                      jobsIndivData[6] + "\n").getBytes());
                         data = dis.readLine();
19
                         dout.write(("OK \setminus n").getBytes());
20
                     }
22
23
                     else {
                         dout.write(("REDY\n").getBytes());
24
                         dis.readLine();
25
26
                         continue;
```

In the above code, we start an inifinite while loop with a condition within the while loop that says if the variable **jobs** is equal to **NONE**, the loop breaks. This ensures that if there are no more jobs then the client will eventually send the **QUIT** command. Or if the jobs array does not contain **JCPL** the GETS Avail command is used. If the jobs array does contain JCPL, the continue keyword is used, which skips the rest of the code in the loop and esentially restarts the loop, moving on to the next set of jobs. When the Gets Avail command is used the server responds with a list of servers that are available and can run a job with the specific resource capacity and core count.

```
int capableCalled = 0;
2
                      if (data.split(" ")[1].equals("0")) {
3
                           dis.readLine():
                           dout.write(
5
                                    ("GETS Capable " + jobsIndivData[4] + " " + jobsIndivData[5] + " " +
                                         jobsIndivData[6] + "\n").getBytes());
                           data = dis.readLine();
                           \verb"dout.write"(("OK\n").getBytes"());
                           capableCalled = 1:
9
10
11
                      int serversPresentNo = Integer.parseInt(data.split(" ")[1]);
14
                      String[] serverList = new String[serversPresentNo];
                      for (int i = 0; i < serversPresentNo; i++) {
15
                           serverList[i] = dis.readLine();
16
17
19
                      if (capableCalled == 1) {
20
                           for (int i = 0; i < serverList.length; i++) {</pre>
                               String server1Name = serverList[i].split(" ")[0];
String server1Id = serverList[i].split(" ")[1];
21
22
                               for (int j = 0; j < allServers.length; j++) {
23
                                    String server2Name = allServers[j].split(" ")[0];
24
                                    String server2Id = allServers[j].split(" ")[1];
26
                                     \  \  \text{if (server1Name.equals(server2Name) \&\& server1Id.equals(server2Id)) } \  \, \{
27
                                         serverList[i] = allServers[j];
28
29
30
32
```

In the above set of code, we initialise a boolean variable called **capableCalled**. The value of this variable is set to 1 if the command GETS Capable is called, which on the other hand, is only called if GETS Avail does not return any servers. When the client uses GETS Capable, it is known that all the servers are busy, therefore, the core count on the servers returned are not the initial core counts, which is what we want, because it might be possible that the core count for the servers returned from the GETS Capable command are not sufficient.

If capableCalled is set to 1, the client then iterates over the list of servers returned by GETS Capable and replaces it with servers that were returned using GETS Avail. Of course, the names and IDs of the servers are compared before the list of servers returned by GETS Capable is altered.

```
String bestServerName = "";
                         String bestServerId = "";
                         int bestServerCores = 0;
4
5
                         bestServerName = "";
                         bestServerId =
6
                         bestServerCores = Integer.MAX_VALUE;
                         for (int i = 0; i < serversPresentNo; i++) {</pre>
                              String currentSserverName = serverList[i].split(" ")[0];
String currentServerId = serverList[i].split(" ")[1];
int currentServerCores = Integer.parseInt(serverList[i].split(" ")[4]);
10
11
12
13
14
                              if (currentServerCores >= neededCores && currentServerCores <= bestServerCores)
15
                                   bestServerName = currentSserverName:
16
                                   bestServerId = currentServerId;
17
                                   bestServerCores = currentServerCores;
18
                                   break;
19
```

The above set of code finds the best possible server present in the list of servers returned by either the GETS Avail or GETS Capable command. The server with the right amount of cores (the server with cores higher or equal to the amount of cores needed for the job and lower than the core count of the rest of the servers returned) is selected. The client uses for loop to iterate over the server to compare each server core count.

```
dis.readLine();
dout.flush();

dout.close();
dis.close();
socket.close();

socket.close();

catch (

Exception e) {
System.out.println(e);
}
}
```

And finally, once the most fit server for the given job is found, the client uses the **SCHD** command to assign the given job to said server. And when all the jobs have been completed and the loop is broken, the client uses the QUIT command to exit the simulation.

# Section 5: Evaluation

Section 5. Evaluation	711					
Running client with config12	2-long-med.	xml .				
