

123 inputs

- Non Uniform & Uniform
- Machines number 5,10,25
- Jobs number 10,50,100,500, 1000

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"-----START 1 from 93-----"

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machines content(number of jobs=10):
bucket1 sum:115, content= (100, 15)
bucket2 sum:189, content= (99, 90)
bucket3 sum:188, content= (98, 90)
bucket4 sum:188, content= (97, 91)
bucket5 sum:187, content= (94, 93)
"----Comparison for the 1 example----"
"***tf from benchmark was 194(we added the number of machines) and target
function from our local search is 194"
***RESULT IS THE SAME
Run time: 0.032 seconds
"Correct (size-numberCorrect):" QMap((10, 2))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 2 from 93-----"
"-----START 3 from 93-----"
"input file number 3: inputName=C:/algo/h/docs/benchMark/all/NU_1_0010_05_2.txt
and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0010_2.txt"
"***Data from file NU_1_0010_05_2.txt: machinesNum=5 jobsNum=10"
"***SOLUTION Data from file SOL_NU_1_05_0010_2.txt: machinesNum=5
jobsNum=10 lowerBound=186 upperBound=186 isOptimal=1"
Content of machines summed (103, 185, 186, 185, 185)
input selected: size 10 sum 844
----Our Results-----
best from Our local search found:
target function = 191, num of machines=5, square root lms=384.551687033096
machines content(number of jobs=10):
bucket1 sum:103, content= (100, 3)
bucket2 sum:185, content= (91, 94)
bucket3 sum:186, content= (94, 92)
bucket4 sum:185, content= (90, 95)
bucket5 sum:185, content= (93, 92)
"----Comparison for the 2 example----"
"***tf from benchmark was 191(we added the number of machines) and target
function from our local search is 191"
***RESULT IS THE SAME
Run time: 0.031 seconds
"Correct (size-numberCorrect):" QMap((10, 3))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 3 from 93-----"
"-----START 4 from 93-----"
"input file number 4: inputName=C:/algo/h/docs/benchMark/all/NU_1_0010_05_3.txt
and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0010_3.txt"

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***Data from file NU_1_0010_05_3.txt: machinesNum=5 jobsNum=10"
***SOLUTION Data from file SOL_NU_1_05_0010_3.txt: machinesNum=5
jobsNum=10 lowerBound=188 upperBound=188 isOptimal=1"
Content of machines summed (188, 187, 104, 184, 183)
input selected: size 10 sum 846
----Our Results-----
best from Our local search found:
target function = 193, num of machines=5, square root lms=385.323240928963
machines content(number of jobs=10):
bucket1 sum:188, content= (97, 91)
bucket2 sum:187, content= (97, 90)
bucket3 sum:104, content= (97, 7)
bucket4 sum:184, content= (93, 91)
bucket5 sum:183, content= (92, 91)
"----Comparison for the 3 example----"
***tf from benchmark was 193(we added the number of machines) and target
function from our local search is 193"
***RESULT IS THE SAME
Run time: 0.031 seconds
"Correct (size-numberCorrect):" QMap((10, 4))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 4 from 93-----"
"-----START 5 from 93-----"

and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0010_4.txt"
***Data from file NU_1_0010_05_4.txt: machinesNum=5 jobsNum=10"
***SOLUTION Data from file SOL_NU_1_05_0010_4.txt: machinesNum=5
jobsNum=10 lowerBound=191 upperBound=191 isOptimal=1"
Content of machines summed (110, 189, 191, 190, 190)
input selected: size 10 sum 870
----Our Results-----
best from Our local search found:
target function = 196, num of machines=5, square root lms=395.60333668967
machines content(number of jobs=10):
bucket1 sum:190, content= (97, 93)
bucket2 sum:189, content= (98, 91)
bucket3 sum:191, content= (97, 94)
bucket4 sum:110, content= (10, 100)
bucket5 sum:190, content= (95, 95)
"----Comparison for the 4 example----"
***tf from benchmark was 196(we added the number of machines) and target
function from our local search is 196"
***RESULT IS THE SAME
Run time: 0.031 seconds

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"Correct (size-numberCorrect):" QMap((10, 5))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 5 from 93-----"
"-----START 6 from 93-----"
"input file number 6: inputName=C:/algo/h/docs/benchMark/all/NU_1_0010_05_5.txt
and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0010_5.txt"
"***Data from file NU_1_0010_05_5.txt: machinesNum=5 jobsNum=10"
"***SOLUTION Data from file SOL_NU_1_05_0010_5.txt: machinesNum=5
jobsNum=10 lowerBound=189 upperBound=189 isOptimal=1"
Content of machines summed (113, 189, 188, 187, 187)
input selected: size 10 sum 864
----Our Results-----
best from Our local search found:
target function = 194, num of machines=5, square root lms=392.137730905864
machines content(number of jobs=10):
bucket1 sum:113, content= (100, 13)
bucket2 sum:189, content= (97, 92)
bucket3 sum:188, content= (96, 92)
bucket4 sum:187, content= (94, 93)
bucket5 sum:187, content= (94, 93)
"----Comparison for the 5 example----"
"***tf from benchmark was 194(we added the number of machines) and target
function from our local search is 194"
***RESULT IS THE SAME
Run time: 0.032 seconds
"Correct (size-numberCorrect):" QMap((10, 6))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 6 from 93-----"
"-----START 7 from 93-----"
"input file number 7: inputName=C:/algo/h/docs/benchMark/all/NU_1_0010_05_6.txt
and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0010_6.txt"
"***Data from file NU_1_0010_05_6.txt: machinesNum=5 jobsNum=10"
"***SOLUTION Data from file SOL_NU_1_05_0010_6.txt: machinesNum=5
jobsNum=10 lowerBound=188 upperBound=188 isOptimal=1"
Content of machines summed (102, 188, 188, 188, 187)
input selected: size 10 sum 853
----Our Results-----
best from Our local search found:
target function = 193, num of machines=5, square root lms=389.107954172104
machines content(number of jobs=10):
bucket1 sum:102, content= (99, 3)
bucket2 sum:188, content= (98, 90)

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bucket3 sum:188, content= (96, 92)
bucket4 sum:188, content= (95, 93)
bucket5 sum:187, content= (95, 92)
"----Comparison for the 6 example----"
"***tf from benchmark was 193(we added the number of machines) and target
function from our local search is 193"
***RESULT IS THE SAME
Run time: 0.031 seconds
"Correct (size-numberCorrect):" QMap((10, 7))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 7 from 93-----"
"-----START 8 from 93-----"
"input file number 8: inputName=C:/algo/h/docs/benchMark/all/NU_1_0010_05_7.txt
and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0010_7.txt"
"***Data from file NU_1_0010_05_7.txt: machinesNum=5 jobsNum=10"
"***SOLUTION Data from file SOL_NU_1_05_0010_7.txt: machinesNum=5
jobsNum=10 lowerBound=190 upperBound=190 isOptimal=1"
Content of machines summed (119, 189, 188, 190, 189)
input selected: size 10 sum 875
----Our Results-----
best from Our local search found:
target function = 195, num of machines=5, square root lms=396.291559334791
machines content(number of jobs=10):
bucket1 sum:188, content= (91, 97)
bucket2 sum:189, content= (97, 92)
bucket3 sum:119, content= (20, 99)
bucket4 sum:190, content= (96, 94)
bucket5 sum:189, content= (95, 94)
"----Comparison for the 7 example----"
"***tf from benchmark was 195(we added the number of machines) and target
function from our local search is 195"
***RESULT IS THE SAME
Run time: 0.031 seconds
"Correct (size-numberCorrect):" QMap((10, 8))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 8 from 93-----"
"-----START 9 from 93-----"
"input file number 9: inputName=C:/algo/h/docs/benchMark/all/NU_1_0010_05_8.txt
and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0010_8.txt"
"***Data from file NU_1_0010_05_8.txt: machinesNum=5 jobsNum=10"
"***SOLUTION Data from file SOL_NU_1_05_0010_8.txt: machinesNum=5
jobsNum=10 lowerBound=190 upperBound=190 isOptimal=1"

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Content of machines summed (190, 113, 189, 189, 189)
input selected: size 10 sum 870
----Our Results-----
best from Our local search found:
target function = 195, num of machines=5, square root lms=395.008860660112
machines content(number of jobs=10):
bucket1 sum:190, content= (100, 90)
bucket2 sum:113, content= (100, 13)
bucket3 sum:189, content= (98, 91)
bucket4 sum:189, content= (95, 94)
bucket5 sum:189, content= (95, 94)
"----Comparison for the 8 example----"
"***tf from benchmark was 195(we added the number of machines) and target
function from our local search is 195"
***RESULT IS THE SAME
Run time: 0.031 seconds
"Correct (size-numberCorrect):" QMap((10, 9))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 9 from 93-----"
"-----START 10 from 93-----"
"input file number 10:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0010_05_9.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0010_9.txt"
"***Data from file NU_1_0010_05_9.txt: machinesNum=5 jobsNum=10"
"***SOLUTION Data from file SOL_NU_1_05_0010_9.txt: machinesNum=5
jobsNum=10 lowerBound=190 upperBound=190 isOptimal=1"
Content of machines summed (189, 107, 190, 188, 190)
input selected: size 10 sum 864
----Our Results-----
best from Our local search found:
target function = 195, num of machines=5, square root lms=393.337005632575
machines content(number of jobs=10):
bucket1 sum:188, content= (92, 96)
bucket2 sum:189, content= (98, 91)
bucket3 sum:190, content= (96, 94)
bucket4 sum:107, content= (9, 98)
bucket5 sum:190, content= (95, 95)
"----Comparison for the 9 example----"
"***tf from benchmark was 195(we added the number of machines) and target
function from our local search is 195"
***RESULT IS THE SAME
Run time: 0.032 seconds
"Correct (size-numberCorrect):" QMap((10, 10))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"

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"-----END 10 from 93-----"
"-----START 11 from 93-----"


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"----Comparison for the 11 example----"
"***tf from benchmark was 942(we added the number of machines) and target
function from our local search is 942"
***RESULT IS THE SAME
Run time: 2.422 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 2))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 12 from 93-----"
"-----START 13 from 93-----"
"input file number 13:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_05_2.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0050_2.txt"
"***Data from file NU_1_0050_05_2.txt: machinesNum=5 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_05_0050_2.txt: machinesNum=5
jobsNum=50 lowerBound=938 upperBound=938 isOptimal=1"
Content of machines summed (938, 938, 938, 938, 905)
input selected: size 50 sum 4657
----Our Results-----
best from Our local search found:
target function = 943, num of machines=5, square root lms=2082.88285796393
machines content(number of jobs=50):
bucket1 sum:938, content= (94, 94, 94, 90, 95, 95, 97, 92, 93, 94)
bucket2 sum:938, content= (90, 90, 90, 98, 91, 90, 99, 98, 97, 95)
bucket3 sum:938, content= (99, 94, 90, 90, 94, 91, 96, 96, 91, 97)
bucket4 sum:938, content= (93, 97, 95, 97, 96, 94, 92, 92, 91, 91)
bucket5 sum:905, content= (100, 7, 100, 100, 100, 100, 100, 99, 100, 99)
"----Comparison for the 12 example----"
"***tf from benchmark was 943(we added the number of machines) and target
function from our local search is 943"
***RESULT IS THE SAME
Run time: 1.395 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 3))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 13 from 93-----"
"-----START 14 from 93-----"
"input file number 14:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_05_3.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0050_3.txt"
"***Data from file NU_1_0050_05_3.txt: machinesNum=5 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_05_0050_3.txt: machinesNum=5
jobsNum=50 lowerBound=936 upperBound=936 isOptimal=1"
Content of machines summed (892, 936, 936, 936, 936)
input selected: size 50 sum 4636
----Our Results-----

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best from Our local search found:
target function = 941, num of machines=5, square root lms=2073.63497269891
machines content(number of jobs=50):
bucket1 sum:936, content= (90, 96, 96, 93, 93, 93, 92, 95, 96, 92)
bucket2 sum:936, content= (91, 90, 91, 93, 97, 96, 96, 93, 97, 92)
bucket3 sum:893, content= (99, 99, 99, 3, 100, 99, 99, 98, 98, 99)
bucket4 sum:936, content= (98, 98, 95, 90, 90, 91, 91, 95, 91, 97)
bucket5 sum:935, content= (96, 93, 96, 96, 96, 95, 91, 92, 90, 90)
"----Comparison for the 13 example----"
"***tf from benchmark was 941(we added the number of machines) and target
function from our local search is 941"
***RESULT IS THE SAME
Run time: 1.517 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 4))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 14 from 93-----"
"-----START 15 from 93-----"
"input file number 15:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_05_4.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0050_4.txt"
"***Data from file NU_1_0050_05_4.txt: machinesNum=5 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_05_0050_4.txt: machinesNum=5
jobsNum=50 lowerBound=933 upperBound=933 isOptimal=1"
Content of machines summed (933, 933, 933, 932, 898)
input selected: size 50 sum 4629
----Our Results-----
best from Our local search found:
target function = 938, num of machines=5, square root lms=2070.38522985458
machines content(number of jobs=50):
bucket1 sum:933, content= (93, 93, 94, 92, 91, 95, 95, 95, 94, 91)
bucket2 sum:932, content= (91, 92, 93, 93, 90, 97, 96, 92, 91, 97)
bucket3 sum:933, content= (98, 98, 92, 93, 94, 90, 91, 94, 93, 90)
bucket4 sum:933, content= (97, 93, 93, 92, 90, 90, 95, 91, 98, 94)
bucket5 sum:898, content= (100, 4, 100, 99, 99, 100, 100, 99, 99, 98)
"----Comparison for the 14 example----"
"***tf from benchmark was 938(we added the number of machines) and target
function from our local search is 938"
***RESULT IS THE SAME
Run time: 2.062 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 5))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 15 from 93-----"
"-----START 16 from 93-----"
"input file number 16:

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inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_05_5.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0050_5.txt"
"***Data from file NU_1_0050_05_5.txt: machinesNum=5 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_05_0050_5.txt: machinesNum=5
jobsNum=50 lowerBound=941 upperBound=941 isOptimal=1"
Content of machines summed (941, 941, 941, 939, 901)
input selected: size 50 sum 4663
----Our Results-----
best from Our local search found:
target function = 946, num of machines=5, square root lms=2085.65649137148
machines content(number of jobs=50):
bucket1 sum:940, content= (95, 93, 93, 90, 92, 92, 97, 98, 98, 92)
bucket2 sum:940, content= (93, 91, 90, 97, 94, 91, 97, 99, 97, 91)
bucket3 sum:901, content= (100, 100, 100, 5, 100, 99, 99, 99, 100, 99)
bucket4 sum:941, content= (99, 98, 97, 95, 93, 92, 90, 92, 92, 93)
bucket5 sum:941, content= (96, 98, 98, 96, 95, 95, 90, 92, 91, 90)
"----Comparison for the 15 example----"
"***tf from benchmark was 946(we added the number of machines) and target
function from our local search is 946"
***RESULT IS THE SAME
Run time: 1.547 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 6))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 16 from 93-----"
"-----START 17 from 93-----"
"input file number 17:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_05_6.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0050_6.txt"
"***Data from file NU_1_0050_05_6.txt: machinesNum=5 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_05_0050_6.txt: machinesNum=5
jobsNum=50 lowerBound=943 upperBound=943 isOptimal=1"
Content of machines summed (943, 943, 943, 943, 906)
input selected: size 50 sum 4678
----Our Results-----
best from Our local search found:
target function = 948, num of machines=5, square root lms=2092.32693430066
machines content(number of jobs=50):
bucket1 sum:906, content= (100, 13, 100, 99, 99, 100, 99, 99, 99, 98)
bucket2 sum:943, content= (98, 90, 98, 96, 93, 92, 92, 94, 94, 96)
bucket3 sum:943, content= (91, 98, 94, 94, 92, 91, 90, 98, 97, 98)
bucket4 sum:943, content= (92, 98, 98, 95, 95, 93, 93, 91, 90, 98)
bucket5 sum:943, content= (95, 96, 97, 97, 94, 93, 93, 90, 90, 98)
"----Comparison for the 16 example----"
"***tf from benchmark was 948(we added the number of machines) and target
function from our local search is 948"

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***RESULT IS THE SAME

Run time: 1.14 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 7))

"Mistakes(size-numberMistakes):" QMap()

"Avegare error: 0"

"-----END 17 from 93-----"

"-----START 18 from 93-----"

"input file number 18:

inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_05_7.txt and

solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0050_7.txt"

***Data from file NU_1_0050_05_7.txt: machinesNum=5 jobsNum=50"

***SOLUTION Data from file SOL_NU_1_05_0050_7.txt: machinesNum=5
jobsNum=50 lowerBound=940 upperBound=940 isOptimal=1"

Content of machines summed (940, 940, 940, 940, 899)

input selected: size 50 sum 4659

----Our Results-----

best from Our local search found:

target function = 945, num of machines=5, square root lms=2083.85292187333

machines content(number of jobs=50):

bucket1 sum:939, content= (90, 96, 92, 94, 93, 97, 93, 97, 92, 95)

bucket2 sum:901, content= (100, 100, 100, 2, 100, 100, 100, 100, 99, 100)

bucket3 sum:939, content= (97, 95, 91, 92, 91, 94, 94, 91, 98, 96)

bucket4 sum:940, content= (98, 99, 99, 96, 93, 92, 91, 90, 90, 92)

bucket5 sum:940, content= (98, 99, 95, 94, 94, 93, 92, 92, 90, 93)

"----Comparison for the 17 example----

***tf from benchmark was 945(we added the number of machines) and target
function from our local search is 945"

***RESULT IS THE SAME

Run time: 1.109 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 8))

"Mistakes(size-numberMistakes):" QMap()

"Avegare error: 0"

"-----END 18 from 93-----"

"-----START 19 from 93-----"

"input file number 19:

inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_05_8.txt and

solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0050_8.txt"

***Data from file NU_1_0050_05_8.txt: machinesNum=5 jobsNum=50"

***SOLUTION Data from file SOL_NU_1_05_0050_8.txt: machinesNum=5
jobsNum=50 lowerBound=950 upperBound=950 isOptimal=1"

Content of machines summed (950, 950, 950, 947, 909)

input selected: size 50 sum 4706

----Our Results-----

best from Our local search found:

target function = 955, num of machines=5, square root lms=2104.89524679971

machines content(number of jobs=50):

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bucket1 sum:909, content= (100, 15, 100, 99, 100, 100, 99, 99, 99, 98)
bucket2 sum:949, content= (98, 90, 97, 96, 94, 93, 93, 96, 95, 97)
bucket3 sum:949, content= (98, 97, 96, 93, 92, 90, 97, 97, 97, 92)
bucket4 sum:949, content= (93, 97, 96, 94, 94, 92, 90, 98, 97, 98)
bucket5 sum:950, content= (95, 97, 98, 97, 97, 96, 94, 94, 91, 91)
"----Comparison for the 18 example----"
"***tf from benchmark was 955(we added the number of machines) and target
function from our local search is 955"
***RESULT IS THE SAME
Run time: 1.235 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 9))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 19 from 93-----"
"-----START 20 from 93-----"
"input file number 20:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_05_9.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0050_9.txt"
"***Data from file NU_1_0050_05_9.txt: machinesNum=5 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_05_0050_9.txt: machinesNum=5
jobsNum=50 lowerBound=936 upperBound=936 isOptimal=1"
Content of machines summed (936, 936, 936, 936, 914)
input selected: size 50 sum 4658
----Our Results-----
best from Our local search found:
target function = 941, num of machines=5, square root lms=2083.21386324112
machines content(number of jobs=50):
bucket1 sum:936, content= (90, 95, 94, 95, 96, 93, 91, 96, 92, 94)
bucket2 sum:936, content= (93, 91, 93, 90, 91, 90, 97, 95, 98, 98)
bucket3 sum:936, content= (91, 96, 94, 91, 91, 91, 93, 94, 97, 98)
bucket4 sum:914, content= (100, 100, 100, 19, 100, 99, 98, 100, 99, 99)
bucket5 sum:936, content= (95, 95, 98, 96, 94, 94, 93, 90, 90, 91)
"----Comparison for the 19 example----"
"***tf from benchmark was 941(we added the number of machines) and target
function from our local search is 941"
***RESULT IS THE SAME
Run time: 1.64 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 10))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 20 from 93-----"
"-----START 21 from 93-----"
"input file number 21:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_10_0.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0050_0.txt"
"***Data from file NU_1_0050_10_0.txt: machinesNum=10 jobsNum=50"

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***SOLUTION Data from file SOL_NU_1_10_0050_0.txt: machinesNum=10
jobsNum=50 lowerBound=474 upperBound=474 isOptimal=1"
Content of machines summed (474, 474, 474, 474, 474, 474, 474, 474, 474, 397)
input selected: size 50 sum 4663

----Our Results-----

best from Our local search found:

target function = 484, num of machines=10, square root lms=1476.32686082724

machines content(number of jobs=50):

bucket1 sum:474, content= (95, 92, 98, 93, 96)

bucket2 sum:474, content= (90, 95, 98, 94, 97)

bucket3 sum:474, content= (97, 93, 95, 98, 91)

bucket4 sum:473, content= (96, 93, 90, 96, 98)

bucket5 sum:474, content= (99, 97, 97, 91, 90)

bucket6 sum:474, content= (99, 97, 96, 92, 90)

bucket7 sum:474, content= (99, 96, 96, 92, 91)

bucket8 sum:474, content= (97, 95, 95, 90, 97)

bucket9 sum:398, content= (1, 100, 99, 99, 99)

bucket10 sum:474, content= (98, 97, 97, 92, 90)

"----Comparison for the 20 example----

***tf from benchmark was 484(we added the number of machines) and target
function from our local search is 484"

***RESULT IS THE SAME

Run time: 8.498 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 11))

"Mistakes(size-numberMistakes):" QMap()

"Avegare error: 0"

"-----END 21 from 93-----"

"-----START 22 from 93-----"

"input file number 22:

inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_10_1.txt and

solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0050_1.txt"

***Data from file NU_1_0050_10_1.txt: machinesNum=10 jobsNum=50"

***SOLUTION Data from file SOL_NU_1_10_0050_1.txt: machinesNum=10
jobsNum=50 lowerBound=472 upperBound=472 isOptimal=1"

Content of machines summed (472, 472, 472, 472, 472, 472, 472, 472, 470, 413)

input selected: size 50 sum 4659

----Our Results-----

best from Our local search found:

target function = 482, num of machines=10, square root lms=1474.36053935257

machines content(number of jobs=50):

bucket1 sum:472, content= (94, 94, 95, 92, 97)

bucket2 sum:472, content= (97, 92, 98, 94, 91)

bucket3 sum:471, content= (97, 92, 91, 93, 98)

bucket4 sum:471, content= (92, 91, 93, 96, 99)

bucket5 sum:472, content= (99, 94, 92, 97, 90)

bucket6 sum:472, content= (96, 96, 91, 91, 98)

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bucket7 sum:472, content= (99, 95, 96, 91, 91)
bucket8 sum:472, content= (99, 96, 93, 90, 94)
bucket9 sum:472, content= (99, 96, 93, 90, 94)
bucket10 sum:413, content= (13, 100, 100, 100, 100)
"----Comparison for the 21 example----"
"***tf from benchmark was 482(we added the number of machines) and target
function from our local search is 482"
***RESULT IS THE SAME
Run time: 12.434 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 12))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 22 from 93-----"
"-----START 23 from 93-----"
"input file number 23:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_10_2.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0050_2.txt"
"***Data from file NU_1_0050_10_2.txt: machinesNum=10 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_10_0050_2.txt: machinesNum=10
jobsNum=50 lowerBound=475 upperBound=475 isOptimal=1"
Content of machines summed (475, 475, 475, 475, 475, 475, 475, 475, 471, 410)
input selected: size 50 sum 4681
----Our Results-----
best from Our local search found:
target function = 485, num of machines=10, square root lms=1481.52927746974
machines content(number of jobs=50):
bucket1 sum:474, content= (98, 95, 96, 95, 90)
bucket2 sum:474, content= (93, 94, 98, 91, 98)
bucket3 sum:474, content= (98, 95, 94, 90, 97)
bucket4 sum:410, content= (100, 10, 100, 100, 100)
bucket5 sum:475, content= (100, 98, 93, 90, 94)
bucket6 sum:474, content= (100, 97, 92, 90, 95)
bucket7 sum:475, content= (99, 99, 95, 92, 90)
bucket8 sum:475, content= (99, 97, 97, 92, 90)
bucket9 sum:475, content= (99, 97, 97, 91, 91)
bucket10 sum:475, content= (99, 96, 96, 94, 90)
"----Comparison for the 22 example----"
"***tf from benchmark was 485(we added the number of machines) and target
function from our local search is 485"
***RESULT IS THE SAME
Run time: 7.858 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 13))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 23 from 93-----"
"-----START 24 from 93-----"

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bucket3 sum:471, content= (95, 93, 97, 92, 94)
bucket4 sum:470, content= (95, 90, 93, 98, 94)
bucket5 sum:471, content= (100, 93, 95, 93, 90)
bucket6 sum:471, content= (100, 95, 95, 91, 90)
bucket7 sum:471, content= (99, 94, 92, 91, 95)
bucket8 sum:471, content= (99, 94, 92, 90, 96)
bucket9 sum:419, content= (19, 100, 100, 100, 100)
bucket10 sum:471, content= (98, 97, 94, 91, 91)
"----Comparison for the 24 example----"
"***tf from benchmark was 481(we added the number of machines) and target
function from our local search is 481"
***RESULT IS THE SAME
Run time: 11.248 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 15))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 25 from 93-----"
"-----START 26 from 93-----"
"input file number 26:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_10_5.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0050_5.txt"
"***Data from file NU_1_0050_10_5.txt: machinesNum=10 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_10_0050_5.txt: machinesNum=10
jobsNum=50 lowerBound=471 upperBound=471 isOptimal=1"
Content of machines summed (471, 471, 471, 471, 471, 471, 471, 471, 471, 398)
input selected: size 50 sum 4637
----Our Results-----
best from Our local search found:
target function = 481, num of machines=10, square root lms=1467.65356947748
machines content(number of jobs=50):
bucket1 sum:470, content= (96, 93, 94, 95, 92)
bucket2 sum:470, content= (93, 92, 93, 96, 96)
bucket3 sum:470, content= (91, 94, 97, 96, 92)
bucket4 sum:470, content= (90, 91, 95, 99, 95)
bucket5 sum:470, content= (99, 99, 91, 90, 91)
bucket6 sum:470, content= (99, 94, 93, 90, 94)
bucket7 sum:405, content= (5, 100, 100, 100, 100)
bucket8 sum:471, content= (99, 95, 95, 91, 91)
bucket9 sum:471, content= (99, 94, 93, 91, 94)
bucket10 sum:470, content= (99, 95, 94, 91, 91)
"----Comparison for the 25 example----"
"***tf from benchmark was 481(we added the number of machines) and target
function from our local search is 481"
***RESULT IS THE SAME
Run time: 11.232 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 16))

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"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 26 from 93-----"
"-----START 27 from 93-----"
"input file number 27:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_10_6.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0050_6.txt"
"***Data from file NU_1_0050_10_6.txt: machinesNum=10 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_10_0050_6.txt: machinesNum=10
jobsNum=50 lowerBound=476 upperBound=476 isOptimal=1"
Content of machines summed (476, 476, 476, 476, 476, 476, 476, 474, 414)
input selected: size 50 sum 4696
----Our Results-----
best from Our local search found:
target function = 486, num of machines=10, square root lms=1486.16217150081
machines content(number of jobs=50):
bucket1 sum:476, content= (100, 98, 92, 93, 93)
bucket2 sum:476, content= (96, 96, 93, 97, 94)
bucket3 sum:476, content= (99, 97, 90, 99, 91)
bucket4 sum:475, content= (98, 97, 90, 99, 91)
bucket5 sum:475, content= (100, 98, 91, 90, 96)
bucket6 sum:476, content= (100, 98, 96, 90, 92)
bucket7 sum:414, content= (100, 14, 100, 100, 100)
bucket8 sum:476, content= (100, 98, 95, 91, 92)
bucket9 sum:476, content= (99, 99, 94, 91, 93)
bucket10 sum:476, content= (98, 99, 94, 94, 91)
"----Comparison for the 26 example----"
"***tf from benchmark was 486(we added the number of machines) and target
function from our local search is 486"
***RESULT IS THE SAME
Run time: 7.889 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 17))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 27 from 93-----"
"-----START 28 from 93-----"
"input file number 28:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_10_7.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0050_7.txt"
"***Data from file NU_1_0050_10_7.txt: machinesNum=10 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_10_0050_7.txt: machinesNum=10
jobsNum=50 lowerBound=472 upperBound=472 isOptimal=1"
Content of machines summed (410, 472, 472, 472, 472, 472, 472, 472, 472, 471)
input selected: size 50 sum 4657
----Our Results-----
best from Our local search found:

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target function = 482, num of machines=10, square root lms=1473.84293600098
machines content(number of jobs=50):
bucket1 sum:472, content= (99, 92, 92, 97, 92)
bucket2 sum:472, content= (95, 94, 98, 93, 92)
bucket3 sum:472, content= (96, 92, 90, 97, 97)
bucket4 sum:472, content= (95, 90, 95, 93, 99)
bucket5 sum:471, content= (99, 97, 95, 90, 90)
bucket6 sum:472, content= (99, 95, 91, 91, 96)
bucket7 sum:472, content= (97, 95, 92, 90, 98)
bucket8 sum:472, content= (93, 97, 95, 97, 90)
bucket9 sum:410, content= (11, 100, 100, 100, 99)
bucket10 sum:472, content= (98, 98, 93, 91, 92)
"----Comparison for the 27 example----"
"***tf from benchmark was 482(we added the number of machines) and target
function from our local search is 482"
***RESULT IS THE SAME
Run time: 11.292 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 18))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 28 from 93-----"
"-----START 29 from 93-----"

"***Data from file NU_1_0050_10_8.txt: machinesNum=10 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_10_0050_8.txt: machinesNum=10
jobsNum=50 lowerBound=471 upperBound=471 isOptimal=1"
Content of machines summed (471, 471, 471, 471, 410, 471, 471, 471, 471, 471)
input selected: size 50 sum 4649
----Our Results-----
best from Our local search found:
target function = 481, num of machines=10, square root lms=1471.28141427804
machines content(number of jobs=50):
bucket1 sum:471, content= (97, 93, 91, 97, 93)
bucket2 sum:471, content= (94, 92, 92, 98, 95)
bucket3 sum:410, content= (100, 11, 100, 100, 99)
bucket4 sum:471, content= (99, 98, 90, 90, 94)
bucket5 sum:471, content= (99, 95, 92, 93, 92)
bucket6 sum:471, content= (99, 96, 91, 91, 94)
bucket7 sum:471, content= (99, 96, 94, 91, 91)
bucket8 sum:471, content= (99, 96, 93, 91, 92)
bucket9 sum:471, content= (97, 95, 95, 93, 91)
bucket10 sum:471, content= (98, 94, 91, 91, 97)
"----Comparison for the 28 example----"
"***tf from benchmark was 481(we added the number of machines) and target

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function from our local search is 481"
***RESULT IS THE SAME
Run time: 8.81 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 19))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 29 from 93-----"
"-----START 30 from 93-----"
"input file number 30:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_10_9.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0050_9.txt"
"***Data from file NU_1_0050_10_9.txt: machinesNum=10 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_10_0050_9.txt: machinesNum=10
jobsNum=50 lowerBound=473 upperBound=473 isOptimal=1"
Content of machines summed (401, 473, 473, 473, 473, 473, 473, 473, 473, 473)
input selected: size 50 sum 4658
----Our Results-----
best from Our local search found:
target function = 483, num of machines=10, square root lms=1474.52365189576
machines content(number of jobs=50):
bucket1 sum:473, content= (94, 96, 90, 95, 98)
bucket2 sum:473, content= (94, 95, 95, 97, 92)
bucket3 sum:473, content= (94, 94, 98, 96, 91)
bucket4 sum:473, content= (98, 93, 90, 94, 98)
bucket5 sum:473, content= (99, 95, 95, 93, 91)
bucket6 sum:473, content= (97, 96, 93, 97, 90)
bucket7 sum:473, content= (98, 97, 96, 91, 91)
bucket8 sum:473, content= (97, 96, 92, 91, 97)
bucket9 sum:472, content= (96, 97, 96, 92, 91)
bucket10 sum:402, content= (2, 100, 100, 100, 100)
"----Comparison for the 29 example----"
"***tf from benchmark was 483(we added the number of machines) and target
function from our local search is 483"
***RESULT IS THE SAME
Run time: 11.076 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 20))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 30 from 93-----"
"-----START 31 from 93-----"
"input file number 31:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_25_0.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0050_0.txt"
"***Data from file NU_1_0050_25_0.txt: machinesNum=25 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_25_0050_0.txt: machinesNum=25
jobsNum=50 lowerBound=191 upperBound=191 isOptimal=1"

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"***Data from file NU_1_0050_25_1.txt: machinesNum=25 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_25_0050_1.txt: machinesNum=25
jobsNum=50 lowerBound=191 upperBound=191 isOptimal=1"
Content of machines summed (190, 190, 117, 190, 190, 190, 189, 190, 190, 189, 189,
190, 190, 190, 190, 191, 191, 191, 190, 190, 190, 190,
189, 189, 189)
input selected: size 50 sum 4674
----Our Results-----
best from Our local search found:
target function = 216, num of machines=25, square root lms=937.52759959374
machines content(number of jobs=50):
bucket1 sum:117, content= (100, 17)
bucket2 sum:190, content= (90, 100)
bucket3 sum:189, content= (91, 98)
bucket4 sum:189, content= (91, 98)
bucket5 sum:190, content= (99, 91)
bucket6 sum:190, content= (99, 91)
bucket7 sum:190, content= (99, 91)
bucket8 sum:190, content= (96, 94)
bucket9 sum:190, content= (98, 92)
bucket10 sum:190, content= (92, 98)
bucket11 sum:190, content= (93, 97)
bucket12 sum:190, content= (94, 96)
bucket13 sum:190, content= (97, 93)
bucket14 sum:190, content= (94, 96)
bucket15 sum:190, content= (94, 96)
bucket16 sum:191, content= (96, 95)
bucket17 sum:191, content= (96, 95)
bucket18 sum:191, content= (96, 95)
bucket19 sum:190, content= (93, 97)
bucket20 sum:190, content= (93, 97)
bucket21 sum:189, content= (96, 93)
bucket22 sum:190, content= (90, 100)
bucket23 sum:189, content= (96, 93)
bucket24 sum:189, content= (90, 99)
bucket25 sum:189, content= (96, 93)
"----Comparison for the 31 example----"
"***tf from benchmark was 216(we added the number of machines) and target
function from our local search is 216"
***RESULT IS THE SAME
Run time: 161.14 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 22))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 32 from 93-----"
"-----START 33 from 93-----"

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"Avegare error: 0"
"-----END 33 from 93-----"
"-----START 34 from 93-----"



"***Data from file NU_1_0050_25_3.txt: machinesNum=25 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_25_0050_3.txt: machinesNum=25
jobsNum=50 lowerBound=190 upperBound=190 isOptimal=1"
Content of machines summed (190, 190, 190, 190, 190, 190, 190, 108, 189, 189, 188,
188, 188, 190, 189, 188, 188, 188, 189, 189, 188, 188,
188, 187, 187)