Running client with config12						
Running client with config12						
Running client with config12						
Running client with config16						
Running client with config16	5-long-med.	xml				
Running client with config16	5-med-high.	xml				
Running client with config16	ó-short-ȟigl	h.xml				
Running client with config16	5-short-med	.xml				
Running client with config46	-long-high	.xml				
Running client with config46	0-long-med.	xml				
Running client with config46	9-med-high.	xml				
Running client with config40						
Running client with config40						
Running client with config40	O-short-med	.xml				
Turnaround time						
Config	FF	BF	FFQ	BFQ	WFQ	Yours
config12-long-med.xml	2400	2397	2802	2630	6880	2407
config12-med-alt.xml	388	373	813	698	3804	367
config12-med-med.xml	654	653	893	831	4576	653
config12-short-med.xml	61	60	106	100	677	60
config16-long-high.xml	3123	4674	6536	6666	23972	2671
config16-long-med.xml	2548	2562	3997	3778	19538	2556
config16-med-high.xml	3749	5328	6123	5494	23740	1408
config16-short-high.xml	3215	8260  851	5517  1052	4369  1972	24814  17139	991  667
<pre>config16-short-med.xml config40-long-high.xml</pre>	699  4506	851  4164	1952	1312		667  3369
config40-long-migh.xml	4506  3023	4164  3022	3642  3330	3568  3346	8461  11724	3369  3026
config40-med-high.xml	1505	896	940	933   933	3097	906
config40-med-med.xml	963	972	1237	1232	19123	964
config40-short-high.xml	485	1365	373	301	2817	228
confiq40-short-med.xml	180	182	198	193	1945	180
Average	1833.27	2383.93	2563.93	2407.40	10820.47	1363.53
Normalised (FF)	1.0000	1.3004	1.3986	1.3132	5.9023	0.7438
Normalised (BF)	0.7690	1.0000	1.0755	1.0098	4.5389	0.5720
Normalised (FFQ)	0.7150	0.9298	1.0000	0.9389	4.2203	0.5318
Normalised (BFO)	0.7615	0.9903	1.0650	1.0000	4.4947	0.5664
Normalised (WFO)	0.1694	0.2203	0.2370	0.2225	1.0000	0.1260
Normalised (Average)	0.4581	0.5957	0.6407	0.6016	2.7039	0.3407
Resource utilisation						
Config	FF	BF	FFQ	BF0	WFQ	Yours
confia12-lona-med.xml	169.39	166.87	168.24	166.45	179.22	169.76
config12-long-med.xml	69.39	66.87	68.24	66.45  66.45	79.22  79.22	69.76
config12-long-med.xml config12-med-alt.xml	69.39  66.93	66.87  63.88	68.24  66.46	66.45  66.45  63.39	79.22  79.22  49.55	69.76  66.90
config12-long-med.xml config12-med-alt.xml config12-med-med.xml	69.39  66.93  66.22	66.87  63.88  63.06	68.24  66.46  65.92	166.45  66.45  63.39  62.68	79.22  79.22  49.55  71.52	69.76  66.90  66.29
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml	69.39  66.93  66.22  61.56	66.87  63.88  63.06  58.46	68.24  66.46  65.92  61.32	66.45   66.45   63.39   62.68   58.18	79.22  79.22  49.55  71.52  61.48	69.76  66.90  66.29  61.62
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml	69.39  66.93  66.22  61.56  79.97	66.87  63.88  63.06  58.46  74.70	68.24  66.46  65.92  61.32  77.70	66.45  66.45  63.39  62.68  58.18  74.06	79.22  79.22  49.55  71.52  61.48  66.17	69.76  66.90  66.29  61.62  79.98
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml	69.39  66.93  66.22  61.56  79.97  68.16	66.87  63.88  63.06  58.46  74.70  64.71	68.24  66.46  65.92  61.32  77.70  67.59	166.45   66.45   63.39   62.68   58.18   74.06   63.86	79.22   79.22   49.55   71.52   61.48   66.17   65.06	69.76 66.90 66.29 61.62 79.98 68.35
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-med-high.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45	66.87  63.88  63.06  58.46  74.70  64.71  73.06	68.24  66.46  65.92  61.32  77.70  67.59  76.10	166.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14	179.22   179.22   49.55   71.52   61.48   66.17   65.06   48.18	69.76 66.90 66.29 61.62 79.98 68.35 78.72
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config16-short-med.xml config16-long-high.xml config16-long-med.xml config16-wed-high.xml config16-short-high.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21	68.24  66.46  65.92  61.32  77.70  67.59  76.10  74.44	166,45   66,45   63,39   62,68   58,18   74,06   63,86   73,14   70,87	179.22   179.22   49.55   71.52   61.48   66.17   65.06   48.18   50.94	69.76 66.90 66.29 61.62 79.98 68.35 78.72
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-med.xml config16-med-high.xml config16-med-high.xml config16-short-high.xml config16-short-med.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42	68.24  66.46  65.92  61.32  77.70  67.59  76.10  74.44  65.54	166.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08	179.22   79.22   49.55   71.52   61.48   66.17   65.06   48.18   50.94   61.40	69.76 66.90 66.29 61.62 79.98 68.35 78.72 78.62 66.18
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config16-short-med.xml config16-long-high.xml config16-long-med.xml config16-wed-high.xml config16-short-high.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21	68.24  66.46  65.92  61.32  77.70  67.59  76.10  74.44	66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87	179.22   179.22   49.55   71.52   61.48   66.17   65.06   48.18   50.94	69.76 66.90 66.29 61.62 79.98 68.35 78.72
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-high.xml config16-short-med.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91	68.24  66.46  65.92  61.32  77.70  67.59  76.10  74.44  65.54  86.34	166.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81	179.22 179.22 149.55 171.52 161.48 166.17 165.06 148.18 150.94 161.40 179.46	69.76 66.90 66.29 61.62 79.98 68.35 78.72 78.62 66.18
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-med.xml config16-long-med.xml config16-med-high.xml config16-short-med.xml config16-short-med.xml config40-long-high.xml config40-long-high.xml config40-long-med.xml config40-med-high.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43	68.24  66.46  65.92  61.32  77.70  67.59  76.10  74.44  65.54  86.34  74.92	166.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00	179.22   79.22   49.55   71.52   61.48   66.17   65.06   48.18   50.94   61.40   79.46   65.26	69.76 66.90 66.29 61.62 79.98 68.35 78.72 78.62 66.18 87.62
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config40-long-high.xml config40-long-high.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-high.xml config40-med-high.xml config40-med-high.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68	166.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98	179.22   79.22   49.55   71.52   61.48   66.17   65.06   48.18   50.94   61.40   79.46   65.26   67.73   45.66   78.09	69.76 66.90 66.29 61.62 179.98 68.35 78.72 178.62 66.18 87.62 175.21 84.45 58.96
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config40-long-high.xml config40-long-high.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-high.xml config40-med-high.xml config40-med-med.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18	166.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68	179.22 179.22 149.55 171.52 161.48 166.17 165.06 148.18 150.94 161.40 179.46 165.26 167.73 145.66 178.09 187.92	69.76 66.90 66.29 61.62 179.98 68.35 78.72 178.62 66.18 87.62 175.21 84.45 58.96 87.22
config12-long-med.xml config12-med-alt.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config16-short-med.xml config40-long-high.xml config40-long-high.xml config40-med-high.xml config40-med-high.xml config40-med-high.xml config40-short-med.xml config40-short-med.xml config40-short-high.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18	166,45	179.22 179.22 149.55 171.52 161.48 166.17 165.06 148.18 150.94 161.40 179.46 165.26 167.73 145.66 178.09 187.92 165.18	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27
config12-long-med.xml config12-med-alt.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-med-high.xml config16-short-high.xml config16-short-med.xml config40-long-high.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-short-med.xml config40-short-med.xml config40-short-high.xml config40-short-high.xml config40-short-high.xml config40-short-med.xml Average Normalised (FF)	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924	166.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387	179.22	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-short-high.xml config16-short-high.xml config16-short-med.xml config40-long-high.xml config40-long-high.xml config40-long-med.xml config40-med-high.xml config40-med-med.xml config40-short-high.xml config40-short-high.xml config40-short-high.xml config40-short-high.xml config40-short-med.xml Average Normalised (FF)	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000  1.0633	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981	179.22	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-bng-med.xml config16-short-high.xml config16-short-med.xml config40-long-high.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-short-med.xml config40-short-med.xml config40-short-high.xml config40-short-med.xml Average Normalised (FF) Normalised (FF)	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000  1.0633  1.0077	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.9458	179.22 179.22 149.55 171.52 161.48 166.17 165.06 148.18 150.94 161.40 179.46 165.26 167.73 145.66 178.09 187.92 165.18 10.8892 10.9455 10.8960	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config40-long-high.xml config40-long-med.xml config40-long-med.xml config40-short-med.xml config40-med-high.xml config40-med-med.xml config40-short-high.xml config40-short-high.xml config40-short-high.xml config40-short-med.xml Average Normalised (FF) Normalised (FF)	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23  73.30  1.0000  1.0633  