----Our Results-----
best from Our local search found:
target function = 215, num of machines=25, square root lms=931.183655354839
machines content(number of jobs=50):
bucket1 sum:188, content= (98, 90)
bucket2 sum:190, content= (100, 90)
bucket3 sum:190, content= (100, 90)
bucket4 sum:190, content= (100, 90)
bucket5 sum:190, content= (100, 90)
bucket6 sum:190, content= (100, 90)
bucket7 sum:190, content= (100, 90)
bucket8 sum:190, content= (100, 90)
bucket9 sum:189, content= (99, 90)
bucket10 sum:189, content= (92, 97)
bucket11 sum:188, content= (91, 97)
bucket12 sum:188, content= (91, 97)
bucket13 sum:189, content= (98, 91)
bucket14 sum:190, content= (97, 93)
bucket15 sum:188, content= (97, 91)
bucket16 sum:188, content= (90, 98)
bucket17 sum:188, content= (90, 98)
bucket18 sum:108, content= (8, 100)
bucket19 sum:189, content= (96, 93)
bucket20 sum:189, content= (96, 93)
bucket21 sum:188, content= (95, 93)
bucket22 sum:188, content= (95, 93)
bucket23 sum:188, content= (94, 94)
bucket24 sum:187, content= (94, 93)
bucket25 sum:187, content= (94, 93)
"----Comparison for the 33 example----"
"***tf from benchmark was 215(we added the number of machines) and target
function from our local search is 215"
***RESULT IS THE SAME

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Run time: 216.795 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 24))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 34 from 93-----"
"-----START 35 from 93-----"


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***tf from benchmark was 216(we added the number of machines) and target
function from our local search is 216"
***RESULT IS THE SAME
Run time: 315.468 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 25))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 35 from 93-----"
"-----START 36 from 93-----"
"input file number 36:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_25_5.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0050_5.txt"
***Data from file NU_1_0050_25_5.txt: machinesNum=25 jobsNum=50"
***SOLUTION Data from file SOL_NU_1_25_0050_5.txt: machinesNum=25
jobsNum=50 lowerBound=194 upperBound=194 isOptimal=1"
Content of machines summed (191, 191, 190, 190, 190, 103, 191, 191, 191, 190, 190,
192, 191, 191, 191, 191, 191, 190, 194, 193, 192, 192,
192, 192, 192)
input selected: size 50 sum 4692
----Our Results-----
best from Our local search found:
target function = 219, num of machines=25, square root lms=942.384210394041
machines content(number of jobs=50):
bucket1 sum:193, content= (97, 96)
bucket2 sum:192, content= (95, 97)
bucket3 sum:190, content= (100, 90)
bucket4 sum:191, content= (100, 91)
bucket5 sum:192, content= (97, 95)
bucket6 sum:192, content= (97, 95)
bucket7 sum:191, content= (99, 92)
bucket8 sum:192, content= (95, 97)
bucket9 sum:191, content= (99, 92)
bucket10 sum:192, content= (95, 97)
bucket11 sum:191, content= (98, 93)
bucket12 sum:191, content= (98, 93)
bucket13 sum:103, content= (3, 100)
bucket14 sum:191, content= (100, 91)
bucket15 sum:192, content= (98, 94)
bucket16 sum:191, content= (98, 93)
bucket17 sum:191, content= (98, 93)
bucket18 sum:191, content= (98, 93)
bucket19 sum:194, content= (97, 97)
bucket20 sum:191, content= (99, 92)
bucket21 sum:190, content= (91, 99)
bucket22 sum:190, content= (90, 100)
bucket23 sum:190, content= (91, 99)

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bucket24 sum:190, content= (90, 100)
bucket25 sum:190, content= (92, 98)
"----Comparison for the 35 example----"
"***tf from benchmark was 219(we added the number of machines) and target
function from our local search is 219"
***RESULT IS THE SAME
Run time: 367.592 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 26))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 36 from 93-----"
"-----START 37 from 93-----"
"input file number 37:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_25_6.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0050_6.txt"
"***Data from file NU_1_0050_25_6.txt: machinesNum=25 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_25_0050_6.txt: machinesNum=25
jobsNum=50 lowerBound=190 upperBound=190 isOptimal=1"
Content of machines summed (190, 109, 189, 189, 189, 189, 189, 189, 188, 188, 189,
189, 189, 189, 189, 188, 188, 188, 188, 188, 188, 187,
187, 187, 187)
input selected: size 50 sum 4630
----Our Results-----
best from Our local search found:
target function = 215, num of machines=25, square root lms=929.268529543533
machines content(number of jobs=50):
bucket1 sum:190, content= (100, 90)
bucket2 sum:109, content= (100, 9)
bucket3 sum:189, content= (99, 90)
bucket4 sum:189, content= (99, 90)
bucket5 sum:189, content= (99, 90)
bucket6 sum:189, content= (99, 90)
bucket7 sum:188, content= (91, 97)
bucket8 sum:188, content= (91, 97)
bucket9 sum:189, content= (98, 91)
bucket10 sum:189, content= (98, 91)
bucket11 sum:189, content= (97, 92)
bucket12 sum:189, content= (97, 92)
bucket13 sum:189, content= (97, 92)
bucket14 sum:189, content= (97, 92)
bucket15 sum:189, content= (97, 92)
bucket16 sum:188, content= (90, 98)
bucket17 sum:188, content= (90, 98)
bucket18 sum:188, content= (95, 93)
bucket19 sum:188, content= (95, 93)
bucket20 sum:188, content= (95, 93)

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bucket21 sum:188, content= (94, 94)
bucket22 sum:187, content= (94, 93)
bucket23 sum:187, content= (94, 93)
bucket24 sum:187, content= (94, 93)
bucket25 sum:187, content= (94, 93)
"----Comparison for the 36 example----"
"***tf from benchmark was 215(we added the number of machines) and target
function from our local search is 215"
***RESULT IS THE SAME
Run time: 182.935 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 27))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 37 from 93-----"
"-----START 38 from 93-----"
"input file number 38:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_25_7.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0050_7.txt"
"***Data from file NU_1_0050_25_7.txt: machinesNum=25 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_25_0050_7.txt: machinesNum=25
jobsNum=50 lowerBound=190 upperBound=190 isOptimal=1"
Content of machines summed (190, 190, 113, 189, 189, 189, 189, 188, 188, 189, 189,
188, 188, 189, 189, 189, 189, 189, 189, 188, 189,
189, 189, 188)
input selected: size 50 sum 4645
----Our Results-----
best from Our local search found:
target function = 215, num of machines=25, square root lms=931.970493095141
machines content(number of jobs=50):
bucket1 sum:190, content= (100, 90)
bucket2 sum:190, content= (100, 90)
bucket3 sum:113, content= (100, 13)
bucket4 sum:189, content= (99, 90)
bucket5 sum:189, content= (99, 90)
bucket6 sum:188, content= (90, 98)
bucket7 sum:188, content= (91, 97)
bucket8 sum:189, content= (98, 91)
bucket9 sum:189, content= (98, 91)
bucket10 sum:188, content= (92, 96)
bucket11 sum:189, content= (97, 92)
bucket12 sum:189, content= (97, 92)
bucket13 sum:188, content= (90, 98)
bucket14 sum:189, content= (96, 93)
bucket15 sum:189, content= (96, 93)
bucket16 sum:189, content= (96, 93)
bucket17 sum:189, content= (96, 93)

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bucket18 sum:189, content= (96, 93)
bucket19 sum:189, content= (96, 93)
bucket20 sum:189, content= (96, 93)
bucket21 sum:188, content= (91, 97)
bucket22 sum:189, content= (95, 94)
bucket23 sum:189, content= (95, 94)
bucket24 sum:189, content= (95, 94)
bucket25 sum:188, content= (94, 94)
"----Comparison for the 37 example----"
"***tf from benchmark was 215(we added the number of machines) and target
function from our local search is 215"
***RESULT IS THE SAME
Run time: 270.57 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 28))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 38 from 93-----"
"-----START 39 from 93-----"
"input file number 39:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_25_8.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0050_8.txt"
"***Data from file NU_1_0050_25_8.txt: machinesNum=25 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_25_0050_8.txt: machinesNum=25
jobsNum=50 lowerBound=191 upperBound=191 isOptimal=1"
Content of machines summed (190, 190, 118, 191, 191, 191, 190, 190, 189, 189, 191,
191, 190, 191, 191, 191, 191, 190, 190, 191, 191, 190,
190, 190, 190)
input selected: size 50 sum 4687
----Our Results-----
best from Our local search found:
target function = 216, num of machines=25, square root lms=940.083506929039
machines content(number of jobs=50):
bucket1 sum:118, content= (18, 100)
bucket2 sum:190, content= (91, 99)
bucket3 sum:190, content= (100, 90)
bucket4 sum:190, content= (93, 97)
bucket5 sum:191, content= (99, 92)
bucket6 sum:191, content= (99, 92)
bucket7 sum:191, content= (99, 92)
bucket8 sum:190, content= (90, 100)
bucket9 sum:189, content= (99, 90)
bucket10 sum:189, content= (99, 90)
bucket11 sum:190, content= (98, 92)
bucket12 sum:191, content= (98, 93)
bucket13 sum:191, content= (98, 93)
bucket14 sum:190, content= (94, 96)

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bucket15 sum:190, content= (94, 96)
bucket16 sum:191, content= (97, 94)
bucket17 sum:191, content= (97, 94)
bucket18 sum:191, content= (97, 94)
bucket19 sum:191, content= (97, 94)
bucket20 sum:191, content= (96, 95)
bucket21 sum:191, content= (96, 95)
bucket22 sum:190, content= (96, 94)
bucket23 sum:190, content= (93, 97)
bucket24 sum:190, content= (91, 99)
bucket25 sum:190, content= (95, 95)
"----Comparison for the 38 example----"
"***tf from benchmark was 216(we added the number of machines) and target
function from our local search is 216"
***RESULT IS THE SAME
Run time: 274.102 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 39 from 93-----"
"-----START 40 from 93-----"
"input file number 40:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0050_25_9.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0050_9.txt"
"***Data from file NU_1_0050_25_9.txt: machinesNum=25 jobsNum=50"
"***SOLUTION Data from file SOL_NU_1_25_0050_9.txt: machinesNum=25
jobsNum=50 lowerBound=194 upperBound=194 isOptimal=1"
Content of machines summed (190, 190, 190, 190, 190, 190, 119, 192, 192, 191, 191,
190, 190, 189, 189, 194, 194, 193, 192, 192, 192, 194,
193, 193, 193)
input selected: size 50 sum 4713
----Our Results-----
best from Our local search found:
target function = 219, num of machines=25, square root lms=945.29836559681
machines content(number of jobs=50):
bucket1 sum:119, content= (100, 19)
bucket2 sum:190, content= (90, 100)
bucket3 sum:190, content= (90, 100)
bucket4 sum:190, content= (90, 100)
bucket5 sum:192, content= (93, 99)
bucket6 sum:191, content= (92, 99)
bucket7 sum:191, content= (92, 99)
bucket8 sum:193, content= (97, 96)
bucket9 sum:190, content= (100, 90)
bucket10 sum:190, content= (100, 90)
bucket11 sum:190, content= (90, 100)

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bucket12 sum:190, content= (99, 91)
bucket13 sum:190, content= (99, 91)
bucket14 sum:189, content= (99, 90)
bucket15 sum:189, content= (99, 90)
bucket16 sum:192, content= (98, 94)
bucket17 sum:193, content= (96, 97)
bucket18 sum:193, content= (96, 97)
bucket19 sum:194, content= (98, 96)
bucket20 sum:194, content= (98, 96)
bucket21 sum:192, content= (99, 93)
bucket22 sum:194, content= (97, 97)
bucket23 sum:193, content= (95, 98)
bucket24 sum:192, content= (94, 98)
bucket25 sum:192, content= (98, 94)
"----Comparison for the 39 example----"
"***tf from benchmark was 219(we added the number of machines) and target
function from our local search is 219"
***RESULT IS THE SAME
Run time: 266.88 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 40 from 93-----"
"-----START 41 from 93-----"
"input file number 41:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_05_0.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0100_0.txt"
"***Data from file NU_1_0100_05_0.txt: machinesNum=5 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_05_0100_0.txt: machinesNum=5
jobsNum=100 lowerBound=1874 upperBound=1874
isOptimal=1"
Content of machines summed (1874, 1874, 1874, 1874, 1871)
input selected: size 100 sum 9367
----Our Results-----
best from Our local search found:
target function = 1879, num of machines=5, square root lms=0
machines content(number of jobs=100):
bucket1 sum:1873, content= (98, 98, 98, 99, 98, 98, 98, 98, 99, 98, 98, 98, 100, 98,
98, 100, 100, 99, 100)
bucket2 sum:1874, content= (92, 90, 94, 94, 94, 93, 93, 97, 97, 97, 94, 97, 96, 96, 93,
92, 91, 92, 90, 92)
bucket3 sum:1874, content= (91, 95, 95, 94, 94, 90, 90, 90, 97, 96, 96, 95, 97, 97, 96,
95, 91, 94, 90, 91)
bucket4 sum:1874, content= (90, 90, 96, 96, 95, 97, 96, 96, 95, 95, 94, 94, 93, 91, 91,
91, 90, 90, 97, 97)
bucket5 sum:1872, content= (94, 93, 95, 14, 7, 100, 100, 100, 100, 99, 99, 100, 99,

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99, 99, 93, 99, 93, 98, 93, 98)
"----Comparison for the 40 example----"
"***tf from benchmark was 1879(we added the number of machines) and target
function from our local search is 1879"
***RESULT IS THE SAME
Run time: 6.116 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 1))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 41 from 93-----"
"-----START 42 from 93-----"
"input file number 42:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_05_1.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0100_1.txt"
"***Data from file NU_1_0100_05_1.txt: machinesNum=5 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_05_0100_1.txt: machinesNum=5
jobsNum=100 lowerBound=1862 upperBound=1862
isOptimal=1"
Content of machines summed (1862, 1862, 1862, 1862, 1860)
input selected: size 100 sum 9308
----Our Results-----
best from Our local search found:
target function = 1867, num of machines=5, square root lms=0
machines content(number of jobs=100):
bucket1 sum:1862, content= (92, 91, 91, 91, 92, 92, 91, 91, 93, 93, 98, 96, 95, 93, 93,
93, 92, 93, 98, 94)
bucket2 sum:1861, content= (94, 100, 100, 100, 100, 99, 99, 99, 99, 99, 98, 99, 95,
100, 98, 98, 98, 95, 91)
bucket3 sum:1861, content= (100, 100, 100, 99, 98, 99, 18, 2, 96, 95, 94, 93, 93, 100,
99, 97, 96, 96, 93, 94, 99)
bucket4 sum:1862, content= (97, 98, 98, 98, 98, 96, 96, 95, 90, 90, 90, 90, 90, 91, 90,
90, 90, 91, 91, 93)
bucket5 sum:1862, content= (92, 90, 91, 97, 97, 98, 97, 97, 95, 95, 94, 94, 91, 91, 91,
90, 90, 90, 91, 91)
"----Comparison for the 41 example----"
"***tf from benchmark was 1867(we added the number of machines) and target
function from our local search is 1867"
***RESULT IS THE SAME
Run time: 4.433 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 2))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 42 from 93-----"
"-----START 43 from 93-----"
"input file number 43:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_05_2.txt and

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solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0100_2.txt"
"***Data from file NU_1_0100_05_2.txt: machinesNum=5 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_05_0100_2.txt: machinesNum=5
jobsNum=100 lowerBound=1864 upperBound=1864
isOptimal=1"
Content of machines summed (1864, 1864, 1864, 1863, 1862)
input selected: size 100 sum 9317
----Our Results-----
best from Our local search found:
target function = 1869, num of machines=5, square root lms=0
machines content(number of jobs=100):
bucket1 sum:1862, content= (98, 98, 98, 99, 100, 97, 97, 97, 97, 97, 97, 100, 100,
98, 97, 99, 98, 98)
bucket2 sum:1864, content= (97, 15, 97, 93, 91, 10, 94, 96, 95, 100, 99, 99, 98, 98,
97, 99, 98, 98, 97, 97, 96)
bucket3 sum:1863, content= (94, 93, 93, 91, 91, 90, 90, 90, 94, 92, 91, 91, 90, 90, 95,
93, 99, 99, 98, 99)
bucket4 sum:1864, content= (91, 91, 93, 95, 94, 94, 94, 93, 92, 92, 91, 90, 90, 90, 96,
96, 95, 96, 96, 95)
bucket5 sum:1864, content= (91, 93, 93, 94, 95, 96, 96, 95, 96, 95, 94, 94, 94, 93, 92,
91, 91, 91, 90, 90)
"----Comparison for the 42 example----"
"***tf from benchmark was 1869(we added the number of machines) and target
function from our local search is 1869"
***RESULT IS THE SAME
Run time: 6.296 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 3))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 43 from 93-----"
"-----START 44 from 93-----"
"input file number 44:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_05_3.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0100_3.txt"
"***Data from file NU_1_0100_05_3.txt: machinesNum=5 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_05_0100_3.txt: machinesNum=5
jobsNum=100 lowerBound=1865 upperBound=1865
isOptimal=1"
Content of machines summed (1865, 1865, 1865, 1864, 1865)
input selected: size 100 sum 9324
----Our Results-----
best from Our local search found:
target function = 1870, num of machines=5, square root lms=0
machines content(number of jobs=100):
bucket1 sum:1865, content= (99, 99, 99, 99, 99, 97, 98, 97, 97, 97, 97, 98, 99, 99, 99,
98, 98, 99, 97)

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bucket2 sum:1865, content= (96, 90, 90, 95, 93, 93, 92, 92, 91, 91, 90, 94, 94, 93, 93,
94, 92, 98, 97, 97)
bucket3 sum:1865, content= (93, 94, 94, 93, 92, 92, 92, 92, 90, 90, 90, 96, 95, 95, 94,
96, 96, 91, 94, 96)
bucket4 sum:1865, content= (90, 94, 95, 95, 95, 96, 96, 96, 95, 95, 95, 92, 93, 92, 92,
92, 92, 90, 90, 90)
bucket5 sum:1864, content= (100, 92, 92, 92, 91, 91, 90, 17, 100, 100, 100, 100, 100,
100, 100, 100, 99, 99, 1, 100)
"----Comparison for the 43 example----"
"***tf from benchmark was 1870(we added the number of machines) and target
function from our local search is 1870"
***RESULT IS THE SAME
Run time: 5.641 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 4))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 44 from 93-----"
"-----START 45 from 93-----"
"input file number 45:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_05_4.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0100_4.txt"
"***Data from file NU_1_0100_05_4.txt: machinesNum=5 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_05_0100_4.txt: machinesNum=5
jobsNum=100 lowerBound=1874 upperBound=1874
isOptimal=1"
Content of machines summed (1874, 1874, 1874, 1874, 1872)
input selected: size 100 sum 9368
----Our Results-----
best from Our local search found:
target function = 1879, num of machines=5, square root lms=0
machines content(number of jobs=100):
bucket1 sum:1872, content= (98, 98, 98, 99, 98, 98, 99, 98, 99, 98, 98, 99, 99, 98, 99,
98, 99, 99, 100)
bucket2 sum:1874, content= (93, 92, 92, 91, 90, 96, 94, 94, 93, 93, 93, 96, 95, 97, 97,
95, 96, 93, 93, 91)
bucket3 sum:1874, content= (95, 94, 93, 93, 93, 91, 90, 90, 96, 96, 97, 96, 95, 97, 95,
95, 91, 90, 97, 90)
bucket4 sum:1874, content= (90, 91, 96, 96, 96, 96, 96, 96, 94, 95, 94, 93, 93, 92, 92,
91, 90, 90, 96, 97)
bucket5 sum:1874, content= (95, 92, 92, 94, 91, 14, 13, 100, 100, 100, 100, 100, 100,
99, 99, 100, 100, 98, 94, 99, 94)
"----Comparison for the 44 example----"
"***tf from benchmark was 1879(we added the number of machines) and target
function from our local search is 1879"
***RESULT IS THE SAME
Run time: 6.654 seconds

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"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 5))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 45 from 93-----"
"-----START 46 from 93-----"
"input file number 46:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_05_5.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0100_5.txt"
"***Data from file NU_1_0100_05_5.txt: machinesNum=5 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_05_0100_5.txt: machinesNum=5
jobsNum=100 lowerBound=1871 upperBound=1871
isOptimal=1"
Content of machines summed (1871, 1871, 1871, 1871, 1869)
input selected: size 100 sum 9353
----Our Results-----
best from Our local search found:
target function = 1876, num of machines=5, square root lms=0
machines content(number of jobs=100):
bucket1 sum:1871, content= (94, 93, 94, 94, 94, 92, 94, 93, 90, 93, 93, 94, 93, 94, 95,
93, 94, 94, 95, 95)
bucket2 sum:1871, content= (97, 91, 90, 90, 99, 96, 91, 98, 90, 97, 97, 91, 91, 96, 91,
91, 92, 92, 92, 99)
bucket3 sum:1871, content= (97, 100, 100, 100, 100, 100, 99, 99, 99, 98, 100, 98, 98,
98, 96, 99, 97, 93, 100)
bucket4 sum:1869, content= (100, 100, 100, 99, 98, 8, 1, 98, 99, 98, 96, 98, 100, 97,
96, 96, 99, 96, 95, 98, 97)
bucket5 sum:1871, content= (95, 97, 96, 96, 96, 96, 95, 94, 94, 94, 92, 92, 90, 90, 93,
92, 93, 91, 92, 93)
"----Comparison for the 45 example----"
"***tf from benchmark was 1876(we added the number of machines) and target
function from our local search is 1876"
***RESULT IS THE SAME
Run time: 6.969 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 6))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 46 from 93-----"
"-----START 47 from 93-----"
"input file number 47:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_05_6.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0100_6.txt"
"***Data from file NU_1_0100_05_6.txt: machinesNum=5 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_05_0100_6.txt: machinesNum=5
jobsNum=100 lowerBound=1862 upperBound=1862
isOptimal=1"
Content of machines summed (1862, 1862, 1862, 1862, 1862)

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input selected: size 100 sum 9310
----Our Results-----
best from Our local search found:
target function = 1867, num of machines=5, square root lms=0
machines content(number of jobs=100):
bucket1 sum:1862, content= (91, 93, 92, 93, 92, 93, 93, 93, 95, 96, 91, 93, 93, 96, 94,
93, 93, 92, 93, 93)
bucket2 sum:1862, content= (91, 96, 90, 90, 99, 94, 90, 90, 100, 96, 98, 95, 92, 90,
92, 92, 91, 93, 92, 91)
bucket3 sum:1862, content= (90, 92, 96, 95, 95, 95, 94, 94, 92, 92, 91, 91, 97, 94, 99,
91, 90, 92, 90, 92)
bucket4 sum:1862, content= (97, 100, 99, 99, 99, 100, 100, 98, 99, 95, 96, 98, 99, 97,
99, 96, 96, 97, 98)
bucket5 sum:1862, content= (100, 100, 99, 99, 98, 19, 16, 93, 93, 96, 98, 94, 94, 95,
96, 98, 95, 97, 94, 94, 94)
"----Comparison for the 46 example----"
"***tf from benchmark was 1867(we added the number of machines) and target
function from our local search is 1867"
***RESULT IS THE SAME
Run time: 7.683 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 7))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 47 from 93-----"
"-----START 48 from 93-----"
"input file number 48:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_05_7.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0100_7.txt"
"***Data from file NU_1_0100_05_7.txt: machinesNum=5 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_05_0100_7.txt: machinesNum=5
jobsNum=100 lowerBound=1869 upperBound=1869
isOptimal=1"
Content of machines summed (1869, 1869, 1869, 1869, 1869)
input selected: size 100 sum 9345
----Our Results-----
best from Our local search found:
target function = 1874, num of machines=5, square root lms=0
machines content(number of jobs=100):
bucket1 sum:1869, content= (92, 95, 91, 92, 90, 90, 91, 94, 91, 93, 93, 98, 91, 92, 92,
93, 95, 99, 97, 100)
bucket2 sum:1869, content= (99, 99, 90, 90, 90, 90, 99, 99, 98, 94, 90, 93, 90, 90, 94,
90, 91, 91, 92, 100)
bucket3 sum:1869, content= (99, 99, 100, 100, 100, 100, 100, 100, 100, 100, 91, 99,
99, 97, 100, 96, 94, 96, 99)
bucket4 sum:1869, content= (100, 100, 100, 100, 99, 98, 98, 94, 20, 16, 100, 99, 96,
91, 91, 95, 93, 95, 93, 93, 98)

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bucket5 sum:1869, content= (92, 93, 96, 96, 97, 98, 98, 97, 95, 95, 94, 93, 93, 90, 92,
90, 90, 90, 90, 90)
"----Comparison for the 47 example----"
"***tf from benchmark was 1874(we added the number of machines) and target
function from our local search is 1874"
***RESULT IS THE SAME
Run time: 3.52 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 8))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 48 from 93-----"
"-----START 49 from 93-----"
"input file number 49:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_05_8.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0100_8.txt"
"***Data from file NU_1_0100_05_8.txt: machinesNum=5 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_05_0100_8.txt: machinesNum=5
jobsNum=100 lowerBound=1868 upperBound=1868
isOptimal=1"
Content of machines summed (1868, 1868, 1868, 1867, 1867)
input selected: size 100 sum 9338
----Our Results-----
best from Our local search found:
target function = 1873, num of machines=5, square root lms=0
machines content(number of jobs=100):
bucket1 sum:1868, content= (93, 92, 92, 93, 92, 93, 93, 93, 93, 94, 90, 95, 94, 94, 94,
94, 95, 95, 95, 94)
bucket2 sum:1868, content= (90, 99, 96, 90, 98, 100, 90, 97, 91, 96, 91, 93, 91, 90,
92, 92, 92, 93, 96, 91)
bucket3 sum:1868, content= (96, 100, 100, 100, 99, 100, 100, 100, 100, 99, 98, 98,
98, 99, 98, 98, 98, 97, 90)
bucket4 sum:1867, content= (100, 100, 100, 99, 99, 5, 4, 98, 99, 100, 98, 97, 98, 95,
99, 95, 95, 95, 97, 97, 97)
bucket5 sum:1867, content= (90, 96, 96, 96, 98, 96, 97, 96, 95, 94, 92, 90, 90, 90, 90,
92, 92, 91, 93, 93)
"----Comparison for the 48 example----"
"***tf from benchmark was 1873(we added the number of machines) and target
function from our local search is 1873"
***RESULT IS THE SAME
Run time: 7.061 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 9))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 49 from 93-----"
"-----START 50 from 93-----"
"input file number 50:

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inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_05_9.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0100_9.txt"
"***Data from file NU_1_0100_05_9.txt: machinesNum=5 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_05_0100_9.txt: machinesNum=5
jobsNum=100 lowerBound=1866 upperBound=1866
isOptimal=1"
Content of machines summed (1866, 1866, 1866, 1866, 1866)
input selected: size 100 sum 9330
----Our Results-----
best from Our local search found:
target function = 1871, num of machines=5, square root lms=0
machines content(number of jobs=100):
bucket1 sum:1866, content= (91, 93, 91, 94, 91, 94, 93, 91, 93, 93, 93, 94, 94, 94, 93,
96, 94, 94, 97, 93)
bucket2 sum:1866, content= (97, 98, 98, 96, 96, 95, 92, 92, 98, 92, 91, 90, 90, 91, 94,
90, 90, 90, 93, 93)
bucket3 sum:1866, content= (90, 90, 91, 91, 96, 97, 97, 96, 95, 95, 95, 94, 91, 93, 93,
90, 96, 92, 92, 92)
bucket4 sum:1866, content= (97, 99, 93, 100, 99, 99, 99, 99, 99, 98, 99, 98, 98, 100,
98, 97, 97, 99, 98)
bucket5 sum:1866, content= (100, 100, 99, 99, 98, 98, 98, 97, 95, 12, 11, 96, 95, 99,
95, 94, 95, 95, 97, 95, 98)
"----Comparison for the 49 example----"
"***tf from benchmark was 1871(we added the number of machines) and target
function from our local search is 1871"
***RESULT IS THE SAME
Run time: 12.519 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 10))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 50 from 93-----"
"-----START 51 from 93-----"
"input file number 51:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_10_0.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0100_0.txt"
"***Data from file NU_1_0100_10_0.txt: machinesNum=10 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_10_0100_0.txt: machinesNum=10
jobsNum=100 lowerBound=941 upperBound=941
isOptimal=1"
Content of machines summed (931, 941, 941, 941, 941, 941, 941, 941, 938, 892)
input selected: size 100 sum 9348
----Our Results-----
best from Our local search found:
target function = 951, num of machines=10, square root lms=2956.32711315916
machines content(number of jobs=100):
bucket1 sum:940, content= (95, 95, 93, 94, 93, 95, 93, 94, 95, 93)

```

```

bucket2 sum:941, content= (91, 94, 96, 92, 96, 93, 96, 94, 95, 94)
bucket3 sum:941, content= (90, 90, 93, 96, 95, 96, 96, 97, 94, 94)
bucket4 sum:941, content= (97, 91, 90, 91, 92, 97, 97, 94, 97, 95)
bucket5 sum:941, content= (91, 90, 95, 95, 93, 93, 98, 97, 95, 94)
bucket6 sum:911, content= (100, 100, 100, 13, 100, 99, 100, 100, 99, 100)
bucket7 sum:912, content= (18, 99, 99, 100, 100, 100, 99, 99, 99, 99)
bucket8 sum:940, content= (97, 96, 91, 90, 91, 91, 94, 98, 98, 94)
bucket9 sum:940, content= (98, 96, 95, 91, 90, 91, 90, 94, 97, 98)
bucket10 sum:941, content= (96, 95, 98, 96, 95, 95, 92, 91, 90, 93)
"----Comparison for the 50 example----"
"***tf from benchmark was 951(we added the number of machines) and target
function from our local search is 951"
***RESULT IS THE SAME
Run time: 103.355 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 11))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 51 from 93-----"
"-----START 52 from 93-----"
"input file number 52:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_10_1.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0100_1.txt"
"***Data from file NU_1_0100_10_1.txt: machinesNum=10 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_10_0100_1.txt: machinesNum=10
jobsNum=100 lowerBound=942 upperBound=942
isOptimal=1"
Content of machines summed (942, 942, 942, 942, 942, 942, 941, 940, 916, 887)
input selected: size 100 sum 9336
----Our Results-----
best from Our local search found:
target function = 952, num of machines=10, square root lms=2952.71908585968
machines content(number of jobs=100):
bucket1 sum:898, content= (100, 99, 99, 99, 99, 2, 100, 100, 100, 100)
bucket2 sum:941, content= (94, 94, 95, 94, 93, 95, 92, 97, 95, 92)
bucket3 sum:941, content= (96, 92, 92, 92, 95, 92, 95, 96, 94, 97)
bucket4 sum:941, content= (95, 91, 97, 95, 95, 96, 90, 92, 97, 93)
bucket5 sum:941, content= (95, 91, 90, 97, 90, 94, 92, 97, 97, 98)
bucket6 sum:941, content= (96, 96, 93, 91, 90, 92, 97, 92, 97, 97)
bucket7 sum:942, content= (95, 95, 96, 95, 93, 91, 90, 98, 98, 91)
bucket8 sum:942, content= (94, 97, 96, 96, 93, 93, 91, 90, 98, 94)
bucket9 sum:907, content= (20, 99, 99, 99, 99, 99, 98, 98, 98, 98)
bucket10 sum:942, content= (95, 96, 97, 96, 96, 94, 94, 92, 92, 90)
"----Comparison for the 51 example----"
"***tf from benchmark was 952(we added the number of machines) and target
function from our local search is 952"
***RESULT IS THE SAME