1.0077  1.0654	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573	166, 45	179.22 179.22 149.55 171.52 161.48 166.17 165.06 148.18 150.94 161.40 179.46 165.26 167.73 145.66 178.09 187.92 165.18 10.8892 10.9455 10.8960 10.9473	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config16-short-med.xml config40-long-high.xml config40-long-med.xml config40-med-high.xml config40-med-high.xml config40-med-med.xml config40-short-high.xml config40-short-high.xml config40-short-high.xml config40-short-med.xml Average Normalised (FF) Normalised (BF) Normalised (BFQ) Normalised (BFQ)	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23  73.30  1.0000  1.0633  1.0077  1.0654  1.1246	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161	166.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.9458   1.0000   1.0556	179.22	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config40-long-high.xml config40-long-med.xml config40-long-med.xml config40-short-med.xml config40-med-high.xml config40-med-med.xml config40-short-high.xml config40-short-high.xml config40-short-high.xml config40-short-med.xml Average Normalised (FF) Normalised (FF)	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23  73.30  1.0000  1.0633  1.0077  1.0654	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573	166, 45	179.22 179.22 149.55 171.52 161.48 166.17 165.06 148.18 150.94 161.40 179.46 165.26 167.73 145.66 178.09 187.92 165.18 10.8892 10.9455 10.8960 10.9473	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728
config12-long-med.xml config12-med-alt.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config16-short-med.xml config40-long-high.xml config40-long-high.xml config40-med-high.xml config40-med-high.xml config40-med-med.xml config40-short-high.xml config40-short-high.xml config40-short-high.xml config40-short-med.xml Average Normalised (FF) Normalised (FF) Normalised (BFQ) Normalised (BFQ) Normalised (WFQ) Normalised (Average)	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23  73.30  1.0000  1.0633  1.0077  1.0654  1.1246	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161	166.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.9458   1.0000   1.0556	179.22	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325
config12-long-med.xml config12-med-alt.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config16-short-med.xml config40-long-med.xml config40-long-high.xml config40-med-high.xml config40-med-high.xml config40-med-high.xml config40-short-med.xml config40-short-med.xml config40-short-high.xml config40-short-high.xml config40-short-med.xml Average Normalised (FF) Normalised (FF) Normalised (BF) Normalised (BFQ) Normalised (BFQ) Normalised (WFQ) Normalised (Average)	69.39  66.93  66.92  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  53.01  53.01  77.23  73.30  1.0000  1.0633  1.0077  1.0654  1.1246  1.0503	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423	166, 45   66, 45   66, 45   63, 39   62, 68   58, 18   74, 06   63, 86   73, 14   70, 87   62, 08   81, 81   69, 00   79, 32   54, 53   80, 98   71, 68   68, 80   0, 9387   0, 9981   0, 9458   1,0000   1,0556   0, 9858	179.22	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.0576
config12-long-med.xml config12-med-alt.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-high.xml config40-med-high.xml config40-short-med.xml config40-short-med.xml config40-short-med.xml config40-short-med.xml Average Normalised (FF) Normalised (FF) Normalised (BFQ) Normalised (BFQ) Normalised (WFQ) Normalised (Average)  Total rental cost Config	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000  1.0633  1.0077  1.0654  1.1246  1.0503	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  1.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.9458   1.0000   1.0556   0.9858	179.22 179.22 149.55 171.52 161.48 166.17 165.06 148.18 150.94 161.40 179.46 165.26 167.73 145.66 178.09 187.92 165.18 10.8892 10.9455 10.8960 10.9473 11.0000 10.9339	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.0576
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-med-high.xml config16-short-high.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-med.xml config40-short-high.xml config40-short-high.xml config40-short-high.xml config40-short-med.xml Average Normalised (FF) Normalised (FF) Normalised (FFQ) Normalised (BFQ) Normalised (Average)  Total rental cost Config config12-long-med.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000  1.0633  1.0077  1.0654  1.1246  1.0503	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.9458   1.0000   1.0556   0.9858	179.22	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.0576