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Run time: 65.055 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 12))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 52 from 93-----"
"-----START 53 from 93-----"


```

Content of machines summed (924, 937, 937, 937, 937, 937, 937, 937, 936, 884)
input selected: size 100 sum 9303

----Our Results-----

best from Our local search found:

target function = 947, num of machines=10, square root lms=2942.16094053334

machines content(number of jobs=100):

bucket1 sum:937, content= (94, 95, 94, 94, 95, 95, 93, 95, 92, 90)

bucket2 sum:937, content= (90, 94, 93, 96, 97, 96, 92, 96, 92, 91)

bucket3 sum:937, content= (90, 95, 94, 90, 92, 92, 96, 97, 94, 97)

bucket4 sum:937, content= (93, 93, 90, 96, 90, 96, 94, 96, 97, 92)

bucket5 sum:937, content= (94, 90, 90, 93, 91, 94, 93, 97, 97, 98)

bucket6 sum:937, content= (98, 98, 94, 94, 91, 91, 90, 94, 93, 94)

bucket7 sum:904, content= (100, 100, 100, 100, 100, 100, 99, 8, 99, 98)

bucket8 sum:904, content= (100, 17, 98, 98, 98, 98, 98, 98, 100, 99)

bucket9 sum:936, content= (97, 95, 90, 90, 91, 92, 95, 91, 97, 98)

bucket10 sum:937, content= (97, 98, 98, 91, 95, 94, 92, 91, 90, 91)

"----Comparison for the 53 example----"

****tf from benchmark was 947(we added the number of machines) and target
function from our local search is 947"

***RESULT IS THE SAME

Run time: 77.825 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 14))

"Mistakes(size-numberMistakes):" QMap()

"Avegare error: 0"

"-----END 54 from 93-----"

"-----START 55 from 93-----"

"input file number 55:

inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_10_4.txt and

solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0100_4.txt"

****Data from file NU_1_0100_10_4.txt: machinesNum=10 jobsNum=100"

****SOLUTION Data from file SOL_NU_1_10_0100_4.txt: machinesNum=10

jobsNum=100 lowerBound=941 upperBound=941

isOptimal=1"

Content of machines summed (928, 941, 941, 941, 941, 941, 941, 939, 940, 893)

input selected: size 100 sum 9346

----Our Results-----

best from Our local search found:

target function = 951, num of machines=10, square root lms=2955.71074362834

machines content(number of jobs=100):

bucket1 sum:940, content= (95, 95, 93, 93, 94, 94, 96, 92, 95, 93)

bucket2 sum:941, content= (92, 91, 93, 95, 95, 95, 92, 96, 95, 97)

bucket3 sum:940, content= (91, 92, 91, 97, 97, 91, 98, 91, 98, 94)

bucket4 sum:940, content= (90, 94, 92, 91, 93, 92, 97, 94, 99, 98)

bucket5 sum:941, content= (98, 98, 90, 90, 98, 99, 94, 91, 93, 90)

bucket6 sum:941, content= (99, 98, 93, 91, 90, 98, 93, 91, 94, 94)

bucket7 sum:910, content= (100, 100, 100, 100, 100, 100, 100, 100, 10, 100)

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bucket8 sum:911, content= (100, 18, 99, 99, 99, 99, 99, 100, 99, 99)
bucket9 sum:941, content= (99, 98, 97, 97, 91, 90, 91, 92, 96, 90)
bucket10 sum:941, content= (98, 99, 98, 97, 91, 91, 90, 93, 93, 91)
"----Comparison for the 54 example----"
"***tf from benchmark was 951(we added the number of machines) and target
function from our local search is 951"
***RESULT IS THE SAME
Run time: 87.548 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 15))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 55 from 93-----"
"-----START 56 from 93-----"
"input file number 56:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_10_5.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0100_5.txt"
"***Data from file NU_1_0100_10_5.txt: machinesNum=10 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_10_0100_5.txt: machinesNum=10
jobsNum=100 lowerBound=942 upperBound=942
isOptimal=1"
Content of machines summed (913, 942, 942, 942, 942, 942, 942, 938, 940, 892)
input selected: size 100 sum 9335
----Our Results-----
best from Our local search found:
target function = 952, num of machines=10, square root lms=2952.39411325792
machines content(number of jobs=100):
bucket1 sum:941, content= (95, 95, 95, 93, 95, 90, 94, 93, 97, 94)
bucket2 sum:901, content= (100, 100, 100, 100, 100, 100, 100, 1, 100, 100)
bucket3 sum:904, content= (12, 99, 99, 100, 99, 99, 99, 99, 99, 99)
bucket4 sum:941, content= (96, 93, 92, 93, 92, 95, 96, 94, 96, 94)
bucket5 sum:941, content= (91, 93, 90, 96, 91, 96, 98, 95, 97, 94)
bucket6 sum:941, content= (97, 97, 94, 94, 93, 91, 90, 93, 94, 98)
bucket7 sum:941, content= (97, 93, 90, 90, 92, 93, 93, 99, 96, 98)
bucket8 sum:941, content= (96, 99, 97, 97, 92, 92, 90, 90, 95, 93)
bucket9 sum:942, content= (97, 97, 94, 92, 92, 90, 94, 94, 99, 93)
bucket10 sum:942, content= (97, 97, 97, 94, 94, 92, 92, 90, 94, 95)
"----Comparison for the 55 example----"
"***tf from benchmark was 952(we added the number of machines) and target
function from our local search is 952"
***RESULT IS THE SAME
Run time: 58.809 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 16))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 56 from 93-----"
"-----START 57 from 93-----"

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bucket1 sum:944, content= (94, 94, 95, 94, 96, 95, 96, 90, 96, 94)
bucket2 sum:943, content= (92, 90, 93, 97, 92, 98, 97, 93, 95, 96)
bucket3 sum:944, content= (94, 93, 98, 91, 93, 91, 98, 98, 91, 97)
bucket4 sum:905, content= (100, 6, 100, 100, 100, 100, 100, 99, 100, 100)
bucket5 sum:944, content= (98, 93, 93, 90, 90, 93, 98, 95, 98, 96)
bucket6 sum:944, content= (93, 90, 90, 94, 92, 94, 97, 98, 98, 98)
bucket7 sum:906, content= (13, 100, 100, 99, 99, 99, 99, 99, 99, 99)
bucket8 sum:943, content= (98, 98, 92, 90, 90, 90, 92, 98, 98, 97)
bucket9 sum:944, content= (99, 98, 95, 93, 92, 90, 90, 93, 95, 99)
bucket10 sum:944, content= (98, 98, 98, 97, 97, 91, 93, 92, 90, 90)
"----Comparison for the 57 example----"
"***tf from benchmark was 954(we added the number of machines) and target
function from our local search is 954"
***RESULT IS THE SAME
Run time: 91.334 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 18))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 58 from 93-----"
"-----START 59 from 93-----"
"input file number 59:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_10_8.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0100_8.txt"
"***Data from file NU_1_0100_10_8.txt: machinesNum=10 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_10_0100_8.txt: machinesNum=10
jobsNum=100 lowerBound=939 upperBound=939
isOptimal=1"
Content of machines summed (939, 903, 889, 939, 939, 939, 939, 939, 939, 939)
input selected: size 100 sum 9304
----Our Results-----
best from Our local search found:
target function = 949, num of machines=10, square root lms=2942.67157528665
machines content(number of jobs=100):
bucket1 sum:939, content= (95, 94, 94, 95, 93, 94, 93, 94, 91, 96)
bucket2 sum:939, content= (96, 91, 92, 96, 95, 91, 96, 96, 95, 91)
bucket3 sum:896, content= (100, 100, 100, 100, 99, 99, 99, 99, 100)
bucket4 sum:897, content= (8, 2, 98, 98, 98, 98, 98, 100, 99, 99)
bucket5 sum:939, content= (98, 96, 96, 90, 90, 92, 90, 98, 97, 92)
bucket6 sum:939, content= (97, 97, 96, 91, 90, 90, 93, 93, 98, 94)
bucket7 sum:939, content= (97, 97, 96, 91, 90, 93, 94, 90, 93, 98)
bucket8 sum:939, content= (97, 93, 90, 90, 94, 91, 96, 98, 98, 92)
bucket9 sum:938, content= (97, 97, 93, 91, 90, 94, 90, 94, 94, 98)
bucket10 sum:939, content= (96, 97, 98, 97, 95, 90, 91, 91, 90, 94)
"----Comparison for the 58 example----"
"***tf from benchmark was 949(we added the number of machines) and target
function from our local search is 949"

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***RESULT IS THE SAME
Run time: 59.322 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 19))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 59 from 93-----"
"-----START 60 from 93-----"
"input file number 60:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_10_9.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0100_9.txt"
"***Data from file NU_1_0100_10_9.txt: machinesNum=10 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_10_0100_9.txt: machinesNum=10
jobsNum=100 lowerBound=944 upperBound=944
isOptimal=1"
Content of machines summed (944, 944, 944, 944, 944, 942, 944, 941, 902, 886)
input selected: size 100 sum 9335
----Our Results-----
best from Our local search found:
target function = 954, num of machines=10, square root lms=2952.61392667582
machines content(number of jobs=100):
bucket1 sum:895, content= (99, 99, 99, 99, 99, 98, 98, 98, 6, 98, 2)
bucket2 sum:943, content= (98, 90, 93, 91, 93, 95, 93, 96, 97, 97)
bucket3 sum:943, content= (94, 94, 98, 93, 98, 92, 96, 92, 94, 92)
bucket4 sum:943, content= (91, 98, 94, 92, 91, 93, 95, 98, 94, 97)
bucket5 sum:943, content= (93, 92, 92, 98, 96, 91, 91, 96, 98, 96)
bucket6 sum:943, content= (95, 95, 92, 90, 98, 98, 90, 90, 97, 98)
bucket7 sum:943, content= (97, 96, 94, 94, 92, 91, 91, 98, 97, 93)
bucket8 sum:943, content= (97, 94, 94, 91, 90, 98, 98, 90, 96, 95)
bucket9 sum:895, content= (100, 100, 100, 100, 99, 100, 99, 99, 98)
bucket10 sum:944, content= (95, 97, 98, 98, 95, 95, 93, 92, 91, 90)
"----Comparison for the 59 example----"
"***tf from benchmark was 954(we added the number of machines) and target
function from our local search is 954"
***RESULT IS THE SAME
Run time: 61.734 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 20))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 60 from 93-----"
"-----START 61 from 93-----"
"input file number 61:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_25_0.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0100_0.txt"
"***Data from file NU_1_0100_25_0.txt: machinesNum=25 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_25_0100_0.txt: machinesNum=25
jobsNum=100 lowerBound=379 upperBound=379

```

isOptimal=1"

Content of machines summed (379, 318, 299, 379, 379, 379, 379, 379, 379, 379,
379, 379, 379, 379, 379, 379, 379, 379, 379, 379, 379,
379, 379, 372)

input selected: size 100 sum 9327

----Our Results-----

best from Our local search found:

target function = 404, num of machines=25, square root lms=1867.80593210323

`machines content(number of jobs=100):`

bucket1 sum:304, content= (100, 100, 4, 100)

bucket2 sum:378, content= (94, 95, 94, 95)

bucket3 sum:378, content= (97, 90, 98, 93)

bucket4 sum:379, content= (94, 91, 97, 97)

bucket5 sum:379, content= (95, 95, 91, 98)

bucket6 sum:378, content= (96, 90, 98, 94)

bucket7 sum:379, content= (99, 98, 91, 91)

bucket8 sum:379, content= (99, 93, 91, 96)

bucket9 sum:379, content= (99, 97, 93, 90)

bucket10 sum:379, content= (99, 93, 91, 96)

bucket11 sum:379, content= (99, 93, 91, 96)

bucket12 sum:379, content= (99, 97, 93, 90)

bucket13 sum:379, content= (99, 97, 93, 90)

bucket14 sum:379, content= (99, 92, 92, 96)

bucket15 sum:379, content= (99, 92, 92, 96)

bucket16 sum:379, content= (98, 92, 92, 97)

bucket17 sum:379, content= (98, 92, 92, 97)

bucket18 sum:379, content= (97, 98, 92, 92)

bucket19 sum:379, content= (98, 96, 91, 94)

bucket20 sum:378, content= (98, 96, 90, 94)

bucket21 sum:378, content= (98, 96, 94, 90)

bucket22 sum:378, content= (98, 96, 94, 90)

bucket23 sum:378, content= (98, 95, 95, 90)

bucket24 sum:314, content= (14, 100, 100, 100)

bucket25 sum:378, content= (98, 95, 95, 90)

"----Comparison for the 60 example----

***tf from benchmark was 404(we added the number of machines) and target function from our local search is 404"

***RESULT IS THE SAME

Run time: 750.601 seconds

```
"Correct (size-numberCorrect):" OMap((10, 10)(50, 30)(100, 21))
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"Mistakes(size-numberMistakes):" QMap()
```

"Avegare error: 0"

"-----END 61 from 93-----"

"-----START 62 from 93-----"

"input file number 62:

inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_25_1.txt and

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solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0100_1.txt"
"***Data from file NU_1_0100_25_1.txt: machinesNum=25 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_25_0100_1.txt: machinesNum=25
jobsNum=100 lowerBound=379 upperBound=379
isOptimal=1"
Content of machines summed (379, 379, 379, 324, 379, 379, 379, 379, 379, 379,
379, 379, 379, 379, 379, 379, 379, 379, 379, 379,
379, 379, 294)
input selected: size 100 sum 9335
----Our Results-----
best from Our local search found:
target function = 404, num of machines=25, square root lms=1869.1947464082
machines content(number of jobs=100):
bucket1 sum:312, content= (12, 100, 100, 100)
bucket2 sum:379, content= (96, 92, 94, 97)
bucket3 sum:379, content= (94, 94, 96, 95)
bucket4 sum:379, content= (95, 97, 90, 97)
bucket5 sum:379, content= (94, 90, 98, 97)
bucket6 sum:379, content= (100, 90, 97, 92)
bucket7 sum:379, content= (95, 90, 99, 95)
bucket8 sum:379, content= (100, 96, 90, 93)
bucket9 sum:378, content= (100, 94, 90, 94)
bucket10 sum:378, content= (97, 91, 96, 94)
bucket11 sum:378, content= (99, 93, 90, 96)
bucket12 sum:379, content= (99, 97, 93, 90)
bucket13 sum:379, content= (99, 93, 91, 96)
bucket14 sum:379, content= (99, 93, 91, 96)
bucket15 sum:379, content= (99, 93, 91, 96)
bucket16 sum:379, content= (99, 93, 91, 96)
bucket17 sum:379, content= (99, 97, 92, 91)
bucket18 sum:379, content= (99, 97, 92, 91)
bucket19 sum:379, content= (99, 94, 92, 94)
bucket20 sum:379, content= (99, 94, 94, 92)
bucket21 sum:378, content= (98, 98, 92, 90)
bucket22 sum:378, content= (98, 95, 95, 90)
bucket23 sum:312, content= (12, 100, 100, 100)
bucket24 sum:378, content= (98, 95, 95, 90)
bucket25 sum:379, content= (98, 95, 94, 92)
"----Comparison for the 61 example----"
"***tf from benchmark was 404(we added the number of machines) and target
function from our local search is 404"
***RESULT IS THE SAME
Run time: 691.706 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 22))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"

```

```

"-----END 62 from 93-----"
"-----START 63 from 93-----"


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```

Run time: 680.045 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 23))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 63 from 93-----"
"-----START 64 from 93-----"


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"----Comparison for the 63 example----"
"***tf from benchmark was 405(we added the number of machines) and target
function from our local search is 405"
***RESULT IS THE SAME
Run time: 753.642 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 24))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 64 from 93-----"
"-----START 65 from 93-----"
"input file number 65:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_25_4.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0100_4.txt"
"***Data from file NU_1_0100_25_4.txt: machinesNum=25 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_25_0100_4.txt: machinesNum=25
jobsNum=100 lowerBound=378 upperBound=378
isOptimal=1"
Content of machines summed (378, 378, 378, 378, 378, 378, 378, 378, 378, 378,
378, 378, 378, 378, 377, 376, 378, 378, 378, 375,
375, 317, 297)
input selected: size 100 sum 9299
----Our Results-----
best from Our local search found:
target function = 403, num of machines=25, square root lms=1861.9911385396
machines content(number of jobs=100):
bucket1 sum:377, content= (94, 93, 95, 95)
bucket2 sum:377, content= (95, 96, 95, 91)
bucket3 sum:377, content= (94, 96, 96, 91)
bucket4 sum:377, content= (99, 93, 90, 95)
bucket5 sum:377, content= (99, 93, 90, 95)
bucket6 sum:377, content= (99, 93, 90, 95)
bucket7 sum:377, content= (99, 93, 90, 95)
bucket8 sum:377, content= (95, 95, 90, 97)
bucket9 sum:305, content= (5, 100, 100, 100)
bucket10 sum:317, content= (99, 20, 99, 99)
bucket11 sum:377, content= (99, 95, 93, 90)
bucket12 sum:377, content= (99, 95, 93, 90)
bucket13 sum:377, content= (99, 95, 91, 92)
bucket14 sum:377, content= (99, 93, 91, 94)
bucket15 sum:377, content= (98, 96, 93, 90)
bucket16 sum:377, content= (96, 93, 91, 97)
bucket17 sum:378, content= (98, 96, 93, 91)
bucket18 sum:378, content= (98, 96, 93, 91)
bucket19 sum:378, content= (98, 96, 93, 91)
bucket20 sum:377, content= (98, 96, 92, 91)
bucket21 sum:378, content= (98, 96, 92, 92)

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bucket22 sum:377, content= (97, 92, 92, 96)
bucket23 sum:378, content= (97, 97, 92, 92)
bucket24 sum:378, content= (97, 97, 92, 92)
bucket25 sum:377, content= (97, 92, 90, 98)
"----Comparison for the 64 example----"
"***tf from benchmark was 403(we added the number of machines) and target
function from our local search is 403"
***RESULT IS THE SAME
Run time: 473.153 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 25))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 65 from 93-----"
"-----START 66 from 93-----"
"input file number 66:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_25_5.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0100_5.txt"
"***Data from file NU_1_0100_25_5.txt: machinesNum=25 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_25_0100_5.txt: machinesNum=25
jobsNum=100 lowerBound=375 upperBound=375
isOptimal=1"
Content of machines summed (375, 375, 375, 336, 375, 375, 375, 375, 375, 375,
375, 375, 375, 375, 375, 375, 375, 375, 375, 375,
375, 370, 297)
input selected: size 100 sum 9253
----Our Results-----
best from Our local search found:
target function = 400, num of machines=25, square root lms=1852.19626389862
machines content(number of jobs=100):
bucket1 sum:374, content= (95, 96, 92, 91)
bucket2 sum:374, content= (91, 95, 92, 96)
bucket3 sum:374, content= (94, 96, 94, 90)
bucket4 sum:374, content= (90, 93, 97, 94)
bucket5 sum:374, content= (90, 94, 97, 93)
bucket6 sum:375, content= (99, 92, 90, 94)
bucket7 sum:375, content= (99, 92, 90, 94)
bucket8 sum:375, content= (99, 92, 90, 94)
bucket9 sum:375, content= (99, 95, 91, 90)
bucket10 sum:375, content= (99, 95, 91, 90)
bucket11 sum:374, content= (97, 95, 91, 91)
bucket12 sum:375, content= (99, 94, 90, 92)
bucket13 sum:375, content= (98, 91, 91, 95)
bucket14 sum:374, content= (98, 94, 90, 92)
bucket15 sum:375, content= (98, 94, 90, 93)
bucket16 sum:375, content= (98, 94, 90, 93)
bucket17 sum:375, content= (98, 94, 91, 92)

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bucket18 sum:375, content= (98, 94, 93, 90)
bucket19 sum:375, content= (98, 94, 93, 90)
bucket20 sum:375, content= (96, 93, 90, 96)
bucket21 sum:375, content= (97, 93, 90, 95)
bucket22 sum:318, content= (19, 100, 100, 99)
bucket23 sum:318, content= (19, 100, 99, 100)
bucket24 sum:375, content= (97, 96, 91, 91)
bucket25 sum:374, content= (96, 96, 91, 91)
"----Comparison for the 65 example----"
"***tf from benchmark was 400(we added the number of machines) and target
function from our local search is 400"
***RESULT IS THE SAME
Run time: 760.345 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 26))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 66 from 93-----"
"-----START 67 from 93-----"
"input file number 67:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_25_6.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0100_6.txt"
"***Data from file NU_1_0100_25_6.txt: machinesNum=25 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_25_0100_6.txt: machinesNum=25
jobsNum=100 lowerBound=380 upperBound=380
isOptimal=1"
Content of machines summed (380, 380, 330, 380, 380, 380, 380, 380, 380, 380, 380,
380, 380, 380, 380, 380, 380, 380, 380, 380, 380, 380, 380, 380, 380,
380, 380, 287)
input selected: size 100 sum 9357
----Our Results-----
best from Our local search found:
target function = 405, num of machines=25, square root lms=1873.44201938571
machines content(number of jobs=100):
bucket1 sum:379, content= (94, 97, 91, 97)
bucket2 sum:379, content= (97, 93, 94, 95)
bucket3 sum:379, content= (92, 96, 97, 94)
bucket4 sum:379, content= (91, 95, 98, 95)
bucket5 sum:379, content= (94, 98, 92, 95)
bucket6 sum:379, content= (94, 98, 95, 92)
bucket7 sum:379, content= (96, 94, 90, 99)
bucket8 sum:380, content= (100, 96, 94, 90)
bucket9 sum:380, content= (100, 96, 94, 90)
bucket10 sum:380, content= (100, 96, 93, 91)
bucket11 sum:380, content= (100, 96, 93, 91)
bucket12 sum:379, content= (99, 93, 96, 91)
bucket13 sum:380, content= (99, 93, 92, 96)

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bucket14 sum:379, content= (99, 92, 92, 96)
bucket15 sum:380, content= (99, 93, 92, 96)
bucket16 sum:380, content= (99, 93, 92, 96)
bucket17 sum:380, content= (99, 97, 93, 91)
bucket18 sum:380, content= (97, 93, 90, 100)
bucket19 sum:379, content= (98, 98, 93, 90)
bucket20 sum:379, content= (98, 98, 93, 90)
bucket21 sum:379, content= (98, 97, 90, 94)
bucket22 sum:380, content= (97, 93, 93, 97)
bucket23 sum:379, content= (98, 96, 95, 90)
bucket24 sum:314, content= (14, 100, 100, 100)
bucket25 sum:316, content= (16, 100, 100, 100)
"----Comparison for the 66 example----"
"***tf from benchmark was 405(we added the number of machines) and target
function from our local search is 405"
***RESULT IS THE SAME
Run time: 504.603 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 27))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 67 from 93-----"
"-----START 68 from 93-----"
"input file number 68:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_25_7.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0100_7.txt"
"***Data from file NU_1_0100_25_7.txt: machinesNum=25 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_25_0100_7.txt: machinesNum=25
jobsNum=100 lowerBound=380 upperBound=380
isOptimal=1"
Content of machines summed (380, 380, 312, 380, 380, 380, 380, 380, 380, 380,
380, 380, 380, 380, 380, 380, 380, 380, 380, 380, 380, 380, 380, 380,
380, 379, 285)
input selected: size 100 sum 9336
----Our Results-----
best from Our local search found:
target function = 405, num of machines=25, square root lms=1869.84705256874
machines content(number of jobs=100):
bucket1 sum:306, content= (6, 100, 100, 100)
bucket2 sum:379, content= (96, 92, 96, 95)
bucket3 sum:379, content= (96, 91, 95, 97)
bucket4 sum:379, content= (94, 90, 97, 98)
bucket5 sum:379, content= (94, 96, 97, 92)
bucket6 sum:379, content= (100, 94, 90, 95)
bucket7 sum:379, content= (100, 94, 90, 95)
bucket8 sum:379, content= (100, 94, 90, 95)
bucket9 sum:380, content= (100, 96, 94, 90)

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bucket10 sum:380, content= (100, 96, 94, 90)
bucket11 sum:380, content= (100, 96, 94, 90)
bucket12 sum:306, content= (100, 6, 100, 100)
bucket13 sum:379, content= (99, 93, 91, 96)
bucket14 sum:379, content= (99, 97, 93, 90)
bucket15 sum:379, content= (99, 93, 91, 96)
bucket16 sum:379, content= (99, 93, 91, 96)
bucket17 sum:380, content= (99, 97, 93, 91)
bucket18 sum:380, content= (99, 97, 93, 91)
bucket19 sum:379, content= (99, 97, 92, 91)
bucket20 sum:379, content= (98, 92, 92, 97)
bucket21 sum:379, content= (98, 98, 92, 91)
bucket22 sum:380, content= (98, 98, 92, 92)
bucket23 sum:380, content= (98, 98, 92, 92)
bucket24 sum:379, content= (98, 98, 92, 91)
bucket25 sum:379, content= (98, 97, 90, 94)
"----Comparison for the 67 example----"
"***tf from benchmark was 405(we added the number of machines) and target
function from our local search is 405"
***RESULT IS THE SAME
Run time: 654.176 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 28))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 68 from 93-----"
"-----START 69 from 93-----"
"input file number 69:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_25_8.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0100_8.txt"
"***Data from file NU_1_0100_25_8.txt: machinesNum=25 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_25_0100_8.txt: machinesNum=25
jobsNum=100 lowerBound=380 upperBound=380
isOptimal=1"
Content of machines summed (379, 380, 380, 380, 317, 380, 380, 313, 380, 380, 380,
380, 380, 380, 380, 380, 380, 380, 380, 380, 380, 380, 380, 380, 380,
380, 380, 380)
input selected: size 100 sum 9369
----Our Results-----
best from Our local search found:
target function = 405, num of machines=25, square root lms=1875.87339658091
machines content(number of jobs=100):
bucket1 sum:313, content= (100, 100, 13, 100)
bucket2 sum:380, content= (90, 94, 98, 98)
bucket3 sum:380, content= (96, 97, 91, 96)
bucket4 sum:380, content= (96, 91, 97, 96)
bucket5 sum:380, content= (95, 96, 97, 92)

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bucket6 sum:380, content= (90, 95, 99, 96)
bucket7 sum:380, content= (100, 96, 94, 90)
bucket8 sum:380, content= (100, 94, 91, 95)
bucket9 sum:380, content= (100, 96, 94, 90)
bucket10 sum:380, content= (100, 94, 91, 95)
bucket11 sum:380, content= (99, 94, 91, 96)
bucket12 sum:380, content= (99, 97, 94, 90)
bucket13 sum:380, content= (99, 93, 92, 96)
bucket14 sum:380, content= (99, 93, 92, 96)
bucket15 sum:380, content= (99, 93, 92, 96)
bucket16 sum:380, content= (99, 93, 92, 96)
bucket17 sum:380, content= (99, 97, 93, 91)
bucket18 sum:380, content= (98, 97, 93, 92)
bucket19 sum:380, content= (98, 93, 92, 97)
bucket20 sum:380, content= (98, 98, 92, 92)
bucket21 sum:380, content= (98, 96, 96, 90)
bucket22 sum:317, content= (100, 17, 100, 100)
bucket23 sum:380, content= (98, 95, 92, 95)
bucket24 sum:380, content= (96, 95, 92, 97)
bucket25 sum:379, content= (98, 96, 95, 90)
"----Comparison for the 68 example----"
"***tf from benchmark was 405(we added the number of machines) and target
function from our local search is 405"
***RESULT IS THE SAME
Run time: 694.245 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 29))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 69 from 93-----"
"-----START 70 from 93-----"
"input file number 70:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0100_25_9.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0100_9.txt"
"***Data from file NU_1_0100_25_9.txt: machinesNum=25 jobsNum=100"
"***SOLUTION Data from file SOL_NU_1_25_0100_9.txt: machinesNum=25
jobsNum=100 lowerBound=377 upperBound=377
isOptimal=1"
Content of machines summed (377, 377, 377, 313, 377, 377, 377, 377, 377, 377,
377, 377, 377, 377, 377, 377, 377, 377, 377, 377, 377, 377,
377, 377, 287)
input selected: size 100 sum 9271
----Our Results-----
best from Our local search found:
target function = 402, num of machines=25, square root lms=1856.64293820864
machines content(number of jobs=100):
bucket1 sum:301, content= (100, 100, 1, 100)

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bucket2 sum:376, content= (95, 91, 94, 96)
bucket3 sum:376, content= (95, 94, 95, 92)
bucket4 sum:376, content= (95, 91, 94, 96)
bucket5 sum:376, content= (96, 95, 94, 91)
bucket6 sum:376, content= (99, 94, 90, 93)
bucket7 sum:376, content= (99, 90, 94, 93)
bucket8 sum:377, content= (99, 95, 90, 93)
bucket9 sum:377, content= (99, 95, 93, 90)
bucket10 sum:312, content= (14, 100, 99, 99)
bucket11 sum:377, content= (99, 95, 93, 90)
bucket12 sum:376, content= (99, 95, 92, 90)
bucket13 sum:376, content= (98, 92, 91, 95)
bucket14 sum:376, content= (98, 96, 92, 90)
bucket15 sum:376, content= (98, 92, 91, 95)
bucket16 sum:376, content= (98, 96, 91, 91)
bucket17 sum:376, content= (98, 92, 91, 95)
bucket18 sum:376, content= (98, 96, 92, 90)
bucket19 sum:377, content= (98, 95, 94, 90)
bucket20 sum:377, content= (97, 97, 92, 91)
bucket21 sum:377, content= (97, 97, 92, 91)
bucket22 sum:377, content= (97, 97, 92, 91)
bucket23 sum:377, content= (97, 97, 92, 91)
bucket24 sum:377, content= (97, 97, 92, 91)
bucket25 sum:377, content= (97, 95, 94, 91)
"----Comparison for the 69 example----"
"***tf from benchmark was 402(we added the number of machines) and target
function from our local search is 402"
***RESULT IS THE SAME
Run time: 578.686 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 70 from 93-----"
"-----START 71 from 93-----"
"input file number 71:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0500_05_0.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0500_0.txt"
"***Data from file NU_1_0500_05_0.txt: machinesNum=5 jobsNum=500"
"***SOLUTION Data from file SOL_NU_1_05_0500_0.txt: machinesNum=5
jobsNum=500 lowerBound=9407 upperBound=9407
isOptimal=1"
Content of machines summed (9407, 9407, 9407, 9407, 9404)
input selected: size 500 sum 47032
----Our Results-----
best from Our local search found:
target function = 9412, num of machines=5, square root lms=0

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machines content(number of jobs=500):
bucket1 sum:9407, content= (97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 95, 95, 95,
95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 94, 94,
93, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91,
91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 90, 99, 99,
99, 99, 99, 99, 99, 99, 98, 98, 98, 100, 98, 100, 100, 100, 100, 100, 100, 97, 99, 97,
97, 99, 100, 99, 97, 97, 100, 98, 96, 96, 99)
bucket2 sum:9407, content= (100, 100, 100, 100, 99, 99, 99, 99, 99, 99, 98, 98, 98,
98, 98, 98, 98, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96,
96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 94, 93,
93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92,
92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 99, 99, 99,
99, 99, 99, 99, 98, 98, 100, 98, 99)
bucket3 sum:9405, content= (100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100,
100, 98, 98, 98, 98, 98, 97, 97, 97, 97, 97, 96, 96, 96, 96,
96, 96, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93,
93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 91,
91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 19, 15, 13, 6, 4, 2, 100,
100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 98,
98, 98, 98, 97, 97)
bucket4 sum:9406, content= (100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 99, 99, 99,
99, 99, 99, 99, 99, 98, 98, 98, 98, 98, 98, 98, 98, 98, 97,
97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 94,
94, 94, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93,
93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90,
90, 90, 90, 90, 90, 90, 90, 98, 98, 97)
bucket5 sum:9407, content= (98, 99, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 97,
99, 99, 99, 99, 99, 99, 99, 98, 98, 98, 98, 98, 98, 98, 98,
98, 98, 98, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95,
95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93,
93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91,
91, 90, 90, 90, 90, 90, 90, 90, 90, 90, 90)
"----Comparison for the 70 example----"
"***tf from benchmark was 9412(we added the number of machines) and target
function from our local search is 9412"
***RESULT IS THE SAME
Run time: 27.287 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 1))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 71 from 93-----"
"-----START 72 from 93-----"
"input file number 72:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0500_05_1.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0500_1.txt"
"***Data from file NU_1_0500_05_1.txt: machinesNum=5 jobsNum=500"

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***SOLUTION Data from file SOL_NU_1_05_0500_1.txt: machinesNum=5
jobsNum=500 lowerBound=9420 upperBound=9420
isOptimal=1"
Content of machines summed (9420, 9420, 9420, 9420, 9419)
input selected: size 500 sum 47099
----Our Results-----
best from Our local search found:
target function = 9425, num of machines=5, square root lms=0
machines content(number of jobs=500):
bucket1 sum:9420, content= (100, 100, 100, 100, 100, 100, 100, 100, 100, 99, 99, 99, 99,
99, 99, 99, 99, 99, 99, 100, 98, 98, 98, 98, 98, 98, 98,
97, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95,
95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 94,
93, 93, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91,
90, 90, 90, 90, 90, 90, 90, 90, 90, 99)
bucket2 sum:9420, content= (100, 100, 100, 100, 100, 100, 100, 100, 100, 99, 99, 99,
99, 99, 99, 99, 99, 98, 98, 98, 98, 98, 98, 98, 98,
98, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95,
95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 94,
93, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91,
90, 90, 90, 90, 90, 90, 90, 90, 90, 100)
bucket3 sum:9420, content= (100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 99,
99, 99, 99, 99, 99, 99, 98, 98, 98, 98, 98, 98, 98, 98,
98, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95,
95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 94,
94, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91,
91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 90)
bucket4 sum:9419, content= (100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 99, 99, 99,
99, 99, 99, 99, 99, 98, 98, 98, 98, 98, 98, 98, 98,
98, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95,
95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 94,
94, 94, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91,
91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 90)
bucket5 sum:9420, content= (98, 99, 100, 100, 100, 100, 100, 100, 100, 100, 99, 99, 99,
99, 99, 99, 99, 99, 98, 98, 98, 98, 98, 98, 98, 98,
97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95,
95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 94,
94, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91,
91, 90, 90, 90, 90, 90, 90, 90, 20, 18, 18, 17, 11, 10)
"----Comparison for the 71 example----"
***tf from benchmark was 9425(we added the number of machines) and target
function from our local search is 9425"
***RESULT IS THE SAME
Run time: 0.667 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 2))
"Mistakes(size-numberMistakes):" QMap()

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"Avegare error: 0"
"-----END 72 from 93-----"
"-----START 73 from 93-----"


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91, 90, 90, 90, 90, 90, 90, 90, 90, 90, 90)
"----Comparison for the 72 example----"
"***tf from benchmark was 9404(we added the number of machines) and target
function from our local search is 9404"
***RESULT IS THE SAME
Run time: 0.089 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 3))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 73 from 93-----"
"-----START 74 from 93-----"
"input file number 74:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0500_05_3.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0500_3.txt"
"***Data from file NU_1_0500_05_3.txt: machinesNum=5 jobsNum=500"
"***SOLUTION Data from file SOL_NU_1_05_0500_3.txt: machinesNum=5
jobsNum=500 lowerBound=9401 upperBound=9401
isOptimal=1"
Content of machines summed (9401, 9401, 9401, 9401, 9398)
input selected: size 500 sum 47002
----Our Results-----
best from Our local search found:
target function = 9406, num of machines=5, square root lms=0
machines content(number of jobs=500):
bucket1 sum:9401, content=(96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95,
94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93,
93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90,
90, 90, 90, 90, 90, 90, 99, 99, 99, 99, 99, 99, 99, 99,
98, 98, 98, 98, 100, 100, 100, 100, 100, 100, 100, 99, 100, 99, 97, 100, 97, 97, 99, 97,
98, 96, 96, 98, 96, 98, 96, 96, 98, 96, 97)
bucket2 sum:9401, content=(100, 100, 100, 100, 100, 99, 99, 99, 99, 100, 98, 98, 98,
98, 98, 98, 97, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96,
96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93,
93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92,
92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 90, 99, 99, 99,
99, 99, 99, 99, 98, 100, 98, 98, 97, 97)
bucket3 sum:9401, content=(100, 100, 100, 100, 100, 100, 100, 100, 100, 99, 99, 99,
99, 99, 99, 99, 99, 98, 98, 98, 98, 98, 98, 97, 97, 97,
97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95, 94,
94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93,
93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90,
90, 90, 90, 90, 90, 98, 98, 97, 97, 96)
bucket4 sum:9401, content=(95, 98, 100, 100, 100, 100, 100, 100, 100, 100, 100, 99,
99, 99, 99, 99, 99, 99, 98, 98, 98, 98, 98, 98, 98, 98,
98, 98, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95,
95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93,

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93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91,
91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 90)
bucket5 sum:9398, content= (100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100,
98, 98, 98, 98, 98, 98, 97, 97, 97, 97, 97, 97, 97, 96, 95, 95,
95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93, 93,
93, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91,
91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 16, 10, 10, 7, 6, 3, 100, 100, 100, 100,
100, 100, 100, 100, 100, 100, 100, 100, 98, 98, 98, 97, 97,
97, 97, 97, 97)
"----Comparison for the 73 example----"
"***tf from benchmark was 9406(we added the number of machines) and target
function from our local search is 9406"
***RESULT IS THE SAME
Run time: 28.59 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 4))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 74 from 93-----"
"-----START 75 from 93-----"


"***Data from file NU_1_0500_05_4.txt: machinesNum=5 jobsNum=500"
"***SOLUTION Data from file SOL_NU_1_05_0500_4.txt: machinesNum=5
jobsNum=500 lowerBound=9381 upperBound=9381
isOptimal=1"
Content of machines summed (9381, 9381, 9381, 9381, 9378)

----Our Results-----
best from Our local search found:
target function = 9386, num of machines=5, square root lms=0
machines content(number of jobs=500):
bucket1 sum:9381, content= (98, 98, 98, 98, 98, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96,
96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95,
95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93, 93, 93, 92,
92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91,
91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 90, 90, 99, 99, 99, 99, 99, 99, 99, 99, 100, 99, 100,
100, 100, 98, 100, 97, 97, 99, 97, 99)
bucket2 sum:9381, content= (100, 100, 100, 99, 99, 99, 99, 99, 99, 99, 99, 99, 98, 98, 98,
98, 98, 98, 98, 98, 97, 97, 97, 97, 97, 97, 97, 96,
96, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94,
94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93, 93, 93, 93,
93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90,
90, 90, 90, 90, 90, 99, 99, 99, 98)
bucket3 sum:9381, content= (100, 100, 100, 99, 99, 99, 99, 99, 99, 99, 99, 99, 98, 98,
98, 98, 98, 98, 98, 98, 97, 97, 97, 97, 97, 97, 97, 97,