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-short-high.xml config16-short-high.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-high.xml config40-short-med.xml config40-short-med.xml config40-short-med.xml xml config40-short-med.xml Average Normalised (FF) Normalised (FF) Normalised (BF) Normalised (BFQ) Normalised (BFQ) Normalised (Average)  Total rental cost Config config12-long-med.xml config12-long-med.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000  1.0633  1.0077  1.0654  1.1246  1.1246  1.0503	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.9458   1.0000   1.0556   0.9858	179.22	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.0576
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-med.xml config40-short-med.xml config40-short-med.xml config40-short-med.xml config40-short-med.xml Average Normalised (FF) Normalised (FF) Normalised (FFQ) Normalised (FQ) Normalised (Average)  Total rental cost Config config12-long-med.xml config12-med-alt.xml config12-med-med.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000  1.0633  1.0077  1.0654  1.1246  1.1246  1.0503	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423	166.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.9458   1.0000   1.0556   0.9858	179.22	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.0576
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-med-high.xml config16-short-high.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-high.xml config40-med-med.xml config40-short-med.xml config40-short-high.xml config40-short-med.xml Average Normalised (FF) Normalised (FF) Normalised (BFQ) Normalised (BFQ) Normalised (Average)  Total rental cost Config config12-long-med.xml config12-med-alt.xml config12-med-alt.xml config12-med-med.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000  1.0633  1.0077  1.0654  1.1246  1.1246  1.0503	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.9458   1.0000   1.0556   0.9858	179.22	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.0576
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-med.xml config40-short-med.xml config40-short-med.xml config40-short-med.xml config40-short-med.xml Average Normalised (FF) Normalised (FF) Normalised (FFQ) Normalised (FQ) Normalised (Average)  Total rental cost Config config12-long-med.xml config12-med-alt.xml config12-med-med.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23  73.30  1.0000  1.0633  1.0077  1.0654  1.1246  1.1246  1.0503	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.99458   1.0000   1.0556   0.9858	179.22	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.0576
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-med.xml config40-med-med.xml config40-short-high.xml config40-short-high.xml config40-short-med.xml Average Normalised (FF) Normalised (BF) Normalised (BFQ) Normalised (BFQ) Normalised (Average)  Total rental cost Config config12-long-med.xml config12-med-alt.xml config12-med-alt.xml config12-short-med.xml config12-short-med.xml config16-long-high.xml	69.39  66.93  66.92  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000  1.0633  1.0077  1.0654  1.1246  1.0503	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423	166.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.99858	179.22	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.0576
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-short-high.xml config16-short-high.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-high.xml config40-med-high.xml config40-med-high.xml config40-med-high.xml config40-short-high.xml config40-short-med.xml Average Normalised (FF) Normalised (FF) Normalised (BF) Normalised (BFQ) Normalised (BFQ) Normalised (Average)  Total rental cost Config config12-long-med.xml config12-med-med.xml config12-med-med.xml config12-short-med.xml config16-long-med.xml config16-long-med.xml config16-long-med.xml	69.39  66.93  66.92  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000  1.0633  1.0077  1.0654  1.1246  1.1246  1.1246  1.13.25  132.82  21.50  589.16  581.93	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423   FFQ   136.01   115.75   134.87   22.68   632.23   600.44	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.99458   1.0000   1.0556   0.9858	179.22   179.22   179.22   149.55   171.52   161.48   166.17   165.06   148.18   150.94   161.40   179.46   165.26   167.73   145.66   178.09   187.92   165.18   10.8892   10.9455   10.8960   10.9473   1.0000   10.9339   1.0000   1.9339   1.0000   1.09339   1.0000   1.09339   1.0000   1.09339   1.0000   1.09339   1.0000   1.09339   1.0000   1.09339   1.0000   1.09339   1.0000   1.09339   1.0000   1.09339   1.0000   1.09339   1.0000   1.09339   1.0000   1.09339   1.0000   1.09339   1.0000   1.09339   1.0000   1.09339   1.00000   1.09339   1.00000   1.09339   1.00000   1.09339   1.00000   1.09339   1.00000   1.09339   1.00000   1.09339   1.00000000000000000000000000000000000	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.0576   Yours   132.04   113.25   132.93   21.50   583.50   582.39
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-short-high.xml config16-short-high.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-high.xml config40-med-high.xml config40-short-med.xml config40-short-med.xml config40-short-med.xml xonfig40-short-med.xml Average Normalised (FF) Normalised (FF) Normalised (BF) Normalised (BF) Normalised (BFQ) Normalised (WFQ) Normalised (WFQ) Config12-med-med.xml config12-med-alt.xml config12-med-med.xml config16-long-med.xml config16-long-med.xml config16-long-med.xml config16-long-med.xml config16-long-med.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000  1.0633  1.0077  1.0654  1.1246  1.0503	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423   FFQ   136.01   115.75   134.87   21.68   632.23   600.44   632.22	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   1.0000   1.0556   0.9858   BFQ   133.20   115.21   134.60   21.68   632.18   599.28   617.53	179.22   179.22   149.55   71.52   161.48   166.17   165.06   148.18   150.94   161.40   179.46   165.26   167.73   145.66   178.09   187.92   165.18   10.8892   10.9455   10.8960   10.9473   10.000   10.9339   10.	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.1325   1.0576   Yours   132.94   113.25   132.93   21.50   583.50   582.39   578.73
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-short-high.xml config40-short-med.xml config40-short-med.xml xonfig40-short-med.xml xonfig40-short-med.xml xonfig40-short-med.xml xoverage Normalised (FF) Normalised (FFQ) Normalised (BFQ) Normalised (Average)  Total rental cost Config config12-long-med.xml config12-med-alt.xml config12-med-med.xml config16-long-med.xml config16-long-med.xml config16-long-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000  1.0633  1.0077  1.0654  1.1246  1.0503	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423   FFQ   136.01   115.75   134.87   21.68   632.23   600.44   632.22   635.48	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.9458   1.0000   1.0556   0.9858	179.22   179.22   179.22   149.55   71.52   161.48   166.17   165.06   148.18   150.94   161.40   179.46   165.26   167.73   145.66   178.09   187.92   165.18   10.8892   10.9455   10.8960   10.9473   10.000   10.9339   10.9	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.1325   1.0576   Yours   132.04   113.25   132.93   21.50   582.39   578.73   580.47
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-high.xml config40-med-high.xml config40-short-high.xml config40-short-med.xml Average Normalised (FF) Normalised (FF) Normalised (BFQ) Normalised (BFQ) Normalised (Average)  Total rental cost Config config12-long-med.xml config12-med-alt.xml config12-med-alt.xml config12-med-med.xml config16-long-med.xml config16-long-high.xml config16-long-med.xml config16-short-med.xml config16-short-high.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000  1.0633  1.0007  1.0654  1.1246  1.0503  FF  131.37  13.25  132.82  21.50  589.16  581.93  598.42  594.10  579.43  1244.09  1552.56	66.87  63.88  63.06  78.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877  BF  131.75  133.01  21.49  596.10  581.49  598.83  612.40  578.62  1236.91  1567.68	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423   FFQ   136.01   115.75   134.87   21.68   632.23   600.44   632.22   635.48   592.54	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.9458   1.0000   1.0556   0.9858	179.22	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.0576   Yours   132.04   113.25   132.93   21.50   582.39   578.73   580.47   579.52   1232.80   1561.71
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config40-long-high.xml config40-long-high.xml config40-med-high.xml config40-med-med.xml config40-short-high.xml config40-short-high.xml config40-short-med.xml Average Normalised (FF) Normalised (BF) Normalised (BFQ) Normalised (BFQ) Normalised (Average)  Total rental cost Config config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-med-med.xml config16-long-med.xml config16-long-high.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config40-long-high.xml config40-long-high.xml config40-long-med.xml config40-long-med.xml	69.39  66.93  66.92  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000  1.0633  1.0077  1.0654  1.1246  1.0503  FF  131.37  131.37  131.37  131.37  131.37  132.82  21.50  589.16  581.93  598.42  594.10  579.43  1244.09  1552.56  614.35	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877  BF  131.75  133.01  21.49  596.10  581.49  598.83  612.40  578.62  1236.91  1567.68  602.11	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423   FFQ   136.01   115.75   134.87   21.68   632.23   600.44   632.22   635.48   592.54   1250.35   1583.64   605.53	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.99458   1.099858   1.0900   1.0556   0.9858	179.22	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.0576   Yours   132.04   113.25   132.93   21.50   583.50   582.39   578.73   580.47   579.52   1232.80   1561.71   600.52