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96, 96, 96, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94,
94, 94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93, 93, 93,
93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90,
90, 90, 90, 90, 90, 90, 99, 99, 98)
bucket4 sum:9378, content= (100, 100, 100, 100, 100, 100, 100, 98, 98, 98, 98, 98,
98, 98, 98, 98, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96,
96, 96, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93,
93, 93, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92,
92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 18, 16, 15,
13, 4, 2, 100, 100, 100, 100, 100, 100, 100, 100, 100, 98,
98, 98)
bucket5 sum:9381, content= (98, 99, 100, 100, 100, 100, 99, 99, 99, 99, 99, 99, 99,
99, 98, 98, 98, 98, 98, 98, 98, 98, 98, 98, 98, 97, 97, 97, 97,
97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95, 95,
94, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93,
93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 90,
90, 90, 90, 90, 90, 90, 90, 90)
"----Comparison for the 74 example----"
"***tf from benchmark was 9386(we added the number of machines) and target
function from our local search is 9386"
***RESULT IS THE SAME
Run time: 13.817 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 5))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 75 from 93-----"
"-----START 76 from 93-----"

"***Data from file NU_1_0500_05_5.txt: machinesNum=5 jobsNum=500"
"***SOLUTION Data from file SOL_NU_1_05_0500_5.txt: machinesNum=5
jobsNum=500 lowerBound=9408 upperBound=9408
isOptimal=1"
Content of machines summed (9408, 9408, 9408, 9408, 9404)

----Our Results-----
best from Our local search found:
target function = 9413, num of machines=5, square root lms=0
machines content(number of jobs=500):
bucket1 sum:9408, content= (100, 100, 99, 98, 98, 98, 98, 98, 98, 98, 98, 97, 97, 97,
97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 95,
95, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93,
93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91,
91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 90, 99, 99, 99, 99, 99, 99, 99, 99,
100, 100, 100, 98, 100, 100, 98, 100)

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bucket2 sum:9406, content= (99, 100, 100, 100, 100, 99, 99, 99, 99, 99, 99, 99, 99,
99, 99, 98, 98, 98, 98, 98, 98, 98, 98, 97, 97, 97, 97, 97, 97,
97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95,
94, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93,
93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90,
90, 90, 90, 90, 90, 99, 99, 99, 99)
bucket3 sum:9406, content= (100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 98,
98, 98, 98, 98, 98, 98, 98, 97, 97, 97, 97, 97, 97, 97, 97, 96,
96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94,
94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93, 93, 92, 92,
92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90,
19, 18, 17, 10, 5, 4, 100, 100, 100, 100, 100, 100, 100, 100,
100, 100, 99)
bucket4 sum:9408, content= (100, 100, 100, 100, 100, 100, 99, 99, 99, 99, 99, 99, 99, 99,
99, 99, 99, 99, 98, 98, 98, 98, 98, 98, 98, 98, 97, 97, 97,
97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95,
95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93,
93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 90, 90,
90, 90, 90, 90, 90, 90, 90, 90, 99, 99)
bucket5 sum:9408, content= (99, 99, 100, 100, 100, 100, 100, 100, 99, 99, 99, 99, 99, 99,
99, 99, 99, 99, 99, 98, 98, 98, 98, 98, 98, 98, 98, 97,
97, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95,
95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 94, 94, 93,
93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91,
90, 90, 90, 90, 90, 90, 90, 90, 90, 90)
"----Comparison for the 75 example----"
"***tf from benchmark was 9413(we added the number of machines) and target
function from our local search is 9413"
***RESULT IS THE SAME
Run time: 12.35 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 6))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 76 from 93-----"
"-----START 77 from 93-----"
"input file number 77:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0500_05_6.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0500_6.txt"
"***Data from file NU_1_0500_05_6.txt: machinesNum=5 jobsNum=500"
"***SOLUTION Data from file SOL_NU_1_05_0500_6.txt: machinesNum=5
jobsNum=500 lowerBound=9381 upperBound=9381
isOptimal=1"
Content of machines summed (9381, 9381, 9381, 9381, 9379)
input selected: size 500 sum 46903
----Our Results-----
best from Our local search found:

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target function = 9386, num of machines=5, square root lms=0
machines content(number of jobs=500):
bucket1 sum:9381, content= (95, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94,
94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92,
92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90,
90, 90, 90, 99, 99, 99, 99, 99, 99, 99, 99, 100, 100, 100, 100,
99, 100, 98, 98, 100, 98, 99, 97, 97, 99, 97, 99, 97, 97, 98, 96, 98, 96, 96, 98, 96, 98,
96, 96, 97, 95, 97, 95, 95, 97, 95, 97)
bucket2 sum:9381, content= (100, 100, 100, 100, 99, 99, 99, 99, 99, 99, 99, 99, 98, 98,
98, 98, 98, 98, 98, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96,
96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94,
93, 93, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92,
92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90,
99, 99, 99, 99, 98, 97, 97, 96, 96)
bucket3 sum:9381, content= (100, 100, 100, 100, 100, 99, 99, 99, 99, 99, 99, 99, 98,
98, 98, 98, 98, 98, 98, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96,
96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94,
94, 93, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92,
92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90,
90, 99, 99, 98, 98, 97, 97, 96, 96)
bucket4 sum:9381, content= (93, 99, 100, 100, 100, 100, 99, 99, 99, 99, 99, 99, 99,
99, 99, 99, 99, 98, 98, 98, 98, 98, 98, 98, 98, 98, 97, 97, 97,
97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95,
95, 94, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93,
93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90,
90, 90, 90, 90, 90, 90, 90, 90)
bucket5 sum:9379, content= (100, 100, 100, 100, 100, 100, 99, 99, 99, 99, 98, 98, 98,
98, 98, 98, 97, 97, 97, 96, 96, 96, 95, 95, 95, 95, 95, 95,
95, 94, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92,
92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90,
90, 90, 90, 90, 90, 15, 12, 10, 6, 4, 1, 100, 100, 100, 100, 100, 100, 100, 100, 99,
99, 99, 98, 98, 98, 98, 98, 97, 97, 97, 97, 97, 97, 96, 96, 96,
96)
"----Comparison for the 76 example----"
"***tf from benchmark was 9386(we added the number of machines) and target
function from our local search is 9386"
***RESULT IS THE SAME
Run time: 33.232 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 7))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 77 from 93-----"
"-----START 78 from 93-----"





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***Data from file NU_1_0500_05_7.txt: machinesNum=5 jobsNum=500"
***SOLUTION Data from file SOL_NU_1_05_0500_7.txt: machinesNum=5
jobsNum=500 lowerBound=9396 upperBound=9396
isOptimal=1"
Content of machines summed (9396, 9396, 9396, 9396, 9395)
input selected: size 500 sum 46979
----Our Results-----
best from Our local search found:
target function = 9401, num of machines=5, square root lms=0
machines content(number of jobs=500):
bucket1 sum:9396, content= (98, 98, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96,
96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95,
94, 94, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92,
92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90,
90, 90, 90, 90, 90, 90, 99, 99, 99, 99, 99, 99, 99, 99, 99, 99, 100, 98, 100, 100, 100, 100,
100, 99, 97, 97, 99, 97, 99, 97, 97, 99)
bucket2 sum:9396, content= (100, 100, 100, 100, 100, 99, 99, 99, 99, 98, 98, 98, 98, 98,
98, 98, 98, 98, 98, 98, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96,
96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94,
94, 94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92,
92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 90,
90, 99, 99, 99, 99, 99, 99, 100, 98, 98)
bucket3 sum:9396, content= (98, 100, 100, 100, 100, 100, 99, 99, 99, 99, 99, 99, 99, 99,
99, 99, 98, 98, 98, 98, 98, 98, 98, 98, 98, 97, 97, 97, 97, 97,
97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95,
95, 94, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93,
93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90,
90, 90, 90, 90, 90, 90, 99, 98)
bucket4 sum:9395, content= (100, 100, 100, 100, 100, 100, 100, 100, 100, 99, 98, 98,
98, 98, 98, 98, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96,
96, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 94, 93,
93, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92,
92, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 90, 19, 18, 13, 7, 7, 1,
100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 98, 98,
98, 98, 98)
bucket5 sum:9396, content= (98, 98, 100, 100, 100, 100, 100, 100, 99, 99, 99, 99, 99,
99, 99, 99, 98, 98, 98, 98, 98, 98, 98, 98, 98, 98, 98, 97,
97, 97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95,
95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93,
93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 90,
90, 90, 90, 90, 90, 90, 90, 90, 90, 90)
"----Comparison for the 77 example----"
***tf from benchmark was 9401(we added the number of machines) and target
function from our local search is 9401"
***RESULT IS THE SAME
Run time: 18.521 seconds

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"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 8))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 78 from 93-----"
"-----START 79 from 93-----"
"input file number 79:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0500_05_8.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0500_8.txt"
"***Data from file NU_1_0500_05_8.txt: machinesNum=5 jobsNum=500"
"***SOLUTION Data from file SOL_NU_1_05_0500_8.txt: machinesNum=5
jobsNum=500 lowerBound=9372 upperBound=9372
isOptimal=1"
Content of machines summed (9372, 9372, 9372, 9372, 9369)
input selected: size 500 sum 46857
----Our Results-----
best from Our local search found:
target function = 9377, num of machines=5, square root lms=0
machines content(number of jobs=500):
bucket1 sum:9372, content= (96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 94, 94,
94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93,
92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90,
90, 90, 90, 90, 90, 90, 90, 90, 90, 98, 99, 99, 99, 99, 99,
99, 99, 98, 98, 98, 98, 98, 98, 98, 97, 97, 97, 100, 97, 100, 97, 100, 97, 100, 96, 100,
96, 96, 100, 97, 96, 100, 96, 98, 95, 98)
bucket2 sum:9372, content= (100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 98,
97, 97, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 94, 94,
94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92,
92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90,
90, 90, 90, 90, 90, 90, 90, 90, 14, 11, 7, 6, 6, 6, 99, 100, 100, 100, 100, 100, 100, 100,
99, 99, 99, 99, 99, 99, 99, 99, 98, 98, 98, 98, 97, 97, 97,
100, 97)
bucket3 sum:9370, content= (100, 100, 100, 99, 99, 99, 99, 99, 99, 99, 99, 98, 98, 98,
98, 98, 98, 98, 97, 97, 97, 97, 97, 97, 97, 97, 97,
97, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 93,
93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92,
92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 90, 90,
90, 98, 98, 98, 97, 97, 97, 96)
bucket4 sum:9371, content= (100, 100, 100, 100, 100, 100, 99, 99, 99, 99, 99, 99, 99,
99, 98, 98, 98, 98, 98, 98, 98, 97, 97, 97, 97, 97, 97,
97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 94, 94, 94,
94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93, 93, 92,
92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90,
90, 90, 90, 90, 90, 90, 97, 97, 96)
bucket5 sum:9372, content= (97, 97, 100, 100, 100, 100, 100, 100, 99, 99, 99, 99, 99,
99, 99, 99, 97, 98, 98, 98, 98, 98, 98, 98, 97, 97, 97,
97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95,

```

94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93,
 93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 90,
 90, 90, 90, 90, 90, 90, 90, 90, 90)
 "----Comparison for the 78 example----"
 "****tf from benchmark was 9377(we added the number of machines) and target
 function from our local search is 9377"
 ***RESULT IS THE SAME
 Run time: 30.218 seconds
 "Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 9))
 "Mistakes(size-numberMistakes):" QMap()
 "Avegare error: 0"
 "-----END 79 from 93-----"
 "-----START 80 from 93-----"
 "input file number 80:
 inputName=C:/algo/h/docs/benchMark/all/NU_1_0500_05_9.txt and
 solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_05_0500_9.txt"
 "****Data from file NU_1_0500_05_9.txt: machinesNum=5 jobsNum=500"
 "****SOLUTION Data from file SOL_NU_1_05_0500_9.txt: machinesNum=5
 jobsNum=500 lowerBound=9391 upperBound=9391
 isOptimal=1"
 Content of machines summed (9391, 9391, 9391, 9391, 9391)
 input selected: size 500 sum 46955
 ----Our Results-----
 best from Our local search found:
 target function = 9396, num of machines=5, square root lms=0
 machines content(number of jobs=500):
 bucket1 sum:9391, content= (95, 95, 94, 94, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93,
 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92,
 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 99, 99, 99,
 99, 99, 99, 99, 99, 99, 99, 99, 100, 98, 100, 100, 100, 100,
 100, 98, 100, 98, 100, 98, 97, 99, 97, 97, 99, 97, 99, 96, 96, 98, 96, 98, 96, 96, 98, 96,
 97, 95, 95, 97, 95, 97, 94, 94, 96, 94, 96)
 bucket2 sum:9391, content= (100, 100, 100, 100, 100, 99, 99, 99, 99, 99, 99, 99, 99, 99,
 99, 98, 98, 98, 98, 98, 98, 98, 97, 97, 97, 97, 97, 97, 97,
 97, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93,
 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92,
 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 99,
 99, 99, 99, 99, 98, 97, 97, 96, 95)
 bucket3 sum:9391, content= (100, 100, 100, 100, 100, 100, 99, 99, 99, 99, 99, 99, 99,
 99, 99, 98, 98, 98, 98, 98, 98, 98, 97, 97, 97, 97, 97,
 97, 97, 97, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 93,
 93, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92,
 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90,
 90, 99, 99, 99, 98, 98, 97, 96, 96, 95)
 bucket4 sum:9391, content= (100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100,
 100, 100, 98, 98, 97, 97, 97, 97, 96, 95, 95, 95, 94, 94,

94, 94, 93, 93, 93, 93, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 18, 9, 8, 3, 2, 1, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 99, 98, 98, 98, 98, 97, 97, 97, 97, 97, 97, 96, 96, 96, 95, 95, 95)

bucket5 sum:9391, content= (98, 98, 98, 98, 99, 100, 100, 100, 100, 100, 99, 99, 99, 99, 99, 99, 99, 99, 98, 98, 98, 98, 98, 98, 98, 98, 98, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93, 93, 93, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 90)

"----Comparison for the 79 example----"

***tf from benchmark was 9396(we added the number of machines) and target function from our local search is 9396"

***RESULT IS THE SAME

Run time: 42.194 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 10))

"Mistakes(size-numberMistakes):" QMap()

"Avegare error: 0"

"-----END 80 from 93-----"

"-----START 81 from 93-----"

"input file number 81:

inputName=C:/algo/h/docs/benchMark/all/NU_1_0500_10_0.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0500_0.txt"

***Data from file NU_1_0500_10_0.txt: machinesNum=10 jobsNum=500"

***SOLUTION Data from file SOL_NU_1_10_0500_0.txt: machinesNum=10
jobsNum=500 lowerBound=4703 upperBound=4703
isOptimal=1"

Content of machines summed (4703, 4703, 4703, 4703, 4703, 4703, 4703, 4703, 4703, 4703, 4703, 4699)

input selected: size 500 sum 47026

----Our Results-----

best from Our local search found:

target function = 4713, num of machines=10, square root lms=0

machines content(number of jobs=500):

bucket1 sum:4703, content= (97, 99, 94, 97, 97, 91, 96, 93, 96, 96, 95, 93, 99, 94, 92, 98, 94, 94, 93, 94, 96, 98, 96, 97, 97, 95, 97, 93, 97, 93, 98, 98, 99, 96, 99, 95, 95, 99, 92, 95, 99, 100, 98, 98, 96, 99, 94, 95, 97)

bucket2 sum:4703, content= (91, 94, 94, 92, 92, 91, 91, 91, 100, 100, 100, 100, 99, 99, 99, 92, 92, 91, 100, 92, 100, 100, 99, 98, 98, 98, 94, 100, 92, 100, 100, 98, 99, 91, 99, 98, 94, 99, 92, 95, 98, 95, 95, 95, 95, 93, 96, 98, 94)

bucket3 sum:4703, content= (100, 100, 100, 91, 91, 91, 100, 100, 100, 93, 92, 92, 91, 91, 100, 99, 100, 99, 99, 93, 99, 91, 91, 97, 97, 99, 100, 99, 97, 94, 93, 92, 91, 100, 100, 100, 94, 97, 94, 94, 94, 93, 98, 94, 95, 98, 95, 96, 99)

bucket4 sum:4703, content= (95, 95, 95, 95, 93, 93, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 90, 90, 90, 90, 90, 96, 96, 95, 94, 92, 92, 90, 90, 93, 91,

97, 95, 94, 100, 97, 97, 100, 100, 94, 100, 99, 97, 93, 96, 96, 99, 96, 93, 96, 95)
bucket5 sum:4703, content= (100, 100, 99, 99, 97, 97, 97, 96, 96, 96, 95, 94, 93, 93,
93, 92, 92, 92, 92, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90,
90, 92, 90, 90, 91, 97, 96, 98, 96, 99, 99, 95, 92, 97, 95, 98, 94, 93, 97, 97)
bucket6 sum:4703, content= (99, 99, 99, 99, 98, 97, 97, 97, 97, 96, 96, 96, 96, 96, 95,
95, 95, 95, 94, 94, 93, 93, 93, 92, 92, 92, 92, 92, 91, 91,
91, 91, 90, 90, 90, 90, 90, 90, 90, 96, 90, 95, 92, 95, 97, 96, 91, 97, 98, 93)
bucket7 sum:4703, content= (90, 90, 90, 99, 99, 99, 99, 99, 98, 98, 98, 98, 97, 97, 97,
97, 97, 96, 96, 96, 96, 96, 90, 91, 95, 93, 94, 94, 94, 94,
92, 93, 93, 92, 92, 92, 92, 92, 91, 91, 91, 91, 90, 90, 90, 90, 90, 98, 96)
bucket8 sum:4703, content= (99, 100, 100, 100, 100, 98, 92, 92, 92, 92, 92, 90, 90,
90, 90, 90, 90, 100, 100, 96, 97, 96, 99, 93, 97, 96, 96, 92,
100, 96, 98, 98, 97, 97, 96, 98, 100, 99, 97, 95, 97, 98, 100, 97, 92, 96, 94, 100, 99)
bucket9 sum:4702, content= (100, 100, 100, 100, 100, 100, 99, 99, 98, 98, 97, 97, 97,
97, 96, 96, 94, 94, 94, 94, 92, 92, 92, 91, 91, 91, 91, 91,
91, 90, 90, 90, 90, 13, 11, 95, 94, 97, 97, 98, 96, 94, 94, 99, 97, 96, 96, 94, 100, 99,
100)
bucket10 sum:4700, content= (100, 100, 100, 100, 100, 99, 99, 99, 99, 99, 98, 98, 98,
98, 97, 97, 97, 97, 96, 96, 96, 96, 96, 96, 96, 95, 94, 94,
94, 94, 94, 93, 93, 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 90, 90, 90, 90, 16, 12, 9,
2, 96)
"----Comparison for the 80 example----"
"***tf from benchmark was 4713(we added the number of machines) and target
function from our local search is 4713"
***RESULT IS THE SAME
Run time: 875.361 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 11))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 81 from 93-----"
"-----START 82 from 93-----"

"***Data from file NU_1_0500_10_1.txt: machinesNum=10 jobsNum=500"
"***SOLUTION Data from file SOL_NU_1_10_0500_1.txt: machinesNum=10
jobsNum=500 lowerBound=4699 upperBound=4699
isOptimal=1"
Content of machines summed (4699, 4699, 4699, 4699, 4699, 4699, 4699, 4699,
4699, 4692)

----Our Results-----
best from Our local search found:
target function = 4709, num of machines=10, square root lms=0
machines content(number of jobs=500):
bucket1 sum:4699, content= (92, 93, 91, 91, 91, 93, 93, 95, 92, 91, 92, 97, 98, 92, 97,

```

92, 96, 92, 94, 99, 99, 95, 99, 96, 100, 93, 100, 96, 92, 95,
93, 99, 91, 96, 95, 94, 93, 95, 93, 93, 93, 92, 91, 92, 94, 92, 91, 91, 93, 92)
bucket2 sum:4699, content= (100, 99, 97, 94, 94, 90, 90, 90, 90, 90, 99, 99, 98, 94,
90, 90, 90, 99, 98, 99, 96, 94, 96, 94, 94, 94, 97, 94, 96, 96,
98, 95, 90, 90, 98, 94, 97, 93, 94, 90, 90, 93, 97, 91, 90, 91, 91, 92, 92, 92)
bucket3 sum:4699, content= (98, 98, 98, 98, 96, 96, 96, 94, 94, 94, 94, 90, 90, 90, 90,
90, 98, 96, 94, 90, 90, 99, 98, 98, 97, 96, 90, 97, 94, 91,
92, 90, 90, 96, 92, 92, 90, 96, 97, 96, 94, 91, 91, 98, 94, 94, 90, 91, 98, 93)
bucket4 sum:4699, content= (90, 99, 100, 100, 98, 98, 97, 97, 97, 96, 94, 94, 94, 91,
99, 99, 99, 99, 100, 100, 97, 100, 96, 98, 91, 90, 91, 99, 94,
99, 91, 91, 99, 99, 99, 94, 90, 91, 99, 99, 97, 91, 90, 99, 95, 91, 91, 98, 99)
bucket5 sum:4699, content= (100, 100, 98, 98, 98, 98, 98, 98, 95, 95, 94, 94, 94, 93,
93, 97, 96, 95, 100, 100, 100, 100, 100, 99, 97, 99, 97, 93,
93, 96, 96, 93, 95, 97, 94, 100, 95, 90, 98, 97, 91, 90, 99, 92, 91, 92, 91, 99, 91)
bucket6 sum:4699, content= (100, 100, 100, 100, 100, 99, 98, 98, 93, 93, 99, 99, 99,
98, 95, 100, 98, 95, 98, 93, 93, 95, 95, 93, 93, 97, 96, 93,
100, 97, 98, 100, 100, 94, 99, 94, 95, 93, 96, 92, 92, 96, 90, 91, 91, 91, 94, 95, 91)
bucket7 sum:4699, content= (100, 100, 100, 100, 99, 99, 99, 98, 98, 97, 97, 97, 97,
97, 93, 93, 93, 92, 96, 95, 97, 92, 92, 99, 100, 99, 96, 99, 95,
98, 100, 98, 98, 93, 93, 98, 93, 95, 95, 92, 92, 92, 93, 92, 95, 94, 96, 92, 91)
bucket8 sum:4698, content= (100, 100, 100, 100, 99, 99, 99, 98, 98, 98, 97, 97, 97,
97, 97, 94, 94, 94, 93, 93, 92, 92, 92, 92, 92, 7, 91, 91, 91, 6,
92, 92, 98, 99, 98, 97, 95, 100, 100, 97, 94, 97, 97, 92, 97, 96, 94, 94, 92, 95, 92)
bucket9 sum:4693, content= (100, 100, 100, 100, 99, 99, 99, 99, 99, 98, 98, 98, 98,
97, 97, 97, 97, 97, 97, 96, 96, 96, 95, 95, 95, 95, 95, 94, 94,
94, 94, 93, 93, 93, 93, 92, 92, 92, 92, 92, 91, 91, 91, 91, 16, 91, 91, 91, 5, 5, 5, 92)
bucket10 sum:4699, content= (94, 94, 94, 95, 96, 96, 96, 96, 96, 96, 97, 97, 97, 97,
97, 97, 97, 97, 97, 95, 96, 96, 94, 95, 95, 95, 95, 94, 94, 94,
94, 93, 93, 93, 93, 92, 92, 92, 92, 90, 91, 91, 90, 90, 90, 90, 90, 90, 91)
"---Comparison for the 81 example---"
"***tf from benchmark was 4709(we added the number of machines) and target
function from our local search is 4709"
***RESULT IS THE SAME
Run time: 1366.96 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 12))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 82 from 93-----"
"-----START 83 from 93-----"


"***Data from file NU_1_0500_10_2.txt: machinesNum=10 jobsNum=500"
"***SOLUTION Data from file SOL_NU_1_10_0500_2.txt: machinesNum=10
jobsNum=500 lowerBound=4686 upperBound=4686
isOptimal=1"

```

Content of machines summed (4686, 4686, 4686, 4686, 4686, 4686, 4686, 4686, 4685, 4683)

input selected: size 500 sum 46856

----Our Results-----

best from Our local search found:

target function = 4696, num of machines=10, square root lms=0

machines content(number of jobs=500):

bucket1 sum:4686, content= (93, 93, 99, 98, 92, 98, 96, 96, 91, 96, 94, 94, 95, 91, 98, 92, 93, 91, 95, 91, 95, 92, 91, 91, 92, 92, 93, 91, 93, 96,

91, 99, 96, 93, 92, 91, 91, 93, 97, 92, 94, 96, 92, 95, 95, 91, 92, 97, 95, 92)

bucket2 sum:4686, content= (98, 98, 91, 90, 98, 90, 99, 98, 95, 95, 90, 98, 96, 95, 95, 98, 90, 90, 95, 90, 98, 92, 96, 92, 99, 90, 96, 98, 93, 90,

90, 93, 97, 90, 98, 91, 91, 91, 91, 91, 91, 92, 92, 97, 92, 94, 91, 98, 92, 91)

bucket3 sum:4685, content= (99, 100, 100, 100, 100, 100, 100, 99, 99, 100, 100, 99, 97, 97, 97, 93, 93, 100, 97, 93, 97, 91, 92, 100, 97, 92, 96,

96, 91, 93, 91, 90, 99, 97, 97, 90, 96, 90, 91, 93, 94, 91, 91, 95, 93, 99, 94, 92, 94)

bucket4 sum:4686, content= (100, 100, 100, 99, 97, 96, 96, 94, 94, 96, 99, 95, 95, 94, 100, 100, 99, 95, 93, 96, 94, 94, 93, 93, 93, 96, 96, 100,

98, 96, 94, 96, 99, 100, 99, 98, 95, 93, 93, 94, 90, 98, 93, 93, 91, 90, 93, 95, 91)

bucket5 sum:4686, content= (100, 100, 100, 100, 100, 98, 98, 98, 98, 95, 95, 95, 91, 91, 94, 98, 94, 95, 95, 98, 95, 100, 98, 95, 95, 94, 94, 97,

97, 97, 95, 94, 92, 92, 93, 94, 92, 95, 100, 94, 94, 97, 98, 91, 91, 98, 94, 92, 95)

bucket6 sum:4686, content= (100, 100, 100, 100, 99, 99, 97, 96, 96, 94, 91, 91, 97, 96, 92, 100, 94, 93, 99, 94, 98, 96, 96, 94, 95, 92, 92, 94, 93,

98, 99, 98, 92, 93, 99, 96, 96, 95, 92, 99, 92, 94, 99, 93, 97, 92, 96, 94, 94)

bucket7 sum:4685, content= (100, 100, 100, 100, 99, 99, 99, 98, 98, 98, 98, 97, 97, 97, 97, 96, 96, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 93, 93,

93, 93, 92, 92, 92, 91, 13, 11, 92, 92, 92, 92, 93, 92, 97, 92, 97, 92, 92, 98, 95, 93)

bucket8 sum:4684, content= (100, 100, 100, 100, 99, 99, 99, 98, 98, 98, 98, 97, 97, 97, 97, 96, 96, 96, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94,

93, 93, 93, 93, 92, 92, 92, 92, 92, 91, 91, 91, 91, 91, 15, 91, 91, 13, 91, 4, 2, 96, 92, 98)

bucket9 sum:4686, content= (100, 100, 99, 99, 99, 98, 98, 98, 97, 97, 97, 97, 97, 96, 96, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94, 93, 93, 92, 92,

91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 90, 90, 91, 91, 91, 90, 91, 91, 91)

bucket10 sum:4686, content= (90, 93, 96, 90, 96, 97, 97, 98, 98, 98, 98, 94, 97, 97, 97, 95, 96, 96, 95, 95, 95, 95, 95, 95, 94, 94, 94, 94, 94,

94, 90, 93, 93, 92, 92, 92, 92, 92, 92, 90, 90, 91, 90, 90, 90, 90, 90)

"----Comparison for the 82 example----

****tf from benchmark was 4696(we added the number of machines) and target function from our local search is 4696"

***RESULT IS THE SAME

Run time: 1319.15 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 13))

"Mistakes(size-numberMistakes):" QMap()

"Avegare error: 0"

```

"-----END 83 from 93-----"
"-----START 84 from 93-----"


```



```

"----Comparison for the 83 example----"
"***tf from benchmark was 4711(we added the number of machines) and target
function from our local search is 4711"
***RESULT IS THE SAME
Run time: 738.422 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 14))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 84 from 93-----"
"-----START 85 from 93-----"
"input file number 85:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0500_10_4.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0500_4.txt"
"***Data from file NU_1_0500_10_4.txt: machinesNum=10 jobsNum=500"
"***SOLUTION Data from file SOL_NU_1_10_0500_4.txt: machinesNum=10
jobsNum=500 lowerBound=4696 upperBound=4696
isOptimal=1"
Content of machines summed (4696, 4696, 4696, 4696, 4696, 4696, 4696, 4696,
4696, 4693)
input selected: size 500 sum 46957
----Our Results-----
best from Our local search found:
target function = 4706, num of machines=10, square root lms=0
machines content(number of jobs=500):
bucket1 sum:4696, content= (99, 91, 92, 98, 99, 98, 99, 98, 98, 100, 98, 93, 100, 95,
96, 97, 96, 97, 99, 91, 94, 98, 98, 97, 98, 98, 98, 100, 99,
93, 100, 96, 91, 94, 94, 97, 90, 96, 92, 91, 91, 91, 95, 97, 99, 92, 93, 92, 98)
bucket2 sum:4696, content= (91, 90, 90, 92, 99, 91, 92, 93, 91, 99, 99, 92, 91, 99, 99,
99, 94, 91, 98, 100, 93, 99, 98, 99, 98, 100, 100, 100, 98,
98, 93, 98, 94, 91, 99, 99, 98, 99, 95, 90, 99, 99, 99, 99, 99, 90, 93, 95, 94)
bucket3 sum:4696, content= (100, 91, 91, 90, 90, 90, 20, 91, 91, 100, 95, 100, 95, 95,
96, 95, 91, 100, 100, 97, 97, 97, 96, 96, 95, 91, 100, 94,
98, 96, 98, 100, 95, 93, 93, 98, 93, 96, 97, 94, 100, 95, 91, 91, 91, 100, 98, 99, 98, 98)
bucket4 sum:4696, content= (100, 100, 100, 100, 98, 98, 97, 96, 96, 96, 94, 94, 94,
93, 93, 90, 90, 19, 96, 93, 100, 93, 92, 96, 96, 100, 100, 94,
96, 94, 97, 93, 100, 93, 96, 96, 92, 94, 93, 100, 94, 100, 91, 93, 91, 96, 99, 96, 92, 92)
bucket5 sum:4696, content= (100, 100, 100, 100, 100, 99, 97, 97, 96, 96, 96, 96, 96,
95, 93, 93, 92, 92, 92, 91, 90, 90, 95, 94, 20, 94, 100, 91,
95, 94, 92, 94, 99, 99, 95, 93, 100, 92, 100, 95, 100, 99, 92, 91, 93, 95, 99, 96, 91, 97)
bucket6 sum:4696, content= (100, 100, 100, 100, 100, 99, 97, 97, 96, 96, 96, 95, 95,
94, 94, 94, 93, 93, 93, 92, 91, 90, 90, 90, 90, 100, 100, 100,
100, 95, 94, 93, 92, 16, 93, 93, 97, 96, 98, 92, 92, 100, 97, 97, 100, 100, 94, 98, 92,
92)
bucket7 sum:4695, content= (99, 98, 97, 97, 96, 96, 96, 96, 96, 95, 95, 94, 94, 94, 93,
93, 93, 93, 92, 92, 91, 91, 91, 91, 90, 90, 90, 90, 90,
90, 94, 92, 90, 90, 90, 90, 90, 92, 95, 100, 96, 99, 99, 100, 2, 92, 99, 98, 98, 93)

```