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-high.xml config40-short-med.xml config40-short-med.xml config40-short-med.xml xonfig40-short-med.xml xonfig40-short-med.xml Average Normalised (FF) Normalised (FF) Normalised (BF) Normalised (BFQ) Normalised (Average)  Total rental cost Config config12-long-med.xml config12-med-alt.xml config12-med-med.xml config16-long-med.xml config16-long-high.xml config16-long-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-high.xml	69.39  66.93  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23   <b>73.30</b>  1.0000  1.0633  1.0077  1.0654  1.1246  1.1246  1.1246  1.13.25  132.82  21.50  589.16  581.93  598.42  594.10  579.43  1244.09  1552.56  614.35  1281.93	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877  BF  131.75  113.19  133.01  21.49  598.83  612.40  578.62  1236.91  1567.68  602.11  1281.04	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423   FFQ   136.01   115.75   134.87   21.68   632.23   600.44   632.22   635.48   592.54   1250.35   1583.64   605.53   1294.66	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.9958   1.0000   1.0556   0.9858	179.22   179.22   179.22   179.22   149.55   171.52   161.48   166.17   165.06   148.18   150.94   161.40   179.46   165.26   167.73   145.66   178.09   187.92   165.18   10.8892   10.9455   10.8960   10.9455   10.	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.1325   1.325   1.32.93   21.50   582.39   578.73   580.47   579.52   1232.80   1561.71   600.52   1282.44
config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-high.xml config40-med-high.xml config40-short-med.xml config40-short-med.xml Average Normalised (FF) Normalised (FF) Normalised (FFQ) Normalised (BFQ) Normalised (Average)  Total rental cost Config config12-long-med.xml config12-med-med.xml config12-med-med.xml config12-med-med.xml config16-long-med.xml config16-long-high.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-high.xml config40-med-high.xml config40-med-med.xml	69.39  66.93  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  583.01  1.0000  1.0633  1.0077  1.0654  1.0503  1.0077  1.0503  1.	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877  BF  131.75  113.19  133.01  21.49  598.83  612.40  578.62  1236.91  1567.68  602.11  1281.04  612.79	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423   FFQ   136.01   115.75   134.87   22.68   632.23   600.44   632.22   635.48   592.54   1250.35   1583.64   609.53   1294.66   601.77	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.9958   1.0000   1.0556   0.9858   1.0000   1.0556   0.9858	179.22   179.22   179.22   149.55   171.52   161.48   166.17   165.06   148.18   150.94   161.40   179.46   165.26   167.73   145.66   178.09   187.92   165.18   10.8892   10.9455   10.8960   10.9455   10.8960   10.9339   10	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.0576   Yours   132.04   113.25   132.93   21.50   582.39   578.73   580.47   579.52   1232.80   1561.71   600.52   1282.44   592.86
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config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-med.xml config40-short-med.xml config40-short-med.xml config40-short-med.xml xwerage Normalised (FF) Normalised (FFQ) Normalised (BFQ) Normalised (WFQ) Normalised (Average)  Total rental cost Config config12-long-med.xml config12-med-alt.xml config12-med-med.xml config16-long-med.xml config16-long-med.xml config16-long-med.xml config16-long-med.xml config16-long-med.xml config16-short-med.xml config16-short-med.xml config16-med-high.xml config40-long-high.xml config40-long-med.xml config40-med-med.xml config40-short-med.xml config40-short-med.xml config40-short-med.xml	69.39  66.93  66.22  61.56  79.97  68.16  77.45  76.88  66.22  85.81  75.19  83.01  58.92  86.54  77.23  73.30  1.0000  1.0633  1.0077  1.0654  1.1246  1.0503  FF  131.37  113.25  132.82  21.50  589.16  581.93  598.42  594.10  579.43  1244.09  1552.56  614.35  1281.93  600.37ivel  586.94  614.81  1.0000	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  71.66  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877  BF  131.75  113.19  133.01  21.49  596.10  581.49  596.10  581.49  598.83  612.40  578.62  1236.91  1567.68  602.11  1281.04  612.79  587.55  617.00  1.0036	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423   FFQ   136.01   115.75   134.87   21.68   632.23   600.44   632.22   635.48   592.54   1250.35   1583.64   605.53   1294.66   601.77   592.51   628.65   1.0225	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.9458   1.0000   1.0556   0.9858   BFQ   133.20   115.21   134.60   21.68   632.18   599.28   617.53   626.12   590.29   1239.58   1584.85   605.93   1293.52   597.96   588.60   625.37   1.0172	179.22	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.0576   Yours   132.04   113.25   132.93   21.50   583.50   582.39   578.73   580.47   579.52   1232.80   1561.71   600.52   1282.44   592.86   587.31   610.80   0.9935