```

bucket8 sum:4694, content= (99, 98, 97, 97, 97, 97, 96, 96, 96, 96, 96, 95, 95, 95,
94, 94, 94, 94, 93, 93, 93, 93, 93, 92, 92, 92, 91, 91, 91,
91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 90, 90, 97, 95, 4, 99, 99, 100, 99, 93)
bucket9 sum:4696, content= (98, 99, 97, 98, 98, 98, 97, 97, 97, 97, 96, 96, 96, 96, 96,
93, 95, 95, 95, 94, 94, 94, 94, 94, 93, 93, 93, 93, 92, 92,
92, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90, 93, 91, 94, 98, 95, 91, 97, 90)
bucket10 sum:4696, content= (90, 90, 91, 95, 97, 96, 96, 97, 99, 98, 98, 98, 98, 97,
97, 97, 97, 96, 96, 96, 96, 96, 95, 95, 95, 95, 94, 94, 94, 94,
94, 93, 93, 93, 93, 92, 92, 92, 92, 91, 91, 91, 91, 91, 90, 90, 90, 90, 90, 90)
"----Comparison for the 84 example----"
"***tf from benchmark was 4706(we added the number of machines) and target
function from our local search is 4706"
***RESULT IS THE SAME
Run time: 1084.32 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 15))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 85 from 93-----"
"-----START 86 from 93-----"
"input file number 86:
inputName=C:/algo/h/docs/benchMark/all/NU_1_0500_10_5.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0500_5.txt"
"***Data from file NU_1_0500_10_5.txt: machinesNum=10 jobsNum=500"
"***SOLUTION Data from file SOL_NU_1_10_0500_5.txt: machinesNum=10
jobsNum=500 lowerBound=4706 upperBound=4706
isOptimal=1"
Content of machines summed (4706, 4706, 4706, 4706, 4706, 4706, 4706, 4706,
4706, 4705)
input selected: size 500 sum 47059
----Our Results-----
best from Our local search found:
target function = 4716, num of machines=10, square root lms=0
machines content(number of jobs=500):
bucket1 sum:4706, content= (96, 94, 91, 92, 95, 91, 91, 96, 92, 92, 92, 98, 91, 94, 91,
91, 97, 93, 93, 92, 94, 92, 94, 92, 93, 91, 91, 97, 92, 99,
92, 97, 92, 96, 99, 99, 100, 93, 98, 98, 97, 96, 94, 95, 96, 91, 96, 92, 93, 95)
bucket2 sum:4706, content= (90, 90, 90, 90, 90, 97, 94, 90, 90, 90, 90, 98, 99, 96, 97,
98, 95, 97, 94, 90, 97, 93, 95, 96, 99, 95, 90, 96, 99, 99,
95, 94, 92, 90, 91, 97, 98, 98, 97, 90, 92, 95, 90, 98, 93, 96, 90, 91, 98, 97)
bucket3 sum:4706, content= (99, 97, 98, 97, 96, 95, 93, 93, 93, 93, 90, 90, 90, 90, 90,
98, 97, 96, 93, 90, 98, 98, 97, 94, 93, 94, 90, 99, 99, 97,
95, 93, 90, 96, 94, 97, 96, 94, 90, 91, 96, 95, 96, 90, 93, 98, 90, 90, 90, 95)
bucket4 sum:4706, content= (100, 100, 100, 100, 100, 100, 100, 90, 90, 100, 100, 100,
100, 100, 100, 100, 97, 97, 93, 93, 99, 99, 98, 98, 98, 100,
100, 95, 93, 95, 98, 90, 90, 99, 99, 96, 90, 93, 93, 93, 96, 91, 90, 94, 99, 93, 91, 91,
91, 94)

```

bucket5 sum:4706, content= (100, 100, 100, 97, 95, 95, 100, 94, 95, 93, 94, 97, 97, 97, 93, 95, 93, 100, 100, 100, 100, 100, 100, 93, 93, 95, 93, 94, 93, 95, 93, 96, 93, 96, 94, 100, 95, 95, 97, 98, 99, 97, 98, 94, 97, 93, 91, 99, 90)

bucket6 sum:4706, content= (99, 100, 100, 100, 100, 100, 98, 98, 98, 98, 96, 95, 95, 95, 93, 100, 95, 98, 98, 99, 92, 92, 93, 95, 92, 93, 93, 95, 92, 97, 95, 95, 98, 100, 100, 100, 94, 100, 97, 98, 97, 94, 93, 99, 94, 90, 91, 91, 91)

bucket7 sum:4706, content= (100, 100, 100, 100, 100, 100, 100, 99, 97, 97, 97, 97, 96, 93, 92, 92, 92, 92, 92, 94, 92, 96, 92, 93, 92, 92, 96, 99, 99, 98, 99, 100, 98, 96, 98, 95, 97, 92, 96, 97, 93, 99, 95, 99, 94, 95, 95, 95, 94)

bucket8 sum:4706, content= (100, 100, 100, 100, 100, 99, 99, 99, 98, 98, 98, 97, 97, 97, 97, 96, 96, 96, 95, 95, 95, 95, 95, 94, 94, 94, 94, 93, 93, 93, 93, 92, 92, 92, 92, 16, 91, 91, 91, 91, 12, 92, 92, 92, 98, 100, 98, 97, 100, 94)

bucket9 sum:4705, content= (100, 100, 100, 100, 100, 99, 99, 99, 99, 99, 98, 98, 97, 97, 97, 97, 96, 96, 96, 95, 95, 95, 95, 95, 94, 94, 94, 93, 93, 93, 93, 92, 92, 92, 91, 91, 91, 91, 91, 15, 91, 91, 7, 91, 6, 4, 99, 98, 95, 97, 97, 94)

bucket10 sum:4706, content= (94, 95, 95, 95, 95, 96, 96, 96, 97, 97, 97, 97, 97, 97, 97, 97, 96, 96, 96, 96, 96, 95, 95, 95, 95, 95, 94, 94, 94, 94, 91, 93, 93, 93, 93, 93, 92, 92, 91, 91, 90, 90, 90, 90, 90, 90, 90, 91)

"----Comparison for the 85 example----"

****tf from benchmark was 4716(we added the number of machines) and target function from our local search is 4716"

***RESULT IS THE SAME

Run time: 1231.93 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 16))

"Mistakes(size-numberMistakes):" QMap()

"Avegare error: 0"

"-----END 86 from 93-----"

"-----START 87 from 93-----"

"input file number 87:

inputName=C:/algo/h/docs/benchMark/all/NU_1_0500_10_6.txt and

solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0500_6.txt"

****Data from file NU_1_0500_10_6.txt: machinesNum=10 jobsNum=500"

****SOLUTION Data from file SOL_NU_1_10_0500_6.txt: machinesNum=10

jobsNum=500 lowerBound=4704 upperBound=4704

isOptimal=1"

Content of machines summed (4704, 4704, 4704, 4704, 4704, 4704, 4704, 4704, 4704, 4701)

input selected: size 500 sum 47037

----Our Results-----

best from Our local search found:

target function = 4714, num of machines=10, square root lms=0

machines content(number of jobs=500):

bucket1 sum:4704, content= (91, 93, 92, 97, 95, 97, 97, 91, 99, 93, 97, 98, 94, 93, 96, 95, 92, 96, 93, 98, 91, 94, 96, 90, 97, 92, 95, 95, 96, 90,

90, 91, 91, 91, 92, 94, 99, 98, 94, 92, 94, 92, 94, 98, 96, 91, 91, 95, 95, 93)

bucket2 sum:4704, content= (94, 90, 99, 99, 99, 90, 90, 90, 90, 99, 97, 97, 90, 96, 98,

95, 90, 91, 95, 91, 94, 96, 98, 96, 90, 98, 96, 92, 94, 98,
 92, 95, 91, 90, 92, 100, 97, 90, 96, 95, 95, 96, 91, 94, 93, 92, 92, 90, 97, 94)
 bucket3 sum:4704, content= (100, 100, 100, 100, 98, 96, 96, 99, 99, 99, 100, 100, 98,
 99, 99, 96, 96, 100, 98, 96, 98, 95, 93, 94, 90, 99, 99, 99,
 90, 99, 96, 98, 98, 93, 90, 91, 93, 90, 93, 91, 91, 90, 99, 91, 94, 97, 90, 97, 97)
 bucket4 sum:4704, content= (100, 100, 100, 100, 100, 99, 99, 98, 100, 100, 96, 100,
 100, 97, 94, 94, 94, 94, 92, 92, 100, 99, 97, 97, 97, 92, 97,
 99, 99, 94, 95, 92, 94, 95, 94, 94, 99, 97, 95, 92, 94, 94, 96, 91, 94, 95, 91, 91, 91)
 bucket5 sum:4704, content= (100, 100, 100, 99, 99, 98, 97, 97, 96, 96, 96, 95, 95, 99,
 96, 93, 93, 94, 93, 95, 96, 97, 96, 96, 98, 96, 94, 100, 95,
 100, 97, 92, 100, 100, 99, 93, 95, 94, 96, 95, 99, 98, 90, 91, 96, 92, 96, 91, 91)
 bucket6 sum:4704, content= (100, 100, 100, 100, 100, 99, 99, 99, 99, 99, 99, 99, 96,
 96, 94, 94, 93, 93, 93, 91, 97, 97, 92, 94, 93, 95, 99, 99, 93,
 93, 99, 96, 99, 99, 96, 93, 93, 92, 93, 96, 98, 93, 96, 98, 98, 92, 94, 94, 90)
 bucket7 sum:4703, content= (100, 100, 100, 100, 99, 99, 99, 99, 98, 98, 98, 97, 97,
 96, 95, 95, 95, 95, 95, 95, 93, 93, 93, 93, 92, 92, 92, 91, 19,
 91, 91, 91, 91, 98, 98, 92, 100, 98, 95, 97, 93, 97, 99, 95, 93, 92, 92, 95, 100, 97)
 bucket8 sum:4702, content= (100, 100, 100, 100, 99, 99, 99, 99, 99, 98, 98, 98, 98,
 98, 98, 97, 97, 97, 97, 96, 96, 96, 96, 95, 95, 95, 95, 95, 93,
 93, 93, 93, 92, 92, 92, 92, 92, 91, 91, 91, 9, 4, 4, 8, 91, 91, 91, 5, 91, 95, 95, 95, 92,
 96)
 bucket9 sum:4704, content= (99, 100, 99, 99, 99, 99, 99, 98, 98, 98, 98, 98, 97,
 97, 97, 96, 96, 96, 95, 95, 95, 95, 95, 94, 94, 94, 93, 92, 92,
 92, 92, 91, 91, 90, 90, 90, 90, 90, 90, 90, 90, 90, 90, 90, 90, 91, 92)
 bucket10 sum:4704, content= (90, 90, 97, 97, 98, 98, 98, 98, 98, 98, 98, 98, 98, 98,
 98, 90, 97, 97, 96, 96, 96, 96, 96, 96, 91, 95, 95, 95, 95, 90,
 93, 94, 93, 93, 93, 93, 92, 92, 92, 92, 92, 90, 91, 91, 90, 90, 90, 90, 90, 90)
 "----Comparison for the 86 example----"
 "***tf from benchmark was 4714(we added the number of machines) and target
 function from our local search is 4714"
 ***RESULT IS THE SAME
 Run time: 1304.87 seconds
 "Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 17))
 "Mistakes(size-numberMistakes):" QMap()
 "Avegare error: 0"
 "-----END 87 from 93-----"
 "-----START 88 from 93-----"
 "input file number 88:
 inputName=C:/algo/h/docs/benchMark/all/NU_1_0500_10_7.txt and
 solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0500_7.txt"
 "***Data from file NU_1_0500_10_7.txt: machinesNum=10 jobsNum=500"
 "***SOLUTION Data from file SOL_NU_1_10_0500_7.txt: machinesNum=10
 jobsNum=500 lowerBound=4706 upperBound=4706
 isOptimal=1"
 Content of machines summed (4706, 4706, 4706, 4706, 4706, 4706, 4706, 4706,
 4706, 4706)

input selected: size 500 sum 47060

----Our Results-----

best from Our local search found:

target function = 4716, num of machines=10, square root lms=0

machines content(number of jobs=500):

bucket1 sum:4706, content= (95, 93, 93, 94, 92, 94, 93, 91, 92, 93, 92, 92, 92, 91, 95, 92, 96, 91, 91, 91, 91, 91, 91, 93, 93, 92, 97, 92, 92, 97, 92, 98, 92, 98, 100, 97, 98, 100, 99, 98, 98, 98, 96, 92, 96, 95, 95, 94, 94, 94)

bucket2 sum:4706, content= (95, 93, 90, 90, 90, 90, 90, 99, 96, 95, 93, 90, 90, 90, 99, 98, 99, 99, 98, 97, 96, 96, 96, 95, 90, 98, 93, 99, 97, 93, 93, 90, 90, 97, 96, 93, 90, 90, 98, 97, 94, 90, 90, 90, 98, 97, 94, 90, 98, 97)

bucket3 sum:4706, content= (99, 98, 98, 98, 98, 98, 98, 96, 96, 96, 95, 90, 90, 90, 90, 90, 98, 98, 90, 90, 99, 98, 97, 94, 93, 90, 97, 99, 95, 94, 91, 90, 96, 98, 95, 96, 91, 91, 93, 91, 93, 91, 93, 98, 94, 91, 90, 90, 91, 91)

bucket4 sum:4706, content= (98, 100, 100, 100, 100, 100, 100, 100, 100, 100, 98, 98, 97, 96, 91, 91, 99, 99, 99, 98, 100, 100, 96, 91, 90, 99, 99, 91, 90, 96, 93, 99, 99, 94, 92, 90, 94, 99, 99, 99, 93, 92, 95, 90, 96, 92, 90, 91, 99, 94)

bucket5 sum:4706, content= (98, 100, 100, 100, 99, 99, 98, 96, 100, 96, 95, 94, 93, 98, 94, 94, 100, 100, 100, 98, 100, 99, 93, 98, 95, 95, 96, 94, 93, 93, 92, 98, 95, 99, 92, 94, 94, 94, 98, 99, 96, 96, 98, 96, 91, 91, 91, 91, 93)

bucket6 sum:4706, content= (100, 100, 100, 100, 100, 100, 98, 98, 91, 91, 91, 100, 100, 99, 100, 99, 100, 92, 98, 96, 95, 92, 92, 93, 96, 97, 96, 94, 100, 99, 100, 98, 99, 97, 97, 94, 95, 95, 95, 94, 97, 90, 90, 93, 92, 90, 91, 99, 93)

bucket7 sum:4706, content= (100, 100, 100, 100, 99, 98, 98, 98, 98, 98, 97, 96, 96, 95, 95, 91, 91, 91, 95, 92, 95, 92, 95, 99, 94, 99, 100, 99, 100, 100, 100, 92, 98, 97, 94, 94, 94, 95, 95, 92, 94, 93, 93, 96, 97, 94, 94, 94, 99)

bucket8 sum:4706, content= (100, 100, 100, 100, 100, 99, 99, 99, 99, 98, 96, 96, 96, 95, 95, 95, 94, 94, 94, 94, 94, 93, 93, 93, 93, 92, 92, 92, 91, 91, 91, 91, 91, 17, 98, 93, 98, 99, 99, 98, 99, 99, 99, 97, 97, 100)

bucket9 sum:4706, content= (100, 100, 100, 100, 100, 99, 99, 99, 99, 99, 98, 98, 98, 98, 98, 98, 98, 97, 97, 96, 96, 96, 96, 95, 95, 95, 95, 94, 94, 94, 93, 93, 93, 93, 92, 92, 92, 92, 91, 91, 91, 91, 91, 17, 91, 91, 91, 91, 9, 8, 1, 96, 95)

bucket10 sum:4706, content= (93, 94, 95, 96, 96, 96, 97, 97, 97, 97, 97, 97, 98, 98, 98, 97, 97, 97, 96, 96, 96, 96, 92, 95, 95, 95, 95, 93, 94, 94, 94, 93, 93, 93, 93, 92, 92, 92, 90, 91, 91, 91, 90, 90, 90, 90, 90, 90, 90)

"----Comparison for the 87 example----

"***tf from benchmark was 4716(we added the number of machines) and target function from our local search is 4716"

***RESULT IS THE SAME

Run time: 1186.86 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 18))

"Mistakes(size-numberMistakes):" QMap()

"Avegare error: 0"

"-----END 88 from 93-----"

"-----START 89 from 93-----"

"input file number 89:

inputName=C:/algo/h/docs/benchMark/all/NU_1_0500_10_8.txt and
 solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_10_0500_8.txt"
 "***Data from file NU_1_0500_10_8.txt: machinesNum=10 jobsNum=500"
 "***SOLUTION Data from file SOL_NU_1_10_0500_8.txt: machinesNum=10
 jobsNum=500 lowerBound=4695 upperBound=4695
 isOptimal=1"
 Content of machines summed (4695, 4695, 4695, 4695, 4695, 4695, 4695, 4695,
 4695, 4693)
 input selected: size 500 sum 46948
 ----Our Results-----
 best from Our local search found:
 target function = 4705, num of machines=10, square root lms=0
 machines content(number of jobs=500):
 bucket1 sum:4695, content= (93, 98, 98, 92, 95, 93, 94, 94, 93, 94, 94, 92, 92, 98, 95,
 91, 92, 91, 92, 91, 91, 92, 92, 91, 91, 95, 92, 95, 92, 91,
 91, 98, 91, 96, 92, 91, 92, 92, 98, 92, 98, 92, 98, 92, 99, 97, 98, 100, 97, 97)
 bucket2 sum:4695, content= (95, 90, 90, 90, 90, 90, 90, 99, 99, 99, 90, 90, 90, 90, 98,
 98, 99, 98, 98, 95, 93, 93, 92, 93, 95, 93, 94, 95, 90, 90,
 98, 98, 97, 95, 95, 90, 94, 92, 93, 95, 93, 96, 90, 95, 98, 98, 93, 97, 91, 91)
 bucket3 sum:4695, content= (98, 98, 98, 96, 96, 96, 95, 95, 95, 94, 94, 93, 90, 90, 90,
 90, 90, 98, 97, 94, 92, 90, 90, 99, 99, 96, 98, 94, 93, 93,
 90, 96, 97, 96, 94, 92, 92, 90, 98, 97, 90, 90, 97, 92, 95, 90, 96, 90, 91, 91)
 bucket4 sum:4695, content= (90, 90, 100, 100, 100, 100, 100, 100, 98, 97, 96, 96, 95,
 95, 94, 93, 99, 99, 99, 98, 100, 100, 95, 97, 95, 90, 91, 99,
 99, 99, 96, 91, 90, 99, 99, 93, 93, 91, 99, 99, 99, 99, 91, 90, 99, 92, 90, 90, 91)
 bucket5 sum:4695, content= (100, 100, 100, 100, 98, 98, 98, 98, 95, 100, 95, 95, 95,
 96, 94, 93, 94, 100, 100, 100, 100, 100, 93, 97, 94, 95, 95,
 94, 94, 94, 94, 96, 95, 93, 97, 92, 99, 97, 90, 99, 98, 90, 95, 90, 97, 92, 90, 90, 96)
 bucket6 sum:4695, content= (100, 100, 100, 100, 98, 98, 98, 98, 97, 94, 93, 93, 93,
 93, 94, 100, 98, 100, 100, 96, 93, 94, 93, 93, 95, 97, 96, 93,
 95, 92, 92, 96, 92, 100, 100, 99, 98, 100, 98, 96, 96, 94, 94, 91, 91, 93, 91, 91, 99)
 bucket7 sum:4695, content= (100, 100, 100, 100, 99, 98, 98, 98, 98, 98, 98, 96, 95,
 95, 95, 95, 94, 94, 94, 93, 92, 92, 92, 92, 18, 91, 91, 91, 92,
 94, 92, 94, 92, 92, 93, 100, 98, 94, 100, 100, 98, 100, 98, 99, 96, 94, 95, 90, 91, 96)
 bucket8 sum:4695, content= (100, 100, 100, 100, 99, 99, 99, 99, 99, 98, 98, 98, 98,
 97, 97, 97, 97, 97, 97, 95, 95, 94, 94, 94, 93, 93, 93, 93, 93,
 20, 91, 91, 91, 91, 95, 93, 93, 96, 93, 93, 92, 93, 92, 96, 96, 92, 99, 97, 92, 93)
 bucket9 sum:4693, content= (100, 100, 100, 100, 99, 99, 99, 99, 97, 97, 97, 97, 96,
 96, 96, 95, 95, 95, 95, 94, 94, 94, 94, 94, 94, 93, 93, 93, 93,
 92, 92, 92, 92, 92, 92, 91, 91, 91, 91, 8, 14, 4, 91, 91, 91, 91, 5, 99, 99, 99, 100, 99,
 98)
 bucket10 sum:4695, content= (92, 93, 94, 96, 96, 96, 96, 96, 96, 96, 97, 97, 97, 97,
 97, 97, 97, 96, 96, 96, 96, 96, 95, 95, 95, 94, 94, 94, 94, 94,
 94, 93, 93, 93, 93, 92, 92, 92, 92, 92, 92, 91, 91, 90, 90, 90, 90, 90, 90)
 "----Comparison for the 88 example----"
 "***tf from benchmark was 4705(we added the number of machines) and target

```

function from our local search is 4705"
***RESULT IS THE SAME
Run time: 1155.14 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 19))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 89 from 93-----"
"-----START 90 from 93-----"



***Data from file NU_1_0500_10_9.txt: machinesNum=10 jobsNum=500"
***SOLUTION Data from file SOL_NU_1_10_0500_9.txt: machinesNum=10
jobsNum=500 lowerBound=4706 upperBound=4706
isOptimal=1"
Content of machines summed (4706, 4706, 4706, 4706, 4706, 4706, 4706, 4706,
4706, 4703)

----Our Results-----
best from Our local search found:
target function = 4716, num of machines=10, square root lms=0
machines content(number of jobs=500):
bucket1 sum:4706, content= (100, 96, 100, 98, 95, 91, 100, 93, 98, 100, 99, 95, 93,
91, 91, 98, 92, 96, 94, 95, 96, 97, 99, 99, 98, 92, 98, 92, 93,
96, 92, 97, 91, 94, 96, 96, 100, 93, 97, 97, 96, 96, 98, 98, 99, 99, 99, 96, 97)
bucket2 sum:4706, content= (100, 100, 100, 100, 94, 92, 91, 91, 100, 100, 100, 100,
100, 93, 93, 92, 92, 100, 97, 97, 92, 91, 91, 98, 98, 91, 96,
94, 97, 98, 100, 100, 96, 100, 93, 93, 97, 93, 92, 100, 94, 95, 99, 99, 90, 95, 95, 99,
98)
bucket3 sum:4706, content= (100, 100, 94, 94, 93, 91, 94, 93, 93, 92, 91, 91, 100, 96,
93, 93, 92, 92, 91, 97, 97, 98, 99, 100, 100, 100, 99, 100,
94, 94, 94, 99, 93, 94, 96, 100, 100, 99, 97, 99, 100, 100, 96, 94, 94, 99, 97, 98, 96)
bucket4 sum:4706, content= (95, 94, 94, 93, 92, 91, 91, 91, 91, 90, 90, 99, 99, 98, 98,
96, 95, 94, 94, 93, 92, 91, 90, 90, 96, 95, 98, 91, 92, 94,
97, 99, 98, 95, 94, 93, 97, 96, 100, 93, 97, 91, 93, 95, 92, 96, 94, 93, 91, 95)
bucket5 sum:4706, content= (97, 97, 97, 96, 95, 95, 95, 94, 94, 94, 93, 93, 93, 93, 92,
92, 92, 92, 92, 91, 91, 91, 91, 90, 90, 90, 90, 90, 99, 99,
96, 98, 98, 94, 92, 91, 90, 91, 96, 95, 97, 99, 96, 97, 92, 99, 99, 95, 96, 97)
bucket6 sum:4706, content= (90, 98, 98, 98, 97, 97, 96, 96, 96, 96, 95, 95, 95, 95, 95,
94, 94, 94, 94, 93, 93, 93, 93, 92, 92, 92, 92, 92, 91, 91,
91, 91, 91, 90, 90, 90, 90, 90, 90, 98, 98, 98, 97, 96, 96, 97, 98, 97, 93, 98)
bucket7 sum:4706, content= (90, 90, 90, 91, 99, 99, 99, 99, 99, 98, 98, 98, 98, 98, 96,
97, 97, 96, 96, 96, 96, 95, 95, 95, 95, 94, 94, 94, 94, 94,
94, 93, 93, 93, 93, 93, 90, 92, 92, 92, 91, 91, 91, 91, 91, 90, 90, 90, 90, 96)
bucket8 sum:4706, content= (100, 100, 100, 100, 100, 99, 99, 98, 96, 96, 95, 95, 93,
94, 94, 94, 94, 92, 92, 91, 91, 91, 91, 90, 90, 20, 94, 95, 94,

```

93, 98, 100, 95, 99, 98, 100, 99, 98, 97, 97, 99, 92, 94, 99, 96, 94, 92, 94, 96, 98)
 bucket9 sum:4705, content= (100, 100, 100, 100, 100, 99, 99, 99, 98, 98, 98, 97, 97,
 97, 97, 96, 96, 95, 95, 95, 94, 94, 94, 94, 94, 94, 93, 93, 93,
 92, 92, 92, 91, 91, 91, 90, 90, 90, 19, 14, 100, 99, 93, 94, 93, 92, 97, 97, 94, 98, 97)
 bucket10 sum:4704, content= (100, 100, 100, 100, 99, 99, 99, 99, 99, 98, 98, 97, 97,
 97, 97, 97, 96, 96, 96, 96, 95, 95, 95, 94, 94, 94, 94, 94, 94,
 93, 93, 93, 93, 93, 92, 92, 92, 92, 91, 91, 91, 91, 91, 90, 90, 90, 18, 13, 10, 99, 100,
 97)
 "----Comparison for the 89 example----"
 "***tf from benchmark was 4716(we added the number of machines) and target
 function from our local search is 4716"
 ***RESULT IS THE SAME
 Run time: 814.135 seconds
 "Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 20))
 "Mistakes(size-numberMistakes):" QMap()
 "Avegare error: 0"
 "-----END 90 from 93-----"
 "-----START 91 from 93-----"
 "input file number 91:
 inputName=C:/algo/h/docs/benchMark/all/NU_1_0500_25_0.txt and
 solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0500_0.txt"
 "***Data from file NU_1_0500_25_0.txt: machinesNum=25 jobsNum=500"
 "***SOLUTION Data from file SOL_NU_1_25_0500_0.txt: machinesNum=25
 jobsNum=500 lowerBound=1878 upperBound=1878
 isOptimal=1"
 Content of machines summed (1878, 1871, 1875, 1878, 1878, 1878, 1878, 1878,
 1871, 1878, 1878, 1878, 1878, 1878, 1878, 1878, 1878, 1878,
 1878, 1878, 1878, 1878, 1878, 1878)
 input selected: size 500 sum 46933
 ----Our Results-----
 best from Our local search found:
 target function = 1903, num of machines=25, square root lms=0
 machines content(number of jobs=500):
 bucket1 sum:1877, content= (98, 98, 98, 98, 100, 99, 99, 98, 98, 100, 100, 100, 98,
 98, 98, 98, 100, 99, 100)
 bucket2 sum:1876, content= (98, 98, 98, 98, 98, 98, 98, 98, 98, 98, 98, 6, 99, 99, 99,
 99, 99, 99, 100, 98)
 bucket3 sum:1876, content= (100, 100, 100, 99, 98, 98, 98, 99, 98, 98, 98, 98, 99,
 99, 99, 99, 99, 99)
 bucket4 sum:1876, content= (99, 99, 99, 100, 99, 99, 99, 99, 99, 98, 98, 98, 98, 98,
 98, 99, 99, 99, 99)
 bucket5 sum:1878, content= (95, 96, 90, 93, 90, 97, 92, 96, 92, 96, 91, 94, 96, 98, 91,
 91, 96, 98, 91, 95)
 bucket6 sum:1878, content= (97, 94, 94, 94, 94, 94, 94, 94, 92, 92, 90, 92, 96, 96, 91,
 98, 92, 90, 97, 97)
 bucket7 sum:1878, content= (97, 90, 92, 95, 92, 94, 95, 93, 94, 93, 93, 94, 91, 98, 93,

90, 97, 97, 97, 93)
bucket8 sum:1878, content= (90, 94, 91, 94, 95, 95, 95, 94, 91, 92, 94, 98, 98, 93, 92, 91, 92, 98, 98, 93)
bucket9 sum:1878, content= (91, 90, 90, 93, 93, 95, 95, 95, 95, 95, 95, 91, 91, 93, 95, 95, 98, 98, 95, 95)
bucket10 sum:1878, content= (94, 93, 93, 92, 90, 90, 90, 96, 96, 95, 92, 92, 95, 90, 94, 92, 100, 98, 97, 99)
bucket11 sum:1877, content= (93, 93, 93, 92, 90, 90, 96, 96, 96, 96, 96, 93, 90, 92, 95, 98, 96, 91, 92, 99)
bucket12 sum:1877, content= (95, 94, 93, 93, 93, 91, 90, 95, 96, 91, 96, 94, 96, 95, 95, 95, 100, 93, 91, 91)
bucket13 sum:1877, content= (94, 93, 93, 93, 91, 91, 91, 90, 90, 96, 96, 96, 96, 94, 94, 94, 94, 100, 97)
bucket14 sum:1877, content= (95, 94, 93, 93, 91, 91, 91, 90, 90, 96, 96, 96, 96, 95, 95, 95, 92, 92, 99, 97)
bucket15 sum:1877, content= (95, 95, 94, 93, 93, 91, 91, 91, 90, 90, 95, 93, 96, 96, 94, 96, 96, 92, 99, 97)
bucket16 sum:1877, content= (96, 96, 95, 95, 94, 93, 92, 92, 91, 91, 90, 90, 97, 96, 91, 96, 90, 96, 98, 98)
bucket17 sum:1877, content= (97, 96, 96, 95, 95, 94, 93, 93, 92, 91, 90, 90, 97, 97, 97, 97, 97, 90, 90, 90)
bucket18 sum:1878, content= (97, 96, 96, 95, 95, 94, 93, 93, 92, 91, 91, 90, 90, 97, 97, 97, 97, 97, 90, 90)
bucket19 sum:1878, content= (97, 96, 96, 95, 94, 93, 92, 92, 91, 91, 90, 90, 97, 97, 97, 97, 97, 90, 90, 96)
bucket20 sum:1878, content= (97, 96, 96, 95, 94, 93, 93, 92, 92, 91, 91, 90, 90, 97, 97, 97, 97, 97, 91, 92)
bucket21 sum:1878, content= (92, 97, 96, 96, 95, 95, 94, 93, 93, 92, 91, 91, 90, 90, 97, 97, 97, 97, 90, 95)
bucket22 sum:1878, content= (97, 97, 96, 96, 95, 94, 93, 93, 92, 92, 91, 90, 90, 97, 97, 97, 97, 90, 90, 94)
bucket23 sum:1878, content= (93, 93, 96, 97, 96, 96, 95, 95, 94, 93, 93, 92, 92, 91, 91, 90, 90, 97, 97, 97)
bucket24 sum:1877, content= (93, 92, 92, 91, 90, 20, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 9, 98, 92)
bucket25 sum:1876, content= (93, 93, 92, 92, 91, 91, 90, 14, 100, 7, 100, 100, 100, 100, 100, 100, 100, 100, 13, 100, 100, 100, 100)
"----Comparison for the 90 example----"
"***tf from benchmark was 1903(we added the number of machines) and target function from our local search is 1903"
***RESULT IS THE SAME
Run time: 17814.5 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 21))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 91 from 93-----"

```

"-----START 92 from 93-----"


```

bucket16 sum:1878, content= (100, 97, 96, 92, 91, 90, 90, 96, 92, 91, 96, 92, 97, 98, 98, 93, 94, 91, 90, 94)
 bucket17 sum:1878, content= (100, 99, 99, 98, 97, 92, 90, 90, 90, 99, 92, 90, 91, 91, 92, 94, 94, 94, 94, 92)
 bucket18 sum:1878, content= (100, 99, 98, 92, 92, 91, 90, 90, 98, 96, 96, 92, 92, 94, 93, 94, 92, 91, 90, 98)
 bucket19 sum:1878, content= (100, 100, 98, 98, 96, 96, 92, 91, 90, 90, 93, 98, 92, 94, 94, 91, 94, 91, 90, 90)
 bucket20 sum:1878, content= (99, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 100, 93, 91, 95)
 bucket21 sum:1878, content= (98, 100, 100, 98, 100, 100, 100, 98, 100, 100, 99, 98, 99, 99, 98, 99, 98, 98, 96)
 bucket22 sum:1877, content= (98, 100, 100, 100, 99, 99, 99, 98, 98, 99, 99, 99, 98, 99, 98, 99, 98, 99, 98)
 bucket23 sum:1877, content= (100, 100, 100, 97, 97, 100, 99, 98, 98, 98, 99, 100, 98, 99, 98, 99, 100, 98, 99)
 bucket24 sum:1876, content= (100, 100, 99, 98, 98, 98, 97, 13, 96, 96, 96, 12, 97, 97, 97, 97, 97, 97, 97, 97)
 bucket25 sum:1868, content= (100, 100, 99, 98, 98, 98, 97, 96, 96, 14, 7, 96, 96, 96, 96, 96, 96, 96, 2, 3)
 "----Comparison for the 91 example----"
 "****tf from benchmark was 1903(we added the number of machines) and target function from our local search is 1903"
 ***RESULT IS THE SAME
 Run time: 19237.9 seconds
 "Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 22))
 "Mistakes(size-numberMistakes):" QMap()
 "Avegare error: 0"
 "-----END 92 from 93-----"
 "-----START 93 from 93-----"
 "input file number 93:
 inputName=C:/algo/h/docs/benchMark/all/NU_1_0500_25_2.txt and
 solutionName=C:/algo/h/docs/benchMark/all/SOL_NU_1_25_0500_2.txt"
 "****Data from file NU_1_0500_25_2.txt: machinesNum=25 jobsNum=500"
 "****SOLUTION Data from file SOL_NU_1_25_0500_2.txt: machinesNum=25
 jobsNum=500 lowerBound=1876 upperBound=1876
 isOptimal=1"
 Content of machines summed (1876, 1876, 1876, 1876, 1875, 1870, 1876, 1875, 1875, 1875, 1875, 1875, 1875, 1875, 1875, 1875, 1876, 1875, 1875, 1875, 1875, 1875, 1875, 1876)
 input selected: size 500 sum 46877
 ----Our Results-----
 best from Our local search found:
 target function = 1901, num of machines=25, square root lms=0
 machines content(number of jobs=500):
 bucket1 sum:1876, content= (94, 94, 94, 94, 94, 94, 93, 95, 95, 95, 93, 95, 93, 91, 94,

92, 95, 94, 93, 94)
bucket2 sum:1876, content= (94, 94, 94, 92, 95, 94, 94, 94, 95, 94, 94, 94, 92, 95, 94, 95, 94, 95, 90, 93)
bucket3 sum:1876, content= (94, 94, 93, 95, 95, 93, 94, 93, 95, 93, 93, 95, 93, 95, 95, 95, 95, 92, 90, 94)
bucket4 sum:1876, content= (93, 95, 93, 95, 93, 95, 95, 93, 95, 91, 95, 95, 95, 92, 92, 93, 93, 95, 94, 94)
bucket5 sum:1876, content= (95, 95, 95, 91, 95, 91, 91, 92, 92, 96, 91, 96, 94, 92, 95, 96, 95, 96, 95, 93)
bucket6 sum:1876, content= (100, 98, 98, 92, 90, 90, 90, 92, 92, 96, 91, 98, 93, 93, 96, 94, 92, 92, 99, 90)
bucket7 sum:1876, content= (100, 98, 98, 93, 90, 90, 90, 93, 93, 98, 93, 96, 99, 91, 96, 93, 90, 94, 91, 90)
bucket8 sum:1876, content= (100, 96, 92, 90, 90, 90, 92, 96, 97, 97, 96, 97, 93, 93, 93, 99, 91, 92, 92, 90)
bucket9 sum:1876, content= (100, 100, 98, 98, 97, 93, 92, 90, 90, 90, 90, 98, 93, 93, 93, 93, 93, 90, 92, 93)
bucket10 sum:1876, content= (100, 100, 98, 98, 91, 90, 90, 90, 92, 90, 98, 96, 94, 92, 93, 93, 94, 94, 92, 91)
bucket11 sum:1876, content= (100, 97, 97, 96, 90, 90, 90, 97, 91, 97, 90, 90, 98, 98, 94, 93, 93, 92, 92, 91)
bucket12 sum:1876, content= (100, 99, 97, 97, 91, 91, 91, 90, 90, 97, 91, 92, 98, 98, 92, 94, 93, 92, 92, 91)
bucket13 sum:1876, content= (100, 99, 99, 97, 97, 92, 91, 91, 90, 90, 92, 97, 92, 92, 97, 92, 92, 93, 90, 93)
bucket14 sum:1876, content= (99, 99, 97, 97, 91, 91, 91, 90, 90, 91, 92, 99, 97, 91, 92, 98, 93, 92, 91, 95)
bucket15 sum:1876, content= (99, 99, 99, 97, 97, 91, 90, 90, 90, 91, 99, 97, 92, 93, 93, 94, 93, 91, 91, 90)
bucket16 sum:1876, content= (100, 99, 99, 99, 97, 91, 91, 91, 90, 90, 91, 97, 92, 92, 92, 92, 94, 94, 92, 93)
bucket17 sum:1876, content= (99, 99, 99, 97, 91, 91, 90, 90, 91, 92, 91, 98, 97, 93, 93, 94, 94, 94, 92, 91)
bucket18 sum:1876, content= (98, 100, 100, 100, 100, 100, 99, 100, 100, 99, 100, 98, 100, 98, 97, 97, 99, 99, 92)
bucket19 sum:1875, content= (96, 100, 100, 99, 99, 100, 99, 99, 97, 98, 100, 97, 99, 100, 98, 97, 100, 99, 98)
bucket20 sum:1876, content= (100, 100, 99, 100, 99, 99, 99, 98, 98, 99, 99, 97, 99, 98, 97, 100, 99, 98, 98)
bucket21 sum:1872, content= (100, 99, 99, 98, 12, 98, 97, 97, 97, 97, 97, 97, 98, 99, 99, 98, 97, 97, 98, 98)
bucket22 sum:1867, content= (100, 99, 99, 98, 98, 98, 97, 96, 18, 8, 96, 96, 96, 96, 96, 96, 96, 96, 96, 96)
bucket23 sum:1867, content= (100, 99, 99, 98, 98, 98, 97, 96, 11, 12, 95, 95, 95, 95, 95, 95, 8, 96, 96, 96, 96, 96, 96)
bucket24 sum:1876, content= (100, 99, 99, 98, 98, 98, 96, 90, 90, 90, 90, 90, 91, 91,

```
91, 93, 91, 92, 94, 95)
bucket25 sum:1876, content= (100, 99, 99, 98, 98, 98, 96, 90, 91, 92, 90, 90, 90, 90,
90, 91, 92, 93, 94, 95)
"----Comparison for the 92 example----"
"***tf from benchmark was 1901(we added the number of machines) and target
function from our local search is 1901"
***RESULT IS THE SAME
Run time: 15434 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 30)(100, 30)(500, 23))
"Mistakes(size-numberMistakes):" QMap()
"Avegare error: 0"
"-----END 93 from 93-----"
```

```

"***Data from file U_1_1000_05_0.txt: machinesNum=5 jobsNum=1000"
"***SOLUTION Data from file SOL_U_1_05_1000_0.txt: machinesNum=5 jobsNum=1000
lowerBound=9990 upperBound=9990
isOptimal=1"
Content of machines summed (9990, 9990, 9989, 9989, 9989)
input selected: size 1000 sum 49947
----Our Results-----
best from Our local search found:
target function = 9995, num of machines=5, square root lms=0
machines content(number of jobs=1000):
bucket1 sum:9990, content= (99, 99, 99, 97, 97, 97, 96, 96, 95, 95, 93, 93, 92, 92, 92, 91, 91,
90, 90, 89, 89, 87, 87, 87, 87, 86, 86, 85, 84, 84,
84, 84, 82, 82, 82, 81, 81, 81, 80, 80, 79, 78, 78, 78, 77, 76, 76, 75, 75, 75, 74, 74, 73, 73, 72,
72, 71, 71, 71, 70, 70, 69, 69, 68, 67, 67, 67, 66,
66, 66, 65, 64, 63, 63, 63, 62, 61, 60, 60, 60, 58, 58, 58, 58, 57, 56, 56, 55, 55, 55, 54, 54, 53,
53, 53, 52, 52, 51, 51, 51, 51, 51, 50, 49, 49, 48,
47, 47, 47, 46, 46, 44, 44, 44, 44, 43, 42, 42, 42, 41, 40, 40, 40, 38, 38, 37, 36, 36, 35, 35, 35,
34, 34, 33, 33, 32, 31, 31, 30, 30, 30, 29, 29, 28,
28, 28, 27, 26, 26, 26, 26, 25, 25, 23, 23, 23, 23, 22, 21, 21, 20, 20, 20, 20, 18, 18, 18, 18, 17,
16, 16, 16, 15, 14, 14, 13, 12, 11, 11, 10, 10, 10, 9,
8, 8, 8, 8, 7, 7, 7, 5, 5, 4, 4, 3, 3, 3, 2, 1, 1)
bucket2 sum:9990, content= (99, 99, 99, 97, 97, 96, 96, 96, 96, 94, 94, 93, 92, 92, 92, 91, 91,
90, 90, 89, 88, 88, 87, 87, 86, 86, 86, 85, 85, 84,
84, 83, 83, 82, 82, 81, 81, 81, 80, 80, 79, 78, 78, 78, 77, 76, 76, 75, 75, 75, 74, 73, 73, 73, 73,
72, 71, 71, 70, 70, 70, 70, 69, 68, 67, 67, 67, 66,
66, 66, 64, 64, 64, 63, 63, 62, 61, 60, 60, 59, 59, 58, 58, 57, 57, 56, 56, 56, 55, 55, 54, 54, 53,
53, 52, 52, 52, 52, 51, 51, 51, 50, 50, 50, 49, 48,
47, 47, 47, 46, 45, 45, 44, 44, 43, 43, 43, 42, 42, 41, 40, 40, 39, 39, 37, 37, 37, 36, 35, 35, 35,
34, 34, 33, 32, 32, 32, 31, 30, 30, 29, 29, 29, 29,
28, 28, 27, 26, 26, 26, 26, 25, 24, 24, 23, 23, 22, 22, 21, 21, 21, 20, 20, 20, 18, 18, 18, 17, 17,
17, 16, 15, 15, 14, 14, 13, 13, 11, 11, 10, 10, 9, 9,
9, 8, 8, 8, 7, 7, 6, 6, 5, 4, 4, 3, 3, 3, 2, 1, 1)
bucket3 sum:9989, content= (99, 99, 98, 98, 97, 96, 96, 96, 95, 95, 94, 93, 92, 92, 91, 91, 91,
91, 90, 89, 88, 88, 87, 87, 86, 86, 86, 85, 85, 84,
84, 83, 83, 82, 81, 81, 81, 81, 81, 80, 79, 78, 78, 78, 77, 76, 76, 75, 75, 74, 74, 74, 73, 73, 73,
71, 71, 71, 71, 70, 70, 69, 69, 68, 68, 67, 67, 66,
66, 65, 65, 64, 64, 63, 63, 61, 61, 61, 60, 59, 59, 58, 58, 57, 57, 56, 56, 56, 55, 55, 54, 54, 53,
53, 52, 52, 52, 52, 51, 51, 51, 50, 50, 50, 48, 48,
48, 47, 47, 46, 45, 45, 44, 44, 43, 43, 43, 42, 42, 41, 40, 40, 39, 39, 37, 37, 37, 36, 35, 35, 35,
34, 34, 33, 32, 32, 31, 31, 31, 30, 29, 29, 29, 28,
28, 28, 27, 27, 26, 26, 26, 25, 24, 24, 23, 23, 22, 22, 21, 21, 21, 20, 20, 19, 19, 18, 18, 17, 17,
17, 16, 15, 15, 14, 14, 13, 12, 12, 11, 10, 10, 9, 9,
9, 8, 8, 8, 7, 7, 6, 6, 5, 4, 4, 3, 3, 3, 1, 1, 1)
bucket4 sum:9989, content= (99, 99, 98, 98, 97, 96, 96, 96, 95, 95, 94, 93, 92, 92, 91, 91, 91,
91, 90, 89, 88, 88, 87, 87, 86, 86, 86, 85, 85, 84,
84, 83, 82, 82, 82, 81, 81, 81, 81, 80, 79, 78, 78, 77, 77, 77, 75, 75, 75, 75, 74, 74, 73, 73, 72,

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72, 71, 71, 71, 70, 70, 69, 69, 68, 68, 67, 67, 66,
 66, 65, 65, 64, 64, 63, 63, 61, 61, 61, 60, 59, 59, 58, 58, 57, 57, 56, 56, 56, 55, 55, 54, 54, 53,
 53, 52, 52, 52, 51, 51, 51, 51, 51, 50, 50, 48, 48,
 48, 47, 46, 46, 46, 45, 44, 44, 43, 43, 43, 42, 41, 41, 41, 40, 39, 38, 38, 37, 36, 36, 36, 35, 35,
 34, 33, 33, 33, 32, 31, 31, 31, 30, 29, 29, 29, 28,
 28, 28, 27, 27, 26, 26, 25, 25, 25, 24, 23, 23, 22, 22, 21, 21, 21, 20, 20, 19, 18, 18, 18, 18, 17,
 17, 16, 15, 15, 14, 14, 13, 12, 12, 11, 10, 10, 9, 9,
 9, 8, 8, 7, 7, 7, 7, 6, 5, 4, 4, 3, 3, 2, 2, 1, 1)
 bucket5 sum:9989, content= (99, 99, 98, 98, 97, 96, 96, 96, 95, 95, 93, 93, 93, 92, 91, 91, 91,
 91, 90, 89, 88, 88, 87, 87, 86, 86, 86, 85, 85, 84,
 84, 83, 82, 82, 82, 81, 81, 81, 80, 80, 80, 78, 78, 77, 77, 76, 76, 75, 75, 75, 74, 74, 73, 73, 72,
 72, 71, 71, 71, 70, 70, 69, 69, 68, 68, 67, 66, 66,
 66, 66, 65, 64, 64, 63, 62, 62, 61, 60, 60, 60, 59, 58, 58, 57, 57, 56, 56, 56, 55, 54, 54, 54, 53,
 53, 53, 52, 52, 51, 51, 51, 51, 51, 50, 49, 49, 48,
 48, 47, 46, 46, 46, 45, 44, 44, 43, 43, 42, 42, 42, 41, 41, 40, 39, 38, 38, 37, 36, 36, 35, 35, 35,
 34, 34, 33, 33, 32, 31, 31, 30, 30, 30, 29, 29, 28,
 28, 28, 27, 26, 26, 26, 26, 25, 25, 24, 23, 23, 22, 22, 21, 21, 20, 20, 20, 20, 18, 18, 18, 18, 17,
 17, 16, 15, 15, 14, 14, 13, 12, 12, 11, 10, 10, 9, 9,
 8, 8, 8, 8, 7, 7, 7, 6, 5, 4, 3, 3, 3, 3, 2, 1, 1)
 "----Comparison for the 100 example----"
 "****tf from benchmark was 9995(we added the number of machines) and target function
 from our local search is 9995"
 ***RESULT IS THE SAME
 Run time: 0.016 seconds
 "Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 1))

 "Avegare error: 0"
 "-----END 101 from 130-----"
 "-----START 102 from 130-----"
 "input file number 102: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_05_1.txt and
 solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_05_1000_1.txt"
 "****Data from file U_1_1000_05_1.txt: machinesNum=5 jobsNum=1000"
 "****SOLUTION Data from file SOL_U_1_05_1000_1.txt: machinesNum=5 jobsNum=1000
 lowerBound=10263 upperBound=10263
 isOptimal=1"
 Content of machines summed (10263, 10263, 10263, 10262, 10262)
 input selected: size 1000 sum 51313
 ----Our Results-----
 best from Our local search found:
 target function = 10268, num of machines=5, square root lms=0
 machines content(number of jobs=1000):
 bucket1 sum:10263, content= (99, 99, 98, 98, 98, 97, 96, 96, 96, 95, 95, 94, 94, 93, 93, 93,
 92, 91, 91, 90, 90, 90, 88, 88, 88, 87, 87, 86, 86, 85,
 85, 84, 83, 83, 83, 83, 82, 81, 81, 80, 79, 79, 78, 78, 78, 77, 77, 77, 76, 76, 75, 74, 74, 74, 73,
 72, 72, 72, 71, 71, 71, 70, 69, 69, 69, 68, 68, 68,
 67, 66, 65, 65, 65, 64, 64, 63, 63, 62, 62, 61, 61, 60, 59, 59, 59, 57, 57, 57, 56, 56, 55, 55, 55,
 54, 53, 53, 53, 52, 52, 51, 51, 50, 50, 49, 49, 49,

47, 47, 47, 47, 46, 46, 45, 45, 45, 43, 43, 43, 42, 42, 41, 41, 41, 40, 40, 39, 39, 39, 38, 38, 37,
37, 37, 36, 35, 35, 35, 34, 34, 33, 32, 32, 32, 32,
31, 30, 30, 29, 29, 29, 29, 28, 28, 27, 26, 26, 26, 24, 24, 24, 23, 23, 22, 22, 22, 21, 20, 20, 19,
18, 17, 17, 17, 15, 15, 15, 15, 14, 13, 13, 12, 12,
11, 11, 9, 9, 9, 7, 6, 6, 6, 5, 4, 4, 4, 3, 2, 2, 2, 1)
bucket2 sum:10263, content= (99, 99, 98, 98, 97, 97, 97, 96, 96, 95, 95, 94, 93, 93, 93, 93,
92, 92, 91, 90, 90, 90, 88, 88, 88, 87, 87, 86, 86, 85,
84, 84, 84, 83, 83, 83, 82, 81, 81, 80, 79, 79, 78, 78, 78, 77, 77, 77, 76, 76, 75, 74, 74, 74, 73,
72, 72, 72, 71, 71, 71, 70, 69, 69, 69, 68, 68, 67,
67, 67, 65, 65, 65, 64, 64, 63, 62, 62, 62, 62, 60, 60, 60, 59, 58, 58, 57, 57, 56, 56, 55, 55, 55,
54, 53, 53, 53, 52, 52, 51, 51, 50, 50, 49, 49, 48,
48, 47, 47, 47, 46, 46, 45, 45, 45, 43, 43, 42, 42, 42, 42, 41, 41, 40, 40, 39, 39, 39, 38, 38, 37,
37, 37, 36, 35, 35, 34, 34, 34, 33, 33, 32, 32, 31,
31, 31, 30, 29, 29, 29, 29, 28, 28, 27, 26, 26, 25, 25, 24, 24, 23, 23, 22, 22, 22, 21, 20, 20, 19,
18, 17, 17, 17, 15, 15, 15, 15, 14, 13, 13, 12, 12,
11, 11, 9, 9, 9, 7, 6, 6, 6, 5, 4, 4, 4, 3, 2, 2, 2, 1)
bucket3 sum:10263, content= (99, 99, 98, 98, 97, 97, 96, 96, 96, 95, 95, 95, 93, 93, 93, 93,
92, 91, 91, 91, 90, 89, 89, 88, 87, 87, 87, 86, 86, 86,
84, 84, 84, 83, 83, 82, 82, 82, 80, 80, 80, 79, 78, 78, 78, 77, 77, 77, 76, 76, 75, 74, 74, 73, 73,
73, 72, 72, 71, 71, 71, 70, 69, 69, 69, 68, 68, 67,
67, 67, 65, 65, 64, 64, 64, 64, 62, 62, 62, 61, 61, 60, 60, 59, 58, 58, 57, 57, 56, 56, 55, 55, 55,
54, 53, 53, 53, 52, 52, 51, 51, 50, 50, 49, 49, 48,
48, 47, 47, 47, 46, 46, 45, 45, 44, 44, 43, 42, 42, 42, 42, 41, 41, 40, 40, 39, 39, 39, 38, 38, 37,
37, 37, 36, 35, 35, 34, 34, 34, 33, 33, 32, 32, 31,
31, 30, 30, 30, 29, 29, 28, 28, 28, 28, 26, 26, 25, 25, 24, 23, 23, 23, 23, 22, 21, 21, 21, 19, 19,
19, 17, 17, 16, 16, 15, 15, 15, 14, 13, 13, 12, 12,
11, 10, 10, 9, 8, 8, 6, 6, 5, 5, 5, 4, 3, 3, 3, 2, 2, 1)
bucket4 sum:10262, content= (99, 99, 98, 98, 97, 97, 96, 96, 96, 95, 95, 94, 94, 93, 93, 93,
92, 91, 91, 91, 90, 89, 89, 88, 87, 87, 87, 86, 86, 85,
85, 84, 84, 83, 83, 82, 82, 81, 81, 80, 80, 79, 78, 78, 78, 77, 77, 77, 76, 75, 75, 75, 74, 73, 73,
73, 72, 72, 71, 71, 70, 70, 69, 69, 69, 68, 68, 68,
67, 67, 65, 65, 64, 64, 64, 63, 63, 62, 62, 61, 61, 60, 60, 59, 58, 58, 57, 57, 56, 56, 55, 55, 54,
54, 54, 53, 53, 52, 51, 51, 51, 50, 50, 49, 49, 49,
48, 47, 47, 47, 46, 46, 45, 45, 44, 44, 43, 42, 42, 42, 42, 41, 41, 40, 40, 39, 39, 39, 38, 38, 37,
37, 36, 36, 36, 35, 34, 34, 34, 33, 33, 32, 32, 31,
31, 30, 30, 30, 29, 29, 28, 28, 28, 28, 26, 26, 25, 25, 24, 23, 23, 23, 23, 22, 21, 21, 21, 19, 19,
18, 18, 17, 16, 16, 15, 15, 14, 14, 14, 13, 12, 12,
11, 10, 10, 9, 8, 7, 7, 6, 5, 5, 5, 4, 3, 3, 3, 2, 1, 1)
bucket5 sum:10262, content= (99, 98, 98, 98, 98, 97, 96, 96, 96, 95, 95, 94, 94, 93, 93, 93,
92, 91, 91, 91, 90, 89, 88, 88, 88, 87, 87, 86, 86, 85,
85, 84, 84, 83, 83, 82, 82, 81, 81, 80, 80, 78, 78, 78, 78, 77, 77, 77, 76, 76, 75, 74, 74, 74, 73,
73, 72, 72, 71, 71, 70, 70, 69, 69, 69, 68, 68, 68,
67, 66, 66, 65, 64, 64, 64, 63, 63, 62, 62, 61, 61, 60, 59, 59, 59, 57, 57, 57, 56, 56, 56, 55, 54,
54, 54, 53, 52, 52, 52, 51, 51, 50, 50, 49, 49, 49,
48, 47, 47, 46, 46, 46, 45, 45, 45, 44, 43, 42, 42, 42, 41, 41, 41, 40, 40, 39, 39, 39, 38, 38, 38,
37, 36, 36, 35, 35, 35, 34, 34, 33, 33, 32, 32, 31,

31, 30, 30, 29, 29, 29, 29, 28, 28, 27, 27, 26, 25, 24, 24, 24, 23, 23, 23, 22, 21, 21, 20, 20, 19,
18, 17, 17, 17, 16, 15, 15, 14, 14, 13, 13, 13, 12,
11, 10, 9, 9, 9, 7, 6, 6, 5, 5, 4, 3, 3, 2, 2, 2, 1)

"----Comparison for the 101 example----

****tf from benchmark was 10268(we added the number of machines) and target function
from our local search is 10268"

***RESULT IS THE SAME

Run time: 0 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 2))

"Avegare error: 0"

"-----END 102 from 130-----"

"-----START 103 from 130-----"

"input file number 103: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_05_2.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_05_1000_2.txt"

****Data from file U_1_1000_05_2.txt: machinesNum=5 jobsNum=1000"

****SOLUTION Data from file SOL_U_1_05_1000_2.txt: machinesNum=5 jobsNum=1000
lowerBound=10073 upperBound=10073

isOptimal=1"

Content of machines summed (10073, 10073, 10073, 10072, 10072)

input selected: size 1000 sum 50363

----Our Results-----

best from Our local search found:

target function = 10078, num of machines=5, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:10073, content= (99, 99, 98, 98, 97, 97, 96, 96, 95, 95, 94, 94, 93, 92, 92, 92,
91, 90, 89, 89, 89, 87, 87, 87, 86, 86, 86, 85, 85, 84,
84, 84, 83, 83, 83, 82, 82, 82, 81, 81, 81, 80, 80, 79, 79, 79, 77, 77, 76, 76, 75, 75, 74, 74, 74,
73, 73, 73, 72, 72, 71, 70, 69, 69, 69, 68, 68, 67,
66, 66, 66, 66, 65, 64, 64, 64, 63, 62, 62, 62, 61, 60, 60, 60, 59, 58, 58, 57, 57, 56, 56, 56, 55,
55, 55, 54, 54, 53, 53, 53, 53, 52, 51, 50, 50, 49,
49, 48, 48, 46, 46, 46, 45, 44, 44, 43, 42, 42, 42, 41, 40, 39, 39, 39, 37, 37, 37, 36, 35, 35, 35,
34, 33, 33, 32, 31, 31, 31, 30, 30, 29, 29, 29, 28,
28, 27, 27, 26, 25, 25, 25, 24, 24, 23, 22, 22, 21, 21, 20, 20, 20, 19, 19, 18, 18, 17, 17, 17, 17,
16, 15, 14, 14, 14, 13, 13, 12, 12, 12, 11, 10, 10, 9,
8, 8, 7, 6, 6, 6, 5, 5, 4, 4, 3, 3, 2, 2, 2, 1, 1)

bucket2 sum:10073, content= (99, 99, 98, 97, 97, 97, 97, 96, 95, 95, 94, 93, 93, 92, 92, 92,
91, 91, 89, 89, 88, 88, 87, 86, 86, 86, 86, 86, 85, 84,
84, 84, 83, 83, 83, 82, 82, 82, 81, 81, 81, 80, 80, 79, 79, 78, 78, 77, 76, 76, 75, 75, 74, 74, 74,
73, 73, 73, 72, 72, 71, 70, 69, 69, 69, 68, 67, 67,
67, 66, 66, 66, 65, 64, 64, 64, 63, 62, 62, 62, 61, 60, 60, 60, 58, 58, 58, 58, 57, 56, 56, 56, 55,
55, 55, 54, 54, 53, 53, 53, 52, 52, 52, 50, 49, 49,
49, 49, 47, 47, 46, 46, 45, 44, 43, 43, 43, 42, 41, 41, 41, 39, 39, 38, 38, 37, 36, 36, 36, 35, 35,
34, 33, 33, 32, 31, 31, 31, 30, 30, 29, 29, 29, 28,
28, 27, 27, 26, 25, 25, 25, 24, 23, 23, 22, 22, 22, 21, 20, 20, 20, 19, 19, 18, 18, 17, 17, 17, 16,
16, 16, 14, 14, 14, 13, 13, 12, 12, 12, 11, 10, 10, 9,
8, 8, 7, 6, 6, 6, 5, 5, 4, 3, 3, 3, 3, 2, 2, 1, 1)

bucket3 sum:10073, content= (99, 99, 98, 97, 97, 97, 97, 96, 95, 95, 94, 93, 93, 92, 92, 92, 91, 90, 90, 89, 88, 88, 87, 86, 86, 86, 86, 85, 85, 85, 84, 84, 83, 83, 83, 82, 82, 81, 81, 81, 81, 80, 80, 80, 79, 78, 78, 77, 76, 76, 75, 75, 74, 74, 74, 73, 73, 73, 72, 71, 71, 71, 69, 69, 68, 68, 68, 67, 67, 66, 66, 66, 65, 64, 64, 64, 63, 62, 62, 61, 61, 61, 60, 59, 59, 58, 58, 57, 57, 57, 56, 56, 55, 55, 55, 54, 54, 53, 53, 53, 52, 52, 51, 50, 50, 49, 49, 49, 47, 47, 46, 46, 45, 44, 43, 43, 43, 42, 41, 41, 40, 40, 39, 38, 38, 37, 36, 36, 36, 35, 35, 34, 33, 32, 32, 32, 31, 31, 30, 30, 29, 29, 29, 28, 28, 27, 26, 26, 26, 25, 25, 24, 23, 23, 22, 22, 21, 21, 21, 20, 20, 19, 19, 18, 18, 17, 17, 17, 16, 16, 15, 15, 14, 13, 13, 13, 13, 12, 12, 11, 10, 9, 9, 9, 8, 7, 6, 6, 6, 5, 4, 4, 4, 3, 3, 3, 2, 2, 1, 1)

bucket4 sum:10072, content= (99, 99, 98, 97, 97, 97, 97, 96, 95, 95, 94, 93, 93, 92, 92, 92, 91, 90, 90, 89, 88, 88, 87, 86, 86, 86, 86, 85, 85, 84, 84, 84, 83, 83, 82, 82, 81, 81, 81, 81, 80, 80, 80, 79, 78, 78, 77, 76, 76, 75, 75, 74, 74, 74, 73, 73, 72, 72, 72, 71, 70, 70, 69, 68, 68, 68, 67, 67, 66, 66, 66, 65, 64, 64, 63, 63, 63, 62, 61, 61, 61, 60, 59, 59, 58, 58, 57, 57, 57, 56, 56, 55, 55, 54, 54, 54, 54, 53, 53, 52, 52, 51, 50, 50, 49, 49, 48, 48, 47, 46, 46, 45, 44, 43, 43, 42, 42, 42, 41, 40, 40, 39, 38, 38, 37, 36, 36, 36, 35, 34, 34, 33, 33, 32, 32, 31, 30, 30, 30, 30, 29, 29, 28, 27, 27, 27, 26, 26, 25, 25, 24, 23, 23, 22, 22, 21, 21, 21, 20, 19, 19, 19, 19, 18, 17, 17, 17, 16, 16, 15, 15, 14, 13, 13, 13, 13, 12, 12, 11, 10, 9, 9, 9, 8, 7, 6, 6, 5, 5, 5, 4, 4, 3, 3, 2, 2, 2, 1, 1)

bucket5 sum:10072, content= (99, 99, 98, 97, 97, 97, 96, 96, 96, 94, 94, 94, 93, 92, 92, 92, 91, 90, 90, 89, 88, 87, 87, 87, 86, 86, 86, 85, 85, 84, 84, 84, 83, 83, 83, 82, 82, 82, 81, 81, 81, 80, 80, 80, 79, 78, 77, 77, 76, 76, 76, 75, 74, 74, 74, 73, 73, 72, 72, 72, 71, 70, 70, 69, 68, 68, 68, 67, 67, 66, 66, 65, 65, 65, 64, 63, 63, 63, 62, 61, 61, 61, 60, 59, 59, 58, 58, 57, 57, 56, 56, 56, 56, 55, 54, 54, 54, 53, 53, 53, 53, 52, 51, 50, 50, 49, 49, 48, 48, 47, 46, 46, 44, 44, 44, 43, 42, 42, 42, 41, 40, 40, 39, 38, 38, 37, 36, 36, 36, 35, 34, 34, 33, 33, 32, 32, 31, 30, 30, 30, 30, 29, 28, 28, 28, 27, 27, 26, 26, 25, 24, 24, 24, 23, 22, 22, 21, 21, 20, 20, 20, 19, 19, 18, 18, 18, 17, 17, 16, 16, 15, 15, 14, 13, 13, 13, 13, 12, 11, 11, 10, 10, 9, 8, 8, 7, 7, 6, 5, 5, 5, 4, 4, 3, 3, 2, 2, 2, 1, 1)

"----Comparison for the 102 example----

****tf from benchmark was 10078(we added the number of machines) and target function from our local search is 10078"

***RESULT IS THE SAME

Run time: 0.016 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 3))

"Avegare error: 0"

"-----END 103 from 130-----"

"-----START 104 from 130-----"

"input file number 104: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_05_3.txt and solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_05_1000_3.txt"

****Data from file U_1_1000_05_3.txt: machinesNum=5 jobsNum=1000"

****SOLUTION Data from file SOL_U_1_05_1000_3.txt: machinesNum=5 jobsNum=1000

lowerBound=10106 upperBound=10106

isOptimal=1"

Content of machines summed (10106, 10106, 10105, 10105, 10105)

input selected: size 1000 sum 50527

----Our Results-----

best from Our local search found:

target function = 10111, num of machines=5, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:10106, content= (99, 99, 99, 99, 98, 98, 98, 97, 97, 95, 95, 95, 94, 93, 93, 92, 92, 92, 91, 91, 90, 89, 89, 88, 87, 86, 86, 85, 84, 84, 83, 83, 82, 82, 81, 81, 81, 80, 80, 80, 79, 78, 78, 77, 77, 77, 76, 76, 75, 75, 75, 75, 74, 73, 72, 72, 72, 71, 70, 70, 69, 69, 68, 68, 67, 67, 67, 66, 66, 65, 65, 65, 65, 65, 64, 64, 63, 62, 62, 61, 61, 60, 60, 60, 59, 59, 58, 58, 58, 57, 56, 56, 55, 54, 54, 53, 53, 53, 53, 51, 51, 50, 50, 49, 49, 48, 47, 47, 46, 45, 45, 44, 44, 43, 43, 42, 42, 41, 41, 41, 41, 40, 40, 40, 39, 38, 38, 37, 37, 36, 36, 35, 35, 35, 34, 34, 33, 33, 33, 32, 31, 31, 30, 29, 29, 29, 28, 27, 27, 26, 26, 25, 24, 24, 24, 23, 23, 22, 21, 21, 20, 20, 19, 19, 18, 18, 17, 17, 16, 16, 16, 15, 14, 14, 14, 13, 13, 13, 12, 12, 11, 11, 10, 10, 9, 9, 7, 7, 7, 6, 6, 5, 5, 4, 3, 3, 3, 2, 1, 1)

bucket2 sum:10106, content= (99, 99, 99, 99, 98, 98, 98, 97, 96, 96, 95, 94, 94, 94, 93, 92, 92, 92, 91, 91, 90, 89, 89, 87, 87, 87, 85, 85, 85, 84, 83, 83, 82, 82, 81, 81, 81, 80, 80, 80, 79, 78, 78, 77, 77, 77, 76, 76, 75, 75, 75, 74, 74, 73, 73, 72, 72, 71, 70, 69, 69, 69, 69, 67, 67, 67, 67, 67, 66, 65, 65, 65, 65, 65, 64, 63, 63, 63, 62, 61, 61, 60, 60, 60, 59, 59, 58, 58, 58, 57, 56, 55, 55, 55, 54, 53, 53, 53, 52, 52, 51, 50, 50, 49, 48, 48, 48, 46, 46, 46, 46, 45, 44, 44, 43, 43, 42, 42, 41, 41, 41, 41, 40, 40, 40, 40, 39, 39, 38, 37, 36, 36, 36, 35, 35, 35, 34, 34, 34, 33, 32, 32, 32, 31, 30, 29, 29, 29, 28, 27, 27, 26, 25, 25, 25, 24, 23, 23, 23, 22, 21, 21, 20, 20, 20, 19, 18, 17, 17, 17, 17, 16, 15, 15, 15, 14, 14, 13, 13, 13, 12, 12, 11, 11, 10, 10, 9, 8, 8, 7, 7, 6, 6, 5, 5, 4, 3, 3, 3, 2, 1, 1)

bucket3 sum:10105, content= (99, 99, 99, 99, 98, 98, 97, 97, 97, 96, 95, 94, 94, 93, 93, 93, 92, 92, 91, 90, 90, 90, 88, 88, 87, 87, 85, 85, 85, 84, 83, 83, 82, 82, 81, 81, 81, 80, 80, 79, 79, 79, 78, 77, 77, 77, 76, 75, 75, 75, 75, 75, 74, 73, 73, 72, 72, 71, 70, 69, 69, 69, 68, 68, 67, 67, 67, 67, 66, 65, 65, 65, 65, 64, 64, 64, 63, 63, 62, 61, 61, 60, 60, 59, 59, 59, 59, 58, 57, 57, 56, 56, 55, 55, 54, 53, 53, 53, 52, 52, 51, 50, 50, 49, 48, 48, 47, 47, 46, 45, 45, 45, 43, 43, 43, 43, 42, 41, 41, 41, 41, 40, 40, 40, 40, 39, 39, 38, 37, 36, 36, 36, 35, 35, 35, 34, 34, 34, 33, 32, 32, 32, 30, 30, 30, 29, 28, 28, 28, 27, 26, 25, 25, 25, 24, 23, 23, 23, 22, 21, 21, 20, 20, 19, 19, 19, 17, 17, 17, 17, 16, 15, 15, 14, 14, 14, 14, 13, 12, 12, 12, 11, 11, 11, 10, 9, 8, 8, 7, 7, 6, 6, 5, 4, 4, 4, 3, 3, 1, 1, 1)

bucket4 sum:10105, content= (99, 99, 99, 99, 98, 98, 97, 97, 97, 96, 95, 94, 94, 93, 93, 93, 92, 92, 91, 90, 90, 90, 88, 88, 87, 87, 85, 85, 85, 84, 83, 82, 82, 82, 81, 81, 81, 80, 80, 80, 79, 78, 78, 78, 77, 76, 76, 76, 75, 75, 75, 75, 74, 73, 73, 72, 71, 71, 70, 70, 69, 69, 68, 68, 67, 67, 67, 66, 66, 66, 65, 65, 65, 64, 64, 64, 63, 63, 61, 61, 61, 60, 60, 60, 59, 59, 59, 58, 57, 57, 56, 56, 55,

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55, 54, 53, 53, 53, 52, 52, 51, 50, 49, 49, 49, 48,
47, 47, 46, 45, 45, 44, 44, 43, 43, 43, 42, 41, 41, 41, 40, 40, 40, 40, 39, 39, 38, 37, 36, 36, 36,
35, 35, 35, 34, 34, 33, 33, 33, 32, 31, 31, 30, 29,
29, 29, 28, 28, 26, 26, 26, 25, 24, 24, 24, 23, 23, 22, 21, 21, 20, 20, 19, 19, 18, 18, 17, 17, 16,
16, 16, 15, 14, 14, 14, 13, 13, 13, 12, 12, 11, 11,
10, 10, 10, 8, 7, 7, 7, 6, 6, 5, 5, 4, 4, 3, 2, 2, 1, 1)
bucket5 sum:10105, content= (99, 99, 99, 98, 98, 98, 98, 97, 97, 96, 95, 94, 94, 93, 93, 93,
92, 92, 91, 90, 90, 90, 88, 88, 87, 86, 86, 85, 85, 84,
83, 82, 82, 82, 81, 81, 81, 80, 80, 80, 79, 78, 78, 77, 77, 77, 76, 76, 75, 75, 75, 75, 74, 73, 73,
72, 71, 71, 70, 70, 69, 69, 68, 68, 67, 67, 67, 66,
66, 66, 65, 65, 65, 64, 64, 64, 63, 63, 61, 61, 61, 60, 60, 60, 59, 59, 58, 58, 58, 57, 56, 56, 55,
54, 54, 54, 53, 53, 52, 52, 51, 50, 49, 49, 49, 48,
47, 47, 46, 45, 45, 44, 44, 43, 43, 42, 42, 42, 41, 41, 40, 40, 40, 40, 39, 38, 38, 37, 37, 36, 36,
35, 35, 35, 34, 34, 33, 33, 33, 32, 31, 31, 30, 29,
29, 29, 28, 27, 27, 26, 26, 25, 24, 24, 24, 23, 23, 22, 21, 21, 20, 20, 19, 19, 18, 18, 17, 17, 16,
16, 16, 15, 14, 14, 14, 13, 13, 13, 12, 12, 11, 11,
10, 10, 10, 8, 7, 7, 7, 6, 6, 5, 5, 4, 4, 3, 2, 2, 1, 1)
"----Comparison for the 103 example----"
"****tf from benchmark was 10111(we added the number of machines) and target function
from our local search is 10111"
***RESULT IS THE SAME
Run time: 0.015 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 4))

"Avegare error: 0"
"-----END 104 from 130-----"
"-----START 105 from 130-----"
"input file number 105: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_05_4.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_05_1000_4.txt"
"***Data from file U_1_1000_05_4.txt: machinesNum=5 jobsNum=1000"
"***SOLUTION Data from file SOL_U_1_05_1000_4.txt: machinesNum=5 jobsNum=1000
lowerBound=9904 upperBound=9904
isOptimal=1"
Content of machines summed (9904, 9903, 9903, 9903, 9903)
input selected: size 1000 sum 49516
----Our Results-----
best from Our local search found:
target function = 9909, num of machines=5, square root lms=0
machines content(number of jobs=1000):
bucket1 sum:9904, content= (99, 99, 98, 98, 97, 97, 96, 96, 95, 95, 95, 94, 94, 93, 93, 93, 92,
91, 91, 91, 90, 90, 88, 88, 87, 87, 86, 86, 86, 85,
85, 84, 84, 83, 83, 82, 82, 81, 81, 81, 80, 80, 78, 77, 77, 76, 76, 75, 75, 74, 74, 73, 73, 72, 72,
71, 71, 70, 70, 69, 69, 68, 67, 67, 66, 66, 65, 65,
64, 64, 63, 63, 62, 61, 61, 61, 60, 60, 60, 59, 59, 59, 58, 58, 57, 57, 57, 57, 56, 55, 55, 55, 54,
54, 54, 53, 53, 52, 52, 51, 51, 50, 50, 49, 48, 48,
48, 47, 47, 46, 46, 45, 44, 44, 44, 43, 43, 43, 42, 40, 40, 39, 38, 37, 37, 37, 36, 36, 35, 35, 35,
34, 33, 32, 32, 31, 30, 30, 30, 28, 28, 27, 27, 26,