config12-long-med.xml config12-med-alt.xml config12-short-med.xml config16-long-high.xml config16-long-med.xml config16-short-high.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config40-long-med.xml config40-long-med.xml config40-med-high.xml config40-med-high.xml config40-short-med.xml config40-short-med.xml Average Normalised (FF) Normalised (FF) Normalised (BFQ) Normalised (BFQ) Normalised (Average)  Total rental cost Config config12-long-med.xml config12-med-alt.xml config12-med-med.xml config12-med-med.xml config16-long-high.xml config16-long-high.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-short-med.xml config16-long-med.xml config16-long-med.xml config16-long-med.xml config16-long-med.xml config16-long-med.xml config40-long-med.xml config40-med-migh.xml config40-med-med.xml config40-med-med.xml config40-med-med.xml config40-med-med.xml config40-med-med.xml config40-med-med.xml config40-med-med.xml config40-med-med.xml	69.39   66.93   66.93   66.93   66.22   61.56   79.97   68.16   77.45   76.88   66.22   85.81   75.19   83.01   58.92   86.54   77.23   73.30   1.0000   1.0633   1.0077   1.0654   1.1246   1.0503   77.23   73.30   1.0503   77.23   73.30   1.0054   1.1246   1.0503   77.23   73.30   1.0077   1.0654   1.0503   77.24   1.13.25   132.82   21.50   589.16   581.93   598.42   594.10   579.43   1244.09   1552.56   614.35   1281.93   600.37   70.25   7586.94   614.81   7586.94   614.81	66.87  63.88  63.06  58.46  74.70  64.71  73.06  71.21  62.42  80.91  69.43  79.51  54.46  79.64  1.066  68.93  0.9404  1.0000  0.9476  1.0019  1.0576  0.9877  BF  131.75  113.19  133.01  21.49  596.10  581.49  598.83  612.40  578.62  1236.91  1567.68  602.11  1281.04  612.79  587.55  617.00	68.24   66.46   65.92   61.32   77.70   67.59   76.10   74.44   65.54   86.34   74.92   83.87   58.83   86.68   77.18   72.74   0.9924   1.0553   1.0000   1.0573   1.1161   1.0423   FFQ   136.01   115.75   134.87   21.68   632.23   600.44   632.22   635.48   592.54   1250.35   1583.64   605.53   1294.66   601.77   592.51   628.65	166.45   66.45   66.45   63.39   62.68   58.18   74.06   63.86   73.14   70.87   62.08   81.81   69.00   79.32   54.53   80.98   71.68   68.80   0.9387   0.9981   0.9458   1.0000   1.0556   0.9858   BFQ   133.20   115.21   134.60   21.68   632.18   599.28   617.53   626.12   590.29   1239.58   1584.85   605.93   1293.52   597.96   588.60   625.37	179.22   179.22   179.22   149.55   71.52   161.48   166.17   165.06   148.18   150.94   161.40   179.46   165.26   167.73   145.66   178.09   187.92   165.18   10.8892   10.9455   10.8960   10.9473   10.0000   10.9339   10.	69.76   66.90   66.29   61.62   79.98   68.35   78.72   78.62   66.18   87.62   75.21   84.45   58.96   87.22   77.27   73.81   1.0070   1.0708   1.0147   1.0728   1.1325   1.0576   Yours   132.04   113.25   132.93   21.50   583.50   5

Normalised (BFQ)	0.9831	0.9866	1.0052	1.0000	1.0133	0.9767
Normalised (WFQ)	0.9702	0.9736	0.9920	0.9868	1.0000	0.9638
Normalised (Average)	0.9854	0.9889	1.0076	1.0023	1.0157	0.9790
Final results: 2.1: 1/1 2.2: 1/1 2.3: 7/7						I

Algorithms	Average Turnaround Time	Average Resource Utilisation	Average Total Rental Cost
FF	1833.27	73.3	614.81
BF	2383.93	68.93	617
FFQ	2563.93	72.74	628.65
BFQ	2407.4	68.8	625.37
WFQ	10820.47	65.18	633.71
Mine	1363.53	73.81	610.8

My algorithm, for the most part has worked well enough. On average it has scored high enough in all the tests. Although there are a few yellow results in the mix, indicating that the results could've been slightly better. The good news is that there are no red results, which would've indicated that the algorithm performed poorly.

### **Section 6: Conclusion**

Well the algorithm has, for the most part, performed well in all tests, but it has not been perfected. Although, achieving perfection in in all three criterions is an impossible and contradicting task. As perfecting one aspect of the algorithm could potentially mean having a shortcoming in another.

# Section 7: References

Link to Github: https://github.com/krispaulbabu/majorAssessmentStage2