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26, 26, 24, 24, 24, 24, 23, 22, 22, 21, 21, 21, 20, 19, 19, 18, 18, 17, 16, 16, 16, 15, 15, 15, 14,
14, 14, 13, 13, 13, 12, 12, 11, 11, 11, 10, 9, 9, 9, 8,
8, 8, 7, 6, 6, 6, 5, 5, 4, 4, 3, 3, 3, 2, 1, 1)
bucket2 sum:9903, content= (99, 98, 98, 98, 98, 97, 96, 96, 95, 95, 95, 94, 94, 93, 93, 93, 92,
91, 91, 91, 90, 90, 88, 88, 87, 87, 86, 86, 86, 85,
85, 84, 84, 83, 83, 82, 82, 81, 81, 81, 80, 79, 79, 77, 77, 76, 76, 75, 75, 74, 74, 73, 72, 72, 72,
72, 70, 70, 70, 70, 69, 68, 67, 66, 66, 66, 66, 65,
64, 64, 63, 63, 62, 61, 61, 61, 60, 60, 59, 59, 59, 59, 59, 58, 57, 57, 57, 57, 56, 55, 55, 55, 54,
54, 54, 53, 53, 52, 52, 51, 51, 50, 49, 49, 49, 48,
47, 47, 47, 46, 46, 46, 44, 44, 44, 43, 43, 43, 41, 41, 40, 39, 38, 37, 37, 36, 36, 36, 36, 35, 35,
34, 33, 32, 32, 31, 30, 30, 30, 28, 28, 27, 27, 26,
26, 25, 25, 24, 24, 23, 23, 22, 22, 22, 21, 20, 20, 20, 18, 18, 18, 17, 17, 16, 16, 15, 15, 15, 14,
14, 14, 13, 13, 13, 12, 12, 11, 11, 10, 10, 10, 9, 9,
8, 8, 7, 7, 7, 6, 6, 5, 5, 4, 4, 3, 3, 2, 2, 1, 1)
bucket3 sum:9903, content= (99, 98, 98, 98, 97, 97, 96, 96, 96, 95, 94, 94, 94, 94, 93, 93, 92,
91, 91, 91, 90, 89, 89, 88, 87, 87, 86, 86, 86, 85,
85, 84, 84, 83, 83, 82, 82, 81, 81, 81, 80, 79, 78, 78, 76, 76, 76, 75, 75, 75, 73, 73, 73, 72, 72,
71, 71, 70, 70, 69, 69, 68, 68, 66, 66, 66, 65, 65,
65, 64, 63, 62, 62, 62, 61, 61, 60, 60, 59, 59, 59, 59, 58, 58, 58, 57, 57, 57, 56, 55, 55, 55, 54,
54, 53, 53, 53, 53, 52, 51, 50, 50, 50, 49, 49, 48,
47, 47, 47, 46, 46, 45, 45, 44, 44, 43, 43, 43, 41, 41, 40, 39, 37, 37, 37, 37, 36, 36, 36, 35, 35,
34, 33, 32, 31, 31, 31, 30, 30, 28, 28, 27, 27, 26,
26, 25, 25, 24, 24, 23, 23, 22, 22, 22, 21, 20, 20, 19, 19, 18, 18, 17, 17, 16, 16, 15, 15, 14, 14,
14, 14, 14, 13, 13, 12, 11, 11, 11, 11, 10, 10, 9, 9,
8, 8, 7, 7, 7, 6, 6, 5, 5, 4, 4, 3, 3, 2, 2, 1, 1)
bucket4 sum:9903, content= (99, 98, 98, 98, 97, 97, 96, 96, 96, 95, 94, 94, 94, 94, 93, 92, 92,
92, 91, 91, 90, 89, 89, 88, 87, 87, 86, 86, 86, 85,
85, 84, 84, 83, 83, 82, 82, 81, 81, 81, 80, 79, 78, 78, 76, 76, 76, 75, 75, 75, 73, 73, 73, 72, 72,
71, 71, 70, 70, 69, 69, 68, 67, 67, 66, 66, 65, 65,
65, 63, 63, 63, 62, 62, 61, 61, 60, 60, 59, 59, 59, 59, 58, 58, 58, 57, 57, 56, 56, 56, 55, 54, 54,
54, 54, 53, 53, 52, 52, 51, 51, 50, 50, 49, 48, 48,
48, 47, 47, 46, 46, 45, 45, 44, 44, 43, 43, 42, 42, 41, 40, 39, 37, 37, 37, 37, 36, 36, 36, 35, 34,
34, 34, 32, 31, 31, 31, 30, 29, 29, 28, 27, 26, 26,
26, 26, 25, 24, 24, 23, 23, 22, 22, 21, 21, 21, 20, 19, 19, 18, 18, 17, 17, 16, 16, 15, 15, 14, 14,
14, 14, 14, 13, 12, 12, 12, 11, 11, 11, 10, 10, 9, 9,
8, 8, 7, 7, 7, 6, 6, 5, 5, 4, 4, 3, 3, 2, 2, 1, 1)
bucket5 sum:9903, content= (99, 98, 98, 98, 97, 97, 96, 96, 96, 95, 94, 94, 94, 93, 93, 93, 92,
91, 91, 91, 90, 90, 88, 88, 87, 87, 86, 86, 86, 85,
85, 85, 84, 83, 82, 82, 82, 82, 81, 80, 80, 80, 78, 78, 76, 76, 76, 75, 75, 74, 74, 73, 73, 72, 72,
71, 71, 70, 70, 69, 69, 68, 67, 67, 66, 66, 65, 65,
64, 64, 63, 63, 62, 62, 61, 60, 60, 60, 60, 59, 59, 59, 58, 58, 57, 57, 57, 57, 56, 55, 55, 55, 54,
54, 54, 53, 53, 52, 52, 51, 51, 50, 50, 49, 48, 48,
48, 47, 47, 46, 46, 45, 45, 44, 44, 43, 43, 42, 42, 41, 39, 39, 38, 37, 37, 37, 36, 36, 35, 35, 35,
34, 33, 32, 32, 31, 31, 30, 29, 28, 28, 27, 27, 26,
26, 26, 24, 24, 24, 24, 23, 22, 22, 21, 21, 21, 20, 19, 19, 18, 18, 17, 17, 16, 15, 15, 15, 15, 14,
14, 14, 13, 13, 13, 12, 12, 11, 11, 11, 10, 10, 9, 8,

8, 8, 8, 7, 6, 6, 6, 5, 5, 4, 4, 4, 3, 2, 2, 1, 1)

"----Comparison for the 104 example----"

***tf from benchmark was 9909(we added the number of machines) and target function from our local search is 9909"

***RESULT IS THE SAME

Run time: 0 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 5))

"Avegare error: 0"

"-----END 105 from 130-----"

"-----START 106 from 130-----"

"input file number 106: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_05_5.txt and solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_05_1000_5.txt"

***Data from file U_1_1000_05_5.txt: machinesNum=5 jobsNum=1000"

***SOLUTION Data from file SOL_U_1_05_1000_5.txt: machinesNum=5 jobsNum=1000 lowerBound=9783 upperBound=9783 isOptimal=1"

Content of machines summed (9783, 9783, 9782, 9782, 9782)

input selected: size 1000 sum 48912

----Our Results-----

best from Our local search found:

target function = 9788, num of machines=5, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:9783, content=(99, 99, 98, 97, 97, 96, 96, 95, 95, 94, 93, 93, 92, 92, 91, 91, 90, 90, 89, 89, 88, 87, 87, 87, 86, 86, 85, 85, 84, 84, 83, 83, 82, 81, 80, 80, 79, 79, 79, 79, 78, 78, 76, 76, 76, 75, 74, 74, 73, 73, 73, 72, 72, 71, 70, 70, 70, 69, 69, 68, 68, 67, 67, 66, 66, 65, 65, 63, 63, 63, 62, 61, 61, 61, 61, 61, 60, 59, 59, 58, 58, 58, 58, 57, 56, 55, 55, 54, 54, 53, 53, 53, 52, 52, 51, 51, 50, 50, 50, 49, 48, 48, 47, 47, 46, 46, 45, 45, 45, 44, 43, 43, 43, 42, 41, 41, 40, 40, 39, 38, 38, 38, 38, 36, 36, 36, 35, 35, 35, 34, 34, 33, 33, 32, 32, 31, 31, 31, 30, 30, 29, 28, 28, 28, 28, 27, 27, 26, 26, 26, 25, 25, 25, 24, 24, 23, 23, 22, 22, 21, 21, 20, 19, 18, 17, 17, 17, 16, 15, 15, 14, 14, 14, 13, 12, 12, 12, 11, 11, 11, 10, 9, 9, 9, 8, 7, 7, 7, 7, 6, 5, 4, 4, 3, 3, 2, 2, 2, 1, 1)

bucket2 sum:9783, content=(99, 99, 98, 97, 97, 96, 96, 95, 95, 94, 93, 93, 92, 92, 91, 91, 90, 90, 89, 89, 88, 87, 87, 86, 86, 86, 86, 85, 84, 84, 83, 83, 82, 81, 80, 80, 79, 79, 79, 79, 78, 77, 77, 76, 75, 75, 75, 74, 73, 73, 73, 72, 72, 71, 70, 70, 70, 69, 69, 68, 68, 67, 67, 66, 66, 65, 64, 64, 63, 63, 62, 61, 61, 61, 61, 60, 60, 60, 59, 58, 58, 58, 57, 57, 57, 55, 55, 54, 54, 53, 53, 53, 52, 52, 51, 51, 50, 50, 49, 49, 49, 47, 47, 47, 47, 46, 45, 45, 45, 44, 43, 43, 42, 42, 41, 41, 41, 40, 39, 38, 38, 38, 37, 37, 36, 36, 35, 35, 35, 34, 34, 33, 33, 32, 32, 31, 31, 31, 30, 29, 29, 29, 28, 28, 28, 27, 27, 26, 26, 26, 25, 25, 25, 24, 24, 23, 23, 22, 22, 21, 20, 20, 19, 19, 17, 17, 16, 16, 16, 15, 14, 14, 14, 13, 12, 12, 12, 11, 11, 11, 10, 9, 9, 9, 8, 7, 7, 7, 6, 6, 5, 5, 4, 3, 3, 2, 2, 2, 1, 1)

bucket3 sum:9782, content=(99, 99, 98, 97, 97, 96, 96, 95, 94, 94, 94, 93, 92, 92, 91, 91, 90, 89, 89, 89, 88, 88, 87, 86, 86, 86, 86, 85, 84, 84,

83, 82, 82, 81, 81, 80, 79, 79, 79, 79, 78, 77, 76, 76, 76, 75, 75, 73, 73, 73, 73, 72, 72, 71, 71,
 70, 69, 69, 69, 69, 68, 67, 67, 66, 66, 65, 64, 64,
 63, 62, 62, 62, 61, 61, 61, 60, 60, 60, 59, 58, 58, 58, 57, 57, 57, 55, 55, 54, 54, 53, 53, 53, 52,
 52, 51, 51, 50, 50, 49, 49, 49, 47, 47, 47, 46, 46,
 46, 45, 45, 44, 43, 43, 42, 42, 41, 41, 40, 40, 40, 38, 38, 38, 37, 37, 36, 36, 35, 35, 35, 34, 33,
 33, 33, 33, 32, 31, 31, 31, 30, 29, 29, 29, 28, 28,
 28, 27, 26, 26, 26, 26, 26, 25, 24, 24, 24, 23, 23, 23, 22, 21, 20, 20, 19, 18, 18, 17, 16, 16, 16,
 15, 14, 14, 13, 13, 13, 12, 12, 11, 11, 10, 10, 10, 9,
 9, 8, 7, 7, 7, 6, 6, 5, 5, 4, 3, 3, 2, 2, 1, 1, 1)
 bucket4 sum:9782, content= (99, 98, 98, 98, 97, 96, 96, 95, 94, 94, 93, 93, 93, 92, 91, 91, 90,
 89, 89, 89, 88, 88, 87, 86, 86, 86, 85, 85, 85, 84,
 83, 82, 82, 81, 81, 80, 79, 79, 79, 78, 78, 78, 76, 76, 76, 75, 74, 74, 73, 73, 73, 72, 72, 71, 71,
 70, 69, 69, 69, 69, 67, 67, 67, 67, 65, 65, 65, 64,
 63, 62, 62, 62, 61, 61, 61, 60, 60, 59, 59, 59, 58, 58, 57, 57, 57, 55, 55, 54, 53, 53, 53, 53, 52,
 52, 51, 51, 51, 50, 49, 49, 48, 48, 47, 47, 46, 46,
 45, 45, 45, 44, 44, 43, 42, 42, 41, 41, 40, 40, 40, 38, 38, 38, 37, 37, 36, 36, 35, 35, 34, 34, 34,
 33, 33, 33, 32, 31, 31, 30, 30, 30, 29, 28, 28, 28,
 28, 28, 26, 26, 26, 26, 26, 25, 24, 24, 24, 23, 23, 22, 22, 22, 20, 20, 19, 18, 18, 17, 16, 16, 15,
 15, 15, 14, 13, 13, 12, 12, 12, 12, 11, 10, 10, 9, 9,
 9, 8, 8, 7, 7, 6, 6, 5, 5, 3, 3, 3, 2, 2, 2, 1, 1)
 bucket5 sum:9782, content= (99, 98, 98, 97, 97, 97, 95, 95, 95, 94, 93, 93, 92, 92, 92, 90, 90,
 90, 89, 89, 88, 88, 87, 86, 86, 86, 85, 85, 85, 84,
 83, 82, 82, 81, 80, 80, 79, 79, 79, 79, 78, 78, 76, 76, 76, 75, 74, 74, 73, 73, 73, 72, 72, 71, 71,
 70, 69, 69, 69, 69, 67, 67, 67, 66, 66, 65, 65, 64,
 63, 62, 62, 62, 61, 61, 61, 60, 60, 59, 59, 59, 58, 58, 57, 57, 56, 56, 54, 54, 54, 53, 53, 53, 52,
 52, 51, 51, 50, 50, 50, 49, 48, 48, 47, 47, 46, 46,
 45, 45, 45, 44, 43, 43, 43, 42, 41, 41, 40, 40, 39, 38, 38, 38, 38, 37, 36, 36, 35, 35, 34, 34, 34,
 33, 33, 32, 32, 32, 31, 30, 30, 30, 29, 28, 28, 28,
 28, 27, 27, 26, 26, 26, 25, 25, 25, 24, 24, 23, 23, 22, 22, 21, 21, 20, 19, 18, 18, 17, 16, 16, 15,
 15, 15, 14, 13, 13, 12, 12, 12, 12, 11, 10, 10, 9, 9,
 9, 8, 8, 7, 7, 6, 6, 5, 5, 3, 3, 3, 2, 2, 2, 1, 1)
 "----Comparison for the 105 example----"
 "****tf from benchmark was 9788(we added the number of machines) and target function
 from our local search is 9788"
 ***RESULT IS THE SAME
 Run time: 0.016 seconds
 "Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 6))

 "Avegare error: 0"
 "-----END 106 from 130-----"
 "-----START 107 from 130-----"
 "input file number 107: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_05_6.txt and
 solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_05_1000_6.txt"
 "****Data from file U_1_1000_05_6.txt: machinesNum=5 jobsNum=1000"
 "****SOLUTION Data from file SOL_U_1_05_1000_6.txt: machinesNum=5 jobsNum=1000
 lowerBound=10049 upperBound=10049
 isOptimal=1"

Content of machines summed (10049, 10049, 10048, 10048, 10048)

input selected: size 1000 sum 50242

----Our Results-----

best from Our local search found:

target function = 10054, num of machines=5, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:10049, content= (99, 99, 98, 97, 97, 96, 95, 95, 94, 94, 93, 93, 93, 92, 92, 92, 91, 91, 90, 90, 89, 89, 88, 88, 87, 87, 86, 86, 85, 85, 84, 84, 83, 82, 82, 82, 81, 81, 80, 79, 79, 78, 78, 78, 77, 76, 76, 76, 75, 75, 75, 73, 73, 72, 72, 72, 72, 71, 70, 70, 70, 69, 68, 68, 68, 67, 66, 66, 65, 65, 64, 64, 64, 63, 63, 63, 63, 62, 62, 61, 61, 60, 59, 59, 58, 57, 56, 56, 56, 56, 55, 54, 54, 53, 53, 52, 52, 51, 51, 51, 51, 50, 50, 50, 49, 49, 49, 48, 48, 47, 46, 46, 46, 45, 45, 45, 44, 44, 43, 43, 42, 41, 41, 40, 40, 39, 39, 38, 38, 38, 37, 36, 36, 35, 35, 34, 34, 32, 32, 32, 31, 31, 30, 29, 28, 28, 27, 27, 26, 25, 25, 24, 24, 24, 24, 23, 23, 22, 22, 21, 21, 20, 20, 19, 18, 18, 17, 17, 16, 16, 15, 15, 14, 13, 12, 11, 11, 11, 11, 9, 9, 8, 8, 8, 7, 6, 6, 5, 5, 5, 4, 4, 3, 3, 3, 2, 2, 2, 1, 1)

bucket2 sum:10049, content= (99, 99, 98, 97, 96, 96, 96, 95, 94, 94, 93, 93, 93, 92, 92, 91, 91, 91, 91, 90, 89, 89, 88, 88, 87, 86, 86, 86, 86, 85, 84, 84, 83, 82, 82, 82, 81, 80, 80, 80, 79, 78, 78, 78, 77, 76, 76, 76, 75, 75, 74, 74, 73, 72, 72, 72, 71, 71, 70, 70, 70, 69, 69, 68, 67, 67, 67, 66, 65, 65, 64, 64, 64, 63, 63, 63, 62, 62, 62, 61, 61, 60, 60, 59, 58, 57, 56, 56, 56, 56, 54, 54, 54, 53, 53, 53, 52, 51, 51, 51, 51, 50, 50, 50, 49, 49, 48, 48, 48, 47, 47, 46, 46, 45, 45, 45, 44, 44, 43, 43, 42, 41, 41, 40, 40, 39, 39, 38, 38, 37, 37, 37, 36, 35, 35, 34, 33, 33, 32, 32, 31, 31, 30, 29, 28, 28, 27, 27, 26, 25, 25, 24, 24, 24, 24, 23, 23, 22, 21, 21, 21, 21, 19, 19, 19, 18, 17, 17, 16, 16, 15, 14, 14, 13, 12, 12, 11, 11, 11, 9, 9, 8, 8, 7, 7, 7, 6, 5, 5, 5, 4, 4, 3, 3, 3, 2, 2, 2, 1, 1)

bucket3 sum:10048, content= (99, 99, 98, 97, 96, 96, 95, 95, 94, 94, 93, 93, 93, 93, 92, 91, 91, 91, 90, 90, 90, 88, 88, 88, 87, 87, 86, 86, 86, 84, 84, 84, 83, 83, 82, 82, 81, 80, 80, 79, 79, 79, 78, 78, 77, 76, 76, 76, 75, 75, 74, 74, 73, 72, 72, 72, 71, 71, 70, 70, 70, 69, 69, 68, 67, 67, 66, 66, 65, 65, 65, 64, 64, 63, 63, 63, 62, 62, 62, 61, 61, 60, 60, 58, 58, 57, 57, 56, 56, 55, 55, 54, 54, 53, 53, 53, 52, 51, 51, 51, 51, 50, 50, 50, 49, 49, 48, 48, 48, 47, 47, 46, 46, 45, 45, 45, 44, 44, 43, 43, 41, 41, 41, 41, 40, 39, 39, 38, 38, 37, 37, 36, 36, 36, 35, 34, 33, 33, 32, 32, 31, 30, 30, 29, 29, 27, 27, 27, 26, 26, 25, 24, 24, 24, 24, 23, 23, 22, 21, 21, 21, 20, 20, 19, 18, 18, 18, 16, 16, 16, 16, 14, 14, 13, 12, 12, 11, 11, 10, 10, 9, 8, 8, 7, 7, 7, 6, 5, 5, 4, 4, 4, 4, 3, 3, 2, 2, 1, 1, 1)

bucket4 sum:10048, content= (99, 98, 98, 97, 97, 96, 95, 95, 94, 94, 93, 93, 93, 92, 92, 92, 91, 91, 90, 90, 89, 89, 88, 88, 87, 87, 86, 86, 85, 85, 84, 84, 83, 83, 82, 81, 81, 81, 80, 79, 79, 78, 78, 78, 77, 77, 76, 76, 75, 75, 74, 74, 73, 72, 72, 72, 71, 71, 70, 70, 70, 69, 69, 68, 67, 67, 66, 66, 65, 65, 64, 64, 64, 64, 63, 63, 62, 62, 62, 61, 61, 60, 59, 59, 58, 57, 57, 56, 56, 55, 55, 54, 54, 53, 53, 53, 52, 51, 51, 51, 51, 50, 50, 49, 49, 49, 49, 48, 48, 48, 47, 47, 46, 46, 45, 45, 45, 44, 44, 43, 42, 42, 41, 41, 41, 39, 39, 39, 39, 38, 37, 37,


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36, 36, 35, 35, 35, 33, 33, 32, 31, 31, 31, 30, 29,
29, 27, 27, 27, 26, 26, 25, 24, 24, 24, 23, 23, 23, 22, 22, 21, 21, 20, 20, 19, 18, 18, 17, 17, 16,
16, 15, 15, 14, 13, 12, 12, 11, 11, 10, 10, 9, 8, 8, 7,
7, 7, 6, 5, 5, 4, 4, 4, 4, 3, 2, 2, 2, 2, 1, 1)
bucket5 sum:10048, content= (99, 98, 98, 97, 97, 96, 95, 95, 94, 94, 93, 93, 93, 92, 92, 92,
91, 91, 90, 90, 89, 89, 88, 88, 87, 87, 86, 86, 85, 85,
84, 84, 83, 83, 82, 81, 81, 81, 80, 79, 79, 78, 78, 78, 77, 76, 76, 76, 76, 75, 74, 73, 73, 73, 72,
72, 71, 71, 70, 70, 70, 69, 69, 68, 67, 67, 66, 66,
65, 65, 64, 64, 64, 63, 63, 63, 63, 62, 62, 61, 61, 60, 59, 59, 58, 57, 57, 56, 56, 55, 55, 54, 54,
53, 53, 52, 52, 52, 51, 51, 51, 50, 50, 49, 49, 49,
49, 48, 48, 47, 46, 46, 46, 46, 45, 45, 44, 44, 43, 42, 42, 41, 41, 40, 40, 39, 39, 38, 38, 38, 37,
36, 36, 35, 35, 34, 34, 33, 32, 31, 31, 31, 30, 29,
28, 28, 27, 27, 26, 25, 25, 25, 24, 24, 23, 23, 23, 22, 22, 21, 21, 20, 20, 19, 18, 18, 17, 17, 16,
16, 15, 15, 14, 13, 12, 12, 11, 11, 10, 9, 9, 9, 8, 7,
7, 6, 6, 6, 5, 4, 4, 4, 4, 3, 2, 2, 2, 2, 1, 1)
"----Comparison for the 106 example----"
"***tf from benchmark was 10054(we added the number of machines) and target function
from our local search is 10054"
***RESULT IS THE SAME
Run time: 0 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 7))

"Avegare error: 0"
"-----END 107 from 130-----"
"-----START 108 from 130-----"
"input file number 108: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_05_7.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_05_1000_7.txt"
"***Data from file U_1_1000_05_7.txt: machinesNum=5 jobsNum=1000"
"***SOLUTION Data from file SOL_U_1_05_1000_7.txt: machinesNum=5 jobsNum=1000
lowerBound=9861 upperBound=9861
isOptimal=1"
Content of machines summed (9861, 9861, 9861, 9861, 9860)
input selected: size 1000 sum 49304
----Our Results-----
best from Our local search found:
target function = 9866, num of machines=5, square root lms=0
machines content(number of jobs=1000):
bucket1 sum:9861, content= (99, 99, 98, 97, 97, 97, 96, 96, 95, 95, 95, 93, 93, 93, 93, 92, 92,
91, 91, 90, 90, 89, 89, 89, 88, 88, 87, 87, 86, 86,
85, 84, 83, 83, 83, 82, 81, 81, 80, 80, 79, 79, 79, 78, 78, 77, 76, 75, 74, 74, 73, 72, 71, 71, 71,
71, 69, 69, 69, 68, 68, 68, 66, 66, 66, 65, 64, 64,
64, 63, 63, 63, 62, 62, 62, 61, 60, 60, 60, 59, 59, 59, 58, 58, 58, 57, 57, 56, 56, 55, 55, 55, 54,
53, 53, 52, 51, 51, 51, 50, 49, 49, 48, 48, 47, 47,
46, 46, 45, 45, 44, 44, 44, 44, 43, 42, 42, 42, 42, 41, 41, 40, 40, 39, 39, 38, 38, 36, 36, 35, 35,
33, 33, 32, 32, 32, 31, 31, 29, 28, 28, 27, 27, 26,
26, 26, 25, 25, 24, 24, 24, 23, 22, 22, 21, 20, 19, 19, 19, 18, 18, 18, 17, 17, 16, 16, 15, 15, 14,
14, 13, 12, 12, 12, 11, 11, 11, 10, 10, 10, 9, 9, 8, 8,

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7, 7, 7, 6, 6, 6, 5, 4, 4, 3, 2, 2, 2, 1, 1, 1)

bucket2 sum:9861, content= (99, 99, 98, 97, 97, 97, 96, 96, 95, 95, 94, 94, 93, 93, 93, 92, 92, 91, 91, 90, 90, 89, 89, 89, 88, 88, 87, 87, 86, 86, 85, 84, 83, 83, 82, 82, 81, 81, 80, 80, 80, 79, 79, 78, 78, 77, 76, 75, 74, 74, 72, 72, 72, 71, 71, 70, 70, 69, 69, 68, 68, 67, 67, 66, 66, 65, 64, 64, 64, 63, 63, 63, 62, 62, 62, 61, 60, 60, 60, 59, 59, 59, 58, 58, 58, 57, 57, 56, 56, 55, 55, 55, 54, 53, 52, 52, 52, 51, 51, 50, 49, 49, 48, 48, 47, 47, 46, 46, 45, 45, 44, 44, 44, 44, 43, 42, 42, 42, 42, 41, 41, 40, 39, 39, 39, 39, 37, 37, 35, 35, 35, 34, 33, 32, 32, 32, 31, 31, 29, 28, 28, 27, 27, 26, 26, 25, 25, 25, 24, 24, 23, 22, 21, 21, 20, 20, 19, 19, 18, 18, 18, 17, 17, 16, 16, 15, 15, 14, 13, 13, 13, 12, 12, 11, 11, 11, 10, 10, 10, 9, 9, 8, 8,

7, 7, 7, 6, 6, 5, 5, 5, 4, 3, 2, 2, 2, 1, 1, 1)

bucket3 sum:9861, content= (99, 98, 98, 98, 97, 97, 96, 96, 95, 95, 94, 94, 93, 93, 93, 92, 92, 91, 90, 90, 90, 90, 89, 89, 88, 88, 87, 87, 86, 86, 84, 84, 84, 83, 82, 82, 81, 81, 80, 80, 80, 79, 79, 78, 78, 77, 75, 75, 75, 74, 72, 72, 72, 71, 71, 70, 70, 69, 69, 68, 68, 67, 67, 66, 66, 65, 64, 64, 64, 63, 63, 63, 62, 62, 61, 61, 61, 60, 60, 59, 59, 59, 58, 58, 58, 57, 57, 56, 56, 55, 55, 55, 54, 53, 52, 52, 52, 51, 51, 50, 49, 48, 48, 48, 47, 47, 47, 45, 45, 45, 45, 44, 44, 44, 43, 42, 42, 42, 41, 41, 41, 40, 40, 39, 39, 39, 37, 37, 35, 35, 35, 34, 33, 32, 32, 32, 31, 31, 29, 28, 27, 27, 27, 27, 26, 25, 25, 25, 25, 24, 23, 23, 23, 21, 21, 20, 20, 19, 19, 18, 18, 17, 17, 17, 17, 15, 15, 15, 14, 14, 13, 13, 12, 12, 11, 11, 11, 10, 10, 10, 9, 9, 8, 8,

7, 7, 7, 6, 6, 5, 5, 5, 4, 3, 2, 2, 2, 1, 1, 1)

bucket4 sum:9861, content= (99, 98, 98, 98, 97, 97, 96, 96, 95, 95, 94, 94, 93, 93, 93, 92, 91, 91, 91, 90, 90, 90, 89, 89, 88, 87, 87, 87, 87, 85, 85, 84, 84, 83, 82, 82, 81, 81, 80, 80, 80, 79, 79, 78, 77, 77, 76, 75, 75, 73, 73, 72, 71, 71, 71, 71, 70, 69, 69, 68, 68, 67, 67, 66, 65, 65, 65, 64, 64, 63, 63, 63, 62, 62, 61, 61, 61, 60, 60, 59, 59, 59, 58, 58, 57, 57, 57, 57, 56, 55, 55, 55, 54, 53, 52, 52, 52, 51, 51, 50, 49, 48, 48, 48, 47, 47, 46, 46, 45, 45, 45, 44, 44, 43, 43, 43, 42, 42, 41, 41, 41, 40, 40, 39, 39, 38, 38, 37, 35, 35, 35, 34, 33, 32, 32, 32, 31, 31, 29, 28, 27, 27, 27, 27, 26, 25, 25, 25, 25, 24, 23, 23, 23, 21, 21, 20, 20, 19, 19, 18, 18, 17, 17, 17, 16, 16, 15, 15, 14, 14, 13, 12, 12, 12, 11, 11, 11, 10, 10, 10, 10, 9, 8,

8, 7, 7, 6, 6, 6, 6, 5, 5, 3, 3, 3, 2, 2, 1, 1, 1)

bucket5 sum:9860, content= (99, 98, 98, 97, 97, 97, 97, 96, 95, 95, 94, 94, 93, 93, 92, 92, 92, 91, 91, 90, 90, 90, 89, 88, 88, 88, 87, 87, 86, 86, 85, 84, 84, 83, 82, 82, 81, 81, 80, 80, 80, 79, 79, 78, 77, 77, 76, 75, 74, 74, 73, 72, 71, 71, 71, 71, 70, 69, 69, 68, 68, 67, 66, 66, 66, 65, 65, 64, 64, 63, 63, 63, 62, 62, 61, 61, 60, 60, 60, 60, 59, 59, 58, 58, 57, 57, 57, 57, 55, 55, 55, 55, 54, 54, 52, 52, 52, 51, 50, 50, 49, 49, 48, 48, 47, 47, 46, 46, 45, 45, 45, 44, 44, 43, 43, 43, 42, 42, 41, 41, 41, 40, 40, 39, 39, 38, 38, 36, 36, 35, 35, 33, 33, 33, 32, 32, 31, 30, 30, 28, 27, 27, 27, 26, 26, 26, 25, 25, 25, 24, 23, 23, 22, 22, 21, 20, 20, 19, 18, 18, 18, 18, 17, 17, 16, 16, 15, 15, 14, 14, 13, 12, 12, 12, 11, 11, 11, 10, 10, 10, 9, 9, 8, 8,

7, 7, 7, 6, 6, 6, 5, 4, 4, 3, 2, 2, 2, 1, 1, 1)

"----Comparison for the 107 example----"

***tf from benchmark was 9866(we added the number of machines) and target function from our local search is 9866"

***RESULT IS THE SAME

Run time: 0.016 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 8))

"Avegare error: 0"

"-----END 108 from 130-----"

"-----START 109 from 130-----"

"input file number 109: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_05_8.txt and solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_05_1000_8.txt"

***Data from file U_1_1000_05_8.txt: machinesNum=5 jobsNum=1000"

***SOLUTION Data from file SOL_U_1_05_1000_8.txt: machinesNum=5 jobsNum=1000

lowerBound=10064 upperBound=10064

isOptimal=1"

Content of machines summed (10064, 10064, 10064, 10064, 10064)

input selected: size 1000 sum 50320

----Our Results-----

best from Our local search found:

target function = 10069, num of machines=5, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:10064, content= (99, 99, 99, 98, 97, 97, 96, 96, 95, 95, 94, 93, 93, 92, 92, 91,

91, 91, 90, 90, 89, 89, 89, 88, 87, 87, 86, 86, 86, 85,

84, 84, 84, 83, 83, 82, 82, 82, 82, 80, 80, 79, 78, 78, 77, 77, 76, 76, 75, 75, 74, 74, 73, 73, 72,

72, 71, 71, 71, 71, 70, 69, 69, 69, 68, 67, 67, 67,

66, 65, 65, 65, 65, 64, 63, 63, 62, 62, 61, 61, 61, 59, 58, 58, 58, 57, 57, 56, 56, 56, 55, 55, 54,

54, 53, 53, 52, 52, 51, 51, 51, 50, 50, 49, 49, 48,

47, 47, 46, 46, 46, 45, 45, 44, 43, 42, 42, 42, 41, 41, 41, 40, 39, 39, 39, 38, 38, 37, 36, 36, 36,

36, 35, 34, 33, 33, 33, 33, 32, 32, 31, 31, 31, 30,

30, 28, 28, 28, 27, 26, 25, 25, 25, 24, 23, 23, 22, 22, 22, 21, 20, 20, 19, 18, 18, 18, 17, 16, 15,

15, 14, 14, 14, 13, 13, 12, 12, 12, 11, 11, 10, 10,

10, 9, 8, 8, 8, 7, 7, 6, 6, 5, 4, 4, 3, 3, 2, 1, 1, 1)

bucket2 sum:10064, content= (99, 99, 99, 98, 97, 97, 96, 96, 95, 94, 94, 94, 93, 92, 92, 91,

91, 90, 90, 90, 90, 89, 88, 88, 87, 87, 87, 86, 85, 85,

85, 84, 84, 83, 83, 82, 82, 82, 81, 81, 80, 79, 78, 78, 77, 77, 76, 76, 75, 75, 74, 74, 73, 73, 72,

72, 71, 71, 71, 71, 70, 69, 69, 69, 68, 67, 67, 66,

66, 66, 65, 65, 64, 64, 64, 63, 62, 62, 61, 61, 60, 59, 59, 58, 58, 57, 57, 56, 56, 56, 55, 55, 54,

54, 53, 52, 52, 52, 52, 51, 51, 50, 50, 49, 49, 48,

47, 47, 46, 46, 45, 45, 45, 44, 43, 43, 42, 42, 41, 41, 41, 40, 39, 39, 38, 38, 38, 38, 36, 36, 36,

35, 35, 34, 34, 33, 33, 33, 32, 32, 31, 31, 31, 30,

30, 28, 28, 27, 27, 27, 25, 25, 25, 24, 23, 23, 22, 22, 21, 21, 21, 20, 19, 18, 18, 18, 17, 16, 15,

15, 14, 14, 14, 13, 12, 12, 12, 12, 12, 11, 10, 10, 9,

9, 9, 8, 8, 7, 7, 6, 6, 5, 4, 4, 3, 3, 2, 1, 1, 1)

bucket3 sum:10064, content= (99, 99, 99, 98, 97, 97, 96, 96, 95, 94, 94, 94, 92, 92, 92, 92,

91, 90, 90, 90, 90, 89, 88, 88, 87, 87, 87, 86, 85, 85,

85, 84, 84, 83, 83, 82, 82, 82, 81, 81, 79, 79, 78, 78, 78, 76, 76, 76, 76, 75, 74, 74, 73, 73, 72,

72, 71, 71, 71, 70, 70, 70, 69, 69, 68, 67, 67, 66,

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66, 66, 65, 65, 64, 64, 64, 63, 62, 62, 61, 61, 60, 59, 59, 58, 58, 57, 57, 56, 56, 56, 55, 55, 54,
54, 53, 52, 52, 52, 51, 51, 51, 51, 50, 49, 48, 48,
47, 47, 47, 46, 45, 45, 45, 44, 43, 43, 42, 42, 41, 41, 41, 40, 39, 39, 38, 38, 38, 37, 37, 36, 36,
35, 35, 34, 34, 33, 33, 33, 32, 32, 31, 31, 31, 30,
29, 29, 28, 27, 27, 26, 26, 25, 25, 24, 23, 23, 22, 22, 21, 21, 21, 20, 19, 18, 18, 18, 17, 16, 15,
14, 14, 14, 14, 13, 13, 12, 12, 12, 11, 11, 11, 10, 9,
9, 9, 8, 8, 7, 7, 6, 6, 5, 4, 4, 3, 3, 2, 1, 1, 1)
bucket4 sum:10064, content= (99, 99, 98, 98, 98, 97, 96, 96, 95, 94, 94, 93, 93, 92, 92, 91,
91, 91, 90, 90, 90, 89, 88, 88, 87, 87, 86, 86, 86, 85,
84, 84, 84, 83, 83, 83, 82, 82, 81, 80, 80, 79, 78, 78, 77, 77, 76, 76, 76, 75, 74, 74, 73, 73, 72,
71, 71, 71, 71, 71, 70, 70, 69, 68, 68, 68, 67, 66,
66, 65, 65, 65, 65, 64, 64, 63, 62, 62, 61, 61, 60, 59, 59, 58, 58, 57, 57, 56, 56, 55, 55, 55, 55,
53, 53, 53, 52, 52, 51, 51, 51, 51, 50, 49, 48, 48,
47, 47, 47, 46, 45, 45, 45, 44, 43, 43, 42, 42, 41, 41, 40, 40, 40, 39, 38, 38, 38, 37, 37, 36, 36,
35, 35, 34, 34, 33, 33, 33, 32, 32, 31, 31, 31, 30,
29, 29, 28, 27, 27, 26, 26, 25, 24, 24, 24, 23, 22, 22, 21, 21, 20, 20, 19, 19, 18, 17, 17, 16, 15,
15, 14, 14, 14, 13, 13, 12, 12, 12, 11, 11, 10, 10,
10, 9, 9, 8, 8, 7, 7, 6, 6, 4, 4, 4, 4, 3, 2, 1, 1, 1)
bucket5 sum:10064, content= (99, 99, 98, 98, 98, 97, 96, 95, 95, 95, 94, 93, 93, 92, 92, 91,
91, 91, 90, 90, 89, 89, 89, 88, 87, 87, 86, 86, 86, 85,
84, 84, 84, 83, 83, 83, 82, 82, 81, 80, 80, 79, 78, 78, 77, 77, 76, 76, 76, 75, 74, 73, 73, 73, 73,
71, 71, 71, 71, 71, 70, 70, 69, 68, 68, 68, 67, 66,
66, 65, 65, 65, 65, 64, 64, 62, 62, 62, 62, 61, 60, 59, 58, 58, 58, 57, 57, 57, 56, 55, 55, 55, 54,
54, 53, 53, 52, 52, 51, 51, 51, 51, 50, 49, 48, 48,
47, 47, 47, 46, 45, 45, 45, 44, 43, 43, 42, 42, 41, 41, 40, 40, 39, 39, 39, 38, 38, 37, 37, 36, 36,
35, 35, 34, 33, 33, 33, 33, 32, 32, 32, 31, 30, 30,
30, 29, 28, 27, 27, 26, 26, 25, 24, 24, 23, 23, 23, 22, 21, 21, 20, 20, 19, 19, 18, 17, 17, 16, 15,
15, 14, 14, 14, 13, 13, 12, 12, 12, 11, 11, 10, 10,
10, 9, 8, 8, 8, 8, 6, 6, 6, 5, 4, 4, 4, 2, 2, 2, 1, 1)
"----Comparison for the 108 example----"
"***tf from benchmark was 10069(we added the number of machines) and target function
from our local search is 10069"
***RESULT IS THE SAME
Run time: 0 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 9))

"Avegare error: 0"
"-----END 109 from 130-----"
"-----START 110 from 130-----"
"input file number 110: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_05_9.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_05_1000_9.txt"
"***Data from file U_1_1000_05_9.txt: machinesNum=5 jobsNum=1000"
"***SOLUTION Data from file SOL_U_1_05_1000_9.txt: machinesNum=5 jobsNum=1000
lowerBound=9827 upperBound=9827
isOptimal=1"
Content of machines summed (9827, 9827, 9827, 9826, 9826)
input selected: size 1000 sum 49133

```

----Our Results-----

best from Our local search found:

target function = 9832, num of machines=5, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:9827, content= (99, 99, 99, 98, 98, 97, 96, 96, 96, 95, 94, 93, 93, 93, 91, 91, 90, 89, 89, 88, 88, 88, 87, 86, 86, 85, 85, 84, 84, 84, 83, 82, 82, 81, 81, 80, 79, 79, 79, 78, 77, 76, 76, 76, 75, 74, 74, 73, 73, 73, 72, 72, 71, 71, 71, 70, 69, 69, 68, 68, 67, 67, 66, 66, 65, 65, 64, 64, 63, 63, 62, 62, 61, 61, 60, 60, 59, 59, 59, 58, 58, 57, 56, 56, 56, 56, 55, 55, 53, 53, 53, 53, 51, 51, 50, 50, 50, 50, 49, 49, 48, 48, 48, 48, 46, 46, 45, 45, 44, 44, 43, 43, 43, 42, 41, 41, 40, 40, 40, 39, 39, 39, 39, 38, 38, 37, 36, 36, 36, 35, 35, 34, 34, 34, 33, 33, 33, 32, 31, 30, 30, 29, 29, 28, 28, 28, 27, 27, 27, 26, 26, 25, 24, 24, 24, 24, 23, 22, 22, 22, 21, 20, 20, 19, 19, 18, 18, 17, 17, 16, 15, 15, 15, 15, 14, 14, 13, 13, 12, 12, 11, 10, 9, 9, 8, 8, 7, 6, 6, 5, 5, 5, 4, 4, 3, 2, 2, 2, 1, 1)

bucket2 sum:9827, content= (99, 99, 99, 98, 98, 97, 96, 96, 96, 94, 94, 94, 93, 92, 92, 91, 90, 89, 89, 88, 88, 88, 86, 86, 86, 86, 85, 84, 84, 83, 83, 83, 82, 81, 81, 80, 79, 79, 78, 78, 78, 76, 76, 75, 75, 75, 74, 73, 73, 73, 72, 72, 71, 71, 71, 70, 69, 69, 68, 68, 67, 67, 66, 66, 65, 65, 64, 64, 63, 63, 62, 62, 61, 60, 60, 60, 60, 59, 59, 58, 58, 57, 56, 56, 56, 56, 55, 54, 54, 53, 53, 53, 51, 51, 50, 50, 50, 50, 49, 49, 48, 48, 48, 47, 47, 46, 45, 45, 44, 44, 43, 43, 42, 42, 42, 41, 40, 40, 40, 39, 39, 39, 39, 38, 37, 37, 36, 36, 36, 35, 35, 35, 34, 34, 33, 33, 32, 32, 32, 30, 30, 29, 29, 28, 28, 28, 27, 27, 26, 26, 26, 25, 25, 24, 24, 23, 23, 23, 22, 21, 21, 21, 20, 19, 19, 18, 18, 17, 16, 16, 16, 15, 15, 15, 14, 14, 13, 13, 12, 12, 11, 10, 9, 9, 8, 7, 7, 7, 6, 5, 5, 5, 4, 3, 3, 3, 2, 2, 1, 1)

bucket3 sum:9827, content= (99, 99, 99, 98, 98, 97, 96, 96, 95, 95, 94, 94, 93, 92, 91, 91, 90, 90, 89, 88, 88, 88, 86, 86, 86, 86, 85, 84, 84, 83, 83, 82, 82, 82, 81, 80, 79, 79, 78, 78, 78, 76, 76, 75, 75, 75, 74, 73, 73, 73, 72, 72, 71, 71, 70, 70, 69, 69, 69, 68, 67, 67, 66, 66, 65, 65, 64, 64, 63, 63, 62, 62, 61, 60, 60, 60, 60, 59, 58, 58, 58, 57, 57, 56, 56, 55, 55, 55, 54, 53, 53, 52, 52, 51, 50, 50, 50, 50, 49, 49, 48, 48, 48, 47, 47, 46, 45, 45, 44, 44, 43, 43, 42, 42, 41, 41, 41, 40, 40, 39, 39, 39, 39, 38, 37, 37, 36, 36, 36, 35, 35, 35, 34, 33, 33, 33, 33, 32, 31, 30, 30, 30, 29, 28, 28, 28, 27, 27, 26, 26, 26, 25, 25, 24, 24, 23, 23, 23, 22, 21, 21, 21, 20, 19, 19, 18, 18, 17, 16, 16, 16, 15, 15, 15, 14, 14, 13, 13, 12, 12, 10, 10, 10, 9, 8, 7, 7, 7, 6, 5, 5, 4, 4, 4, 3, 3, 2, 2, 1, 1)

bucket4 sum:9826, content= (99, 99, 98, 98, 98, 97, 96, 96, 96, 95, 94, 94, 93, 92, 91, 91, 90, 90, 89, 88, 88, 87, 87, 86, 86, 86, 85, 84, 84, 83, 83, 82, 82, 82, 80, 80, 80, 79, 78, 78, 77, 77, 76, 75, 75, 75, 74, 73, 73, 72, 72, 72, 71, 71, 71, 70, 69, 69, 69, 68, 67, 67, 66, 65, 65, 65, 65, 64, 63, 63, 62, 61, 61, 61, 60, 60, 59, 59, 59, 58, 58, 57, 57, 56, 56, 55, 55, 55, 54, 53, 53, 52, 51, 51, 50, 50, 50, 50, 49, 49, 49, 48, 48, 47, 47, 46, 45, 45, 44, 43, 43, 43, 43, 42, 41, 41, 41, 40, 40, 39, 39, 39, 38, 38, 38, 37, 36, 36, 36, 35, 35, 34, 34, 34, 33, 33, 33, 32, 31, 30, 30, 30, 29, 28, 28, 27, 27, 27, 27, 26, 26, 25, 25, 24, 24, 23, 23, 23, 22, 21, 21, 21, 20, 19, 19, 18, 18, 17, 16,

```

16, 16, 15, 15, 15, 14, 14, 13, 13, 12, 11, 11, 10,
10, 9, 8, 7, 7, 7, 5, 5, 5, 5, 4, 4, 3, 3, 2, 1, 1, 1)
bucket5 sum:9826, content=(99, 99, 98, 98, 98, 97, 96, 96, 96, 95, 94, 94, 93, 92, 91, 91, 90,
89, 89, 89, 88, 87, 87, 86, 86, 85, 85, 85, 84, 83,
83, 82, 82, 81, 81, 80, 79, 79, 79, 78, 77, 77, 76, 75, 75, 75, 74, 73, 73, 72, 72, 72, 71, 71, 71,
70, 69, 69, 69, 68, 67, 67, 66, 65, 65, 65, 65, 64,
63, 63, 62, 61, 61, 61, 60, 60, 59, 59, 59, 58, 58, 57, 56, 56, 56, 56, 55, 55, 54, 53, 53, 52, 51,
51, 50, 50, 50, 50, 49, 49, 48, 48, 48, 48, 46, 46,
46, 44, 44, 44, 43, 43, 43, 42, 41, 41, 40, 40, 40, 39, 39, 39, 39, 38, 38, 37, 36, 36, 36, 35, 35,
34, 34, 34, 33, 33, 33, 32, 31, 30, 30, 29, 29, 28,
28, 28, 27, 27, 27, 26, 26, 25, 24, 24, 24, 24, 23, 22, 22, 22, 21, 21, 20, 19, 19, 18, 18, 17, 16,
16, 16, 15, 15, 14, 14, 14, 13, 13, 13, 11, 11, 10, 9,
9, 8, 8, 7, 6, 6, 5, 5, 5, 4, 4, 3, 3, 2, 1, 1, 1)
"----Comparison for the 109 example----"
"***tf from benchmark was 9832(we added the number of machines) and target function
from our local search is 9832"
***RESULT IS THE SAME
Run time: 0.015 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 10))

"Avegare error: 0"
"-----END 110 from 130-----"
"-----START 111 from 130-----"
"input file number 111: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_10_0.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_10_1000_0.txt"
"***Data from file U_1_1000_10_0.txt: machinesNum=10 jobsNum=1000"
"***SOLUTION Data from file SOL_U_1_10_1000_0.txt: machinesNum=10
jobsNum=1000 lowerBound=4837 upperBound=4837
isOptimal=1"
Content of machines summed (4837, 4837, 4837, 4836, 4836, 4836, 4836, 4836, 4836, 4836)
input selected: size 1000 sum 48363
----Our Results-----
best from Our local search found:
target function = 4847, num of machines=10, square root lms=0
machines content(number of jobs=1000):
bucket1 sum:4837, content=(99, 99, 97, 96, 94, 94, 93, 91, 90, 89, 89, 87, 86, 86, 83, 83, 81,
81, 79, 79, 78, 77, 76, 75, 74, 72, 72, 71, 69, 69,
66, 66, 65, 64, 62, 61, 60, 59, 58, 57, 57, 55, 54, 53, 52, 52, 50, 49, 49, 47, 47, 47, 45, 44, 43,
41, 41, 40, 39, 39, 37, 37, 36, 34, 34, 33, 31, 31,
30, 29, 28, 27, 26, 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 16, 15, 14, 13, 12, 11, 11, 9, 9, 9, 7,
7, 5, 4, 3, 2, 1)
bucket2 sum:4837, content=(99, 99, 97, 96, 94, 94, 93, 91, 90, 89, 88, 88, 86, 86, 83, 83, 81,
81, 79, 79, 78, 77, 76, 75, 73, 73, 72, 71, 69, 68,
67, 66, 65, 64, 62, 61, 60, 59, 58, 57, 57, 55, 54, 53, 52, 52, 50, 49, 48, 48, 47, 46, 46, 44, 43,
41, 41, 40, 39, 38, 38, 37, 36, 34, 34, 33, 31, 31,
30, 29, 28, 27, 26, 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 16, 14, 14, 14, 11, 11, 11, 10, 9, 9, 7,
7, 5, 4, 3, 2, 1)

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bucket3 sum:4837, content= (99, 99, 97, 95, 95, 94, 92, 92, 90, 89, 88, 88, 86, 85, 84, 83, 81, 81, 79, 79, 77, 77, 77, 75, 73, 73, 72, 70, 70, 68, 67, 66, 65, 64, 62, 61, 60, 59, 58, 57, 57, 55, 54, 53, 52, 51, 51, 49, 48, 48, 47, 46, 46, 44, 42, 42, 41, 40, 39, 38, 38, 37, 35, 35, 34, 33, 31, 31, 30, 29, 28, 27, 25, 25, 25, 23, 22, 21, 20, 19, 18, 17, 16, 15, 15, 14, 13, 12, 11, 11, 10, 9, 9, 7, 7, 5, 4, 3, 2, 1)

bucket4 sum:4836, content= (99, 98, 98, 95, 95, 94, 92, 92, 90, 89, 88, 88, 86, 85, 84, 83, 81, 81, 79, 79, 77, 77, 76, 76, 73, 73, 72, 70, 70, 68, 67, 66, 65, 63, 63, 61, 60, 59, 58, 57, 57, 55, 54, 53, 52, 51, 50, 50, 48, 48, 47, 46, 46, 44, 42, 42, 41, 40, 39, 38, 38, 37, 35, 35, 34, 33, 31, 31, 30, 29, 28, 27, 25, 25, 24, 24, 22, 21, 20, 18, 18, 18, 16, 15, 15, 14, 13, 12, 11, 11, 10, 9, 9, 7, 7, 5, 4, 2, 2, 1)

bucket5 sum:4836, content= (99, 98, 97, 96, 95, 94, 92, 92, 90, 89, 88, 88, 86, 85, 84, 83, 81, 80, 80, 79, 77, 77, 76, 75, 74, 73, 72, 70, 70, 68, 67, 66, 65, 63, 63, 61, 60, 59, 58, 57, 56, 56, 54, 53, 52, 51, 50, 50, 48, 48, 47, 46, 45, 44, 43, 42, 40, 40, 40, 38, 38, 36, 36, 35, 34, 32, 32, 31, 30, 29, 28, 27, 25, 25, 24, 24, 22, 21, 20, 18, 18, 17, 17, 15, 15, 14, 13, 12, 11, 11, 10, 9, 9, 7, 6, 5, 4, 3, 2, 1)

bucket6 sum:4836, content= (99, 98, 97, 96, 95, 93, 93, 91, 90, 90, 88, 88, 86, 85, 84, 82, 82, 80, 80, 79, 77, 77, 76, 75, 74, 73, 72, 70, 70, 68, 67, 66, 65, 63, 63, 61, 60, 59, 58, 57, 56, 56, 54, 53, 52, 51, 50, 50, 48, 48, 47, 46, 45, 44, 43, 42, 40, 40, 40, 38, 38, 36, 36, 35, 34, 32, 32, 31, 30, 29, 27, 27, 26, 25, 24, 24, 22, 21, 20, 18, 18, 17, 17, 15, 15, 14, 13, 12, 11, 11, 10, 9, 8, 8, 6, 5, 4, 3, 2, 1)

bucket7 sum:4836, content= (99, 98, 97, 96, 95, 93, 93, 91, 90, 90, 88, 87, 87, 85, 84, 82, 82, 80, 80, 78, 78, 77, 76, 75, 74, 73, 71, 71, 70, 68, 67, 66, 64, 64, 63, 61, 60, 59, 58, 57, 56, 56, 54, 53, 52, 51, 50, 49, 49, 48, 47, 46, 45, 44, 43, 41, 41, 40, 40, 38, 38, 36, 36, 35, 34, 32, 32, 31, 30, 29, 27, 27, 26, 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 16, 15, 14, 13, 12, 11, 11, 10, 9, 8, 8, 6, 5, 4, 3, 2, 1)

bucket8 sum:4836, content= (99, 98, 97, 96, 94, 94, 93, 91, 90, 90, 88, 87, 86, 86, 84, 82, 82, 80, 80, 78, 78, 77, 76, 75, 74, 72, 72, 71, 69, 69, 66, 66, 66, 63, 63, 60, 60, 59, 59, 57, 56, 56, 54, 53, 52, 51, 50, 49, 49, 48, 47, 46, 44, 44, 43, 42, 41, 40, 39, 39, 37, 37, 36, 35, 34, 32, 32, 31, 30, 29, 27, 27, 26, 25, 24, 23, 22, 21, 20, 19, 18, 17, 16, 16, 15, 14, 13, 12, 11, 11, 10, 9, 8, 8, 6, 5, 4, 3, 2, 1)

bucket9 sum:4836, content= (99, 98, 97, 96, 94, 94, 93, 91, 90, 89, 89, 87, 86, 86, 83, 83, 82, 80, 80, 78, 78, 77, 76, 75, 74, 72, 72, 71, 69, 69, 66, 66, 64, 64, 63, 62, 60, 59, 58, 57, 56, 55, 54, 53, 53, 51, 50, 49, 49, 48, 47, 46, 44, 44, 43, 42, 41, 40, 39, 39, 37, 37, 36, 35, 33, 33, 32, 31, 30, 28, 28, 27, 26, 25, 24, 22, 22, 21, 21, 19, 18, 17, 16, 16, 15, 14, 13, 12, 11, 11, 9, 9, 9, 8, 6, 5, 4, 3, 2, 1)

bucket10 sum:4836, content= (99, 98, 96, 96, 95, 94, 93, 91, 90, 89, 89, 87, 86, 86, 83, 83, 81, 81, 79, 79, 78, 77, 76, 74, 74, 73, 72, 71, 69, 69, 66, 66, 64, 64, 63, 62, 59, 59, 59, 57, 56, 55, 54, 53, 52, 52, 50, 49, 49, 48, 47, 46, 44, 44, 43, 42, 41, 40, 39, 39, 37, 37, 36, 34, 34, 33, 32, 31,

30, 28, 28, 27, 26, 25, 24, 22, 22, 21, 20, 19, 18, 18, 16, 16, 15, 14, 12, 12, 11, 11, 11, 9, 8, 8, 5, 5, 4, 3, 2, 2)

"----Comparison for the 110 example----"

****tf from benchmark was 4847(we added the number of machines) and target function from our local search is 4847"

***RESULT IS THE SAME

Run time: 0.016 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 11))

"Avegare error: 0"

"-----END 111 from 130-----"

"-----START 112 from 130-----"

"input file number 112: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_10_1.txt and solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_10_1000_1.txt"

****Data from file U_1_1000_10_1.txt: machinesNum=10 jobsNum=1000"

****SOLUTION Data from file SOL_U_1_10_1000_1.txt: machinesNum=10

jobsNum=1000 lowerBound=5021 upperBound=5021

isOptimal=1"

Content of machines summed (5021, 5021, 5020, 5020, 5020, 5020, 5020, 5020, 5020, 5020)

input selected: size 1000 sum 50202

----Our Results-----

best from Our local search found:

target function = 5031, num of machines=10, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:5021, content= (99, 99, 97, 97, 96, 95, 93, 93, 92, 91, 90, 89, 89, 88, 87, 86, 85, 84, 82, 81, 80, 80, 78, 78, 76, 75, 74, 73, 72, 70,

70, 68, 67, 67, 64, 63, 63, 62, 61, 60, 59, 58, 57, 56, 54, 54, 53, 52, 51, 51, 49, 48, 47, 46, 45, 45, 44, 43, 42, 41, 40, 40, 38, 37, 37, 35, 34, 32,

32, 31, 31, 29, 28, 27, 26, 24, 23, 22, 21, 20, 19, 18, 18, 16, 16, 14, 14, 12, 12, 11, 9, 9, 7, 7, 6, 5, 5, 3, 2, 2)

bucket2 sum:5021, content= (99, 99, 97, 97, 96, 95, 93, 93, 92, 91, 90, 89, 88, 88, 88, 86, 85, 83, 82, 82, 80, 80, 78, 78, 76, 75, 74, 73, 72, 70,

70, 68, 67, 67, 64, 63, 63, 62, 61, 59, 59, 59, 56, 56, 55, 54, 53, 52, 51, 50, 50, 48, 47, 46, 45, 45, 44, 43, 42, 41, 40, 39, 39, 37, 37, 35, 33, 33,

32, 31, 31, 29, 28, 27, 25, 25, 23, 22, 21, 20, 19, 18, 18, 16, 16, 14, 14, 12, 12, 11, 9, 8, 8, 7, 6, 5, 4, 4, 2, 2)

bucket3 sum:5021, content= (99, 98, 98, 97, 95, 95, 94, 93, 92, 91, 90, 89, 88, 88, 88, 86, 85, 83, 82, 82, 80, 80, 78, 78, 76, 75, 74, 73, 71, 71,

70, 68, 67, 66, 65, 63, 63, 62, 61, 59, 59, 59, 56, 56, 55, 54, 53, 52, 51, 50, 50, 48, 47, 46, 45, 45, 44, 43, 42, 41, 40, 39, 39, 37, 36, 36, 33, 33,

32, 31, 30, 30, 28, 27, 25, 24, 23, 23, 20, 20, 20, 18, 18, 16, 15, 15, 14, 12, 12, 10, 10, 8, 8, 7, 6, 5, 4, 4, 2, 1, 1)

bucket4 sum:5021, content= (99, 98, 98, 97, 95, 95, 94, 93, 92, 91, 90, 89, 88, 88, 87, 87, 85, 83, 82, 82, 80, 79, 79, 77, 77, 75, 74, 73, 71, 71,

69, 69, 67, 66, 65, 63, 63, 62, 61, 59, 59, 58, 57, 56, 55, 54, 53, 52, 51, 50, 50, 48, 47, 46, 45, 45, 44, 43, 42, 41, 40, 39, 39, 37, 36, 35, 34, 33,

32, 31, 30, 30, 28, 27, 25, 24, 23, 22, 21, 20, 20, 18, 18, 16, 15, 15, 14, 12, 12, 10, 10, 8, 8, 7,


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6, 5, 4, 4, 2, 1, 1)
bucket5 sum:5021, content= (99, 98, 98, 96, 96, 95, 94, 93, 92, 91, 90, 89, 88, 88, 87, 86, 86,
83, 82, 81, 81, 79, 79, 77, 77, 75, 74, 73, 71, 71,
69, 69, 67, 66, 65, 63, 63, 62, 61, 59, 59, 58, 57, 56, 55, 53, 53, 52, 52, 50, 50, 48, 47, 46, 45,
45, 44, 43, 41, 41, 41, 39, 39, 37, 36, 35, 34, 33,
32, 31, 30, 30, 28, 27, 25, 24, 23, 22, 21, 20, 20, 18, 17, 17, 15, 15, 13, 13, 12, 10, 10, 8, 8, 7,
6, 5, 4, 4, 2, 1, 1)
bucket6 sum:5019, content= (99, 98, 97, 97, 96, 95, 94, 93, 92, 90, 90, 90, 88, 88, 87, 86, 85,
84, 82, 81, 81, 79, 79, 77, 77, 75, 74, 72, 72, 71,
69, 69, 67, 66, 65, 63, 63, 62, 61, 59, 59, 58, 57, 56, 55, 53, 53, 52, 52, 50, 49, 49, 47, 46, 45,
45, 44, 42, 42, 41, 41, 39, 38, 38, 36, 35, 34, 33,
32, 31, 30, 29, 29, 26, 26, 24, 23, 22, 21, 20, 19, 19, 17, 17, 15, 15, 13, 13, 12, 10, 10, 8, 8, 7,
6, 5, 4, 3, 3)
bucket7 sum:5019, content= (99, 98, 97, 97, 96, 95, 94, 93, 91, 91, 90, 89, 89, 88, 87, 86, 84,
84, 83, 81, 81, 79, 79, 77, 76, 76, 74, 72, 72, 71,
69, 69, 67, 66, 65, 63, 63, 62, 61, 59, 59, 58, 57, 56, 55, 53, 53, 52, 52, 50, 49, 48, 47, 46, 46,
44, 44, 43, 42, 41, 41, 39, 38, 38, 36, 35, 34, 33,
32, 31, 30, 29, 29, 26, 26, 24, 23, 22, 21, 20, 19, 19, 17, 17, 15, 15, 13, 13, 12, 10, 10, 8, 8, 6,
6, 6, 4, 3, 3)
bucket8 sum:5019, content= (99, 98, 97, 97, 96, 95, 94, 93, 91, 91, 90, 89, 89, 88, 87, 86, 84,
84, 83, 81, 80, 80, 79, 77, 76, 76, 73, 73, 72, 70,
70, 68, 68, 66, 64, 64, 63, 62, 60, 60, 59, 58, 57, 56, 55, 53, 53, 52, 51, 51, 49, 48, 47, 46, 46,
44, 44, 43, 42, 41, 40, 40, 38, 38, 36, 35, 34, 33,
32, 31, 30, 29, 28, 27, 26, 24, 23, 22, 21, 20, 19, 19, 17, 16, 16, 15, 13, 13, 11, 11, 9, 9, 7, 7,
6, 6, 4, 3, 3)
bucket9 sum:5020, content= (99, 98, 97, 97, 96, 95, 93, 93, 92, 91, 90, 89, 89, 88, 87, 86, 84,
84, 83, 81, 80, 80, 79, 77, 76, 76, 73, 73, 72, 70,
70, 68, 68, 66, 64, 64, 63, 62, 60, 60, 59, 57, 57, 56, 55, 54, 53, 52, 51, 51, 49, 48, 47, 46, 46,
44, 44, 43, 42, 41, 40, 40, 38, 38, 36, 35, 34, 33,
31, 31, 31, 29, 28, 27, 26, 23, 23, 23, 21, 20, 19, 19, 17, 16, 16, 14, 14, 13, 11, 11, 9, 9, 7, 7,
6, 5, 5, 3, 2, 2)
bucket10 sum:5020, content= (99, 98, 97, 97, 96, 95, 93, 93, 92, 91, 90, 89, 89, 88, 87, 86,
84, 84, 82, 82, 80, 80, 78, 78, 76, 75, 74, 73, 72, 70,
70, 68, 68, 66, 64, 64, 62, 62, 61, 60, 59, 57, 57, 56, 55, 54, 53, 52, 51, 51, 49, 47, 47, 47, 46,
44, 44, 43, 42, 41, 40, 40, 38, 38, 36, 35, 34, 32,
32, 31, 31, 29, 27, 27, 26, 25, 23, 22, 21, 20, 19, 18, 18, 16, 16, 14, 14, 13, 11, 11, 9, 9, 7, 7,
6, 5, 5, 3, 2, 2)
"----Comparison for the 111 example----"
"***tf from benchmark was 5031(we added the number of machines) and target function
from our local search is 5031"
***RESULT IS THE SAME
Run time: 0 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 12))

"Avegare error: 0"
"-----END 112 from 130-----"
"-----START 113 from 130-----"

```

"input file number 113: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_10_2.txt and solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_10_1000_2.txt"

****Data from file U_1_1000_10_2.txt: machinesNum=10 jobsNum=1000"

****SOLUTION Data from file SOL_U_1_10_1000_2.txt: machinesNum=10 jobsNum=1000 lowerBound=5110 upperBound=5110 isOptimal=1"

Content of machines summed (5110, 5110, 5110, 5110, 5110, 5110, 5110, 5109, 5109, 5109)

input selected: size 1000 sum 51097

----Our Results-----

best from Our local search found:

target function = 5120, num of machines=10, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:5110, content= (99, 98, 96, 96, 94, 94, 92, 91, 90, 90, 88, 87, 87, 85, 85, 84, 83, 83, 82, 80, 80, 79, 79, 77, 77, 76, 75, 74, 73, 72, 71, 70, 69, 68, 66, 66, 65, 64, 62, 61, 60, 59, 58, 57, 57, 55, 54, 53, 53, 52, 51, 50, 50, 49, 48, 48, 46, 45, 45, 43, 43, 42, 40, 40, 38, 38, 36, 36, 34, 34, 33, 31, 30, 29, 27, 27, 26, 24, 22, 22, 20, 20, 18, 18, 17, 15, 15, 14, 12, 12, 11, 9, 8, 8, 6, 5, 4, 2, 2, 1)

bucket2 sum:5110, content= (99, 98, 96, 96, 94, 94, 92, 91, 90, 89, 88, 88, 86, 86, 85, 84, 83, 83, 81, 81, 80, 79, 79, 77, 77, 76, 75, 74, 73, 72, 71, 70, 68, 68, 67, 66, 65, 64, 62, 61, 60, 59, 58, 57, 57, 55, 54, 53, 52, 52, 52, 50, 50, 49, 48, 48, 46, 45, 45, 43, 43, 42, 40, 40, 38, 38, 36, 36, 34, 34, 33, 31, 30, 29, 27, 27, 26, 24, 22, 22, 20, 20, 18, 18, 16, 16, 15, 14, 12, 12, 11, 9, 8, 7, 7, 5, 3, 3, 2, 1)

bucket3 sum:5110, content= (99, 98, 96, 96, 94, 94, 92, 91, 90, 89, 88, 88, 86, 86, 85, 84, 83, 83, 81, 81, 80, 79, 79, 77, 77, 76, 75, 74, 73, 72, 71, 70, 68, 68, 67, 66, 65, 63, 63, 61, 60, 59, 58, 57, 57, 55, 54, 53, 52, 52, 52, 50, 50, 49, 48, 48, 46, 45, 45, 43, 43, 42, 40, 40, 38, 38, 36, 36, 34, 34, 33, 31, 30, 29, 27, 27, 26, 24, 22, 21, 21, 20, 18, 18, 16, 16, 15, 14, 12, 12, 11, 9, 8, 7, 7, 5, 3, 3, 2, 1)

bucket4 sum:5110, content= (99, 98, 96, 96, 94, 94, 92, 91, 90, 89, 88, 88, 86, 86, 85, 84, 83, 82, 82, 81, 80, 79, 79, 77, 77, 76, 75, 74, 73, 72, 71, 70, 68, 68, 67, 66, 65, 63, 63, 61, 60, 59, 58, 57, 57, 55, 54, 53, 52, 52, 51, 51, 50, 49, 48, 47, 47, 45, 45, 43, 42, 42, 41, 40, 38, 38, 36, 36, 34, 34, 32, 32, 30, 29, 27, 27, 25, 25, 22, 21, 21, 19, 19, 17, 17, 16, 15, 13, 13, 12, 11, 9, 8, 7, 7, 4, 4, 3, 2, 1)

bucket5 sum:5110, content= (99, 98, 96, 96, 94, 93, 93, 91, 90, 89, 88, 87, 87, 86, 85, 84, 83, 82, 82, 81, 80, 79, 78, 78, 77, 76, 75, 73, 73, 73, 71, 69, 69, 68, 67, 66, 65, 63, 63, 61, 60, 59, 58, 57, 56, 56, 54, 53, 52, 52, 51, 51, 50, 49, 48, 47, 47, 45, 45, 43, 42, 42, 41, 39, 39, 38, 36, 35, 35, 34, 32, 31, 31, 29, 27, 27, 25, 24, 22, 22, 21, 19, 19, 17, 17, 16, 15, 13, 13, 12, 10, 10, 8, 7, 7, 4, 4, 3, 2, 1)

bucket6 sum:5110, content= (99, 98, 96, 96, 94, 93, 93, 91, 90, 89, 88, 87, 87, 86, 85, 84, 83, 82, 82, 81, 80, 79, 78, 78, 77, 76, 75, 73, 73, 73, 70, 70, 69, 68, 67, 66, 65, 63, 62, 62, 60, 59, 58, 57, 56, 56, 54, 53, 52, 52, 51, 51, 50, 49, 48, 47, 47, 45, 45, 43, 42, 42, 41, 39, 39, 37, 37, 35,

35, 34, 32, 31, 31, 28, 28, 27, 25, 24, 22, 22, 21, 19, 19, 17, 17, 16, 15, 13, 13, 12, 10, 10, 8, 7, 7, 4, 4, 3, 2, 1)

bucket7 sum:5110, content= (99, 97, 97, 95, 95, 93, 93, 91, 90, 89, 88, 87, 87, 86, 85, 84, 83, 82, 82, 81, 80, 79, 78, 78, 77, 76, 75, 73, 73, 72, 71, 70, 69, 68, 67, 66, 65, 63, 62, 62, 60, 58, 58, 58, 56, 56, 54, 53, 52, 52, 51, 51, 50, 49, 48, 47, 46, 46, 45, 43, 42, 42, 41, 39, 39, 37, 37, 35, 35, 34, 32, 31, 31, 28, 28, 27, 25, 24, 22, 22, 21, 19, 19, 17, 17, 16, 15, 13, 13, 12, 10, 9, 9, 7, 7, 4, 4, 3, 2, 1)

bucket8 sum:5109, content= (99, 97, 97, 95, 95, 93, 93, 91, 90, 89, 88, 87, 87, 85, 85, 85, 83, 82, 82, 81, 80, 79, 78, 78, 77, 76, 74, 74, 73, 72, 71, 70, 69, 68, 67, 66, 65, 63, 62, 62, 59, 59, 58, 58, 56, 55, 55, 53, 52, 52, 51, 51, 50, 49, 48, 47, 46, 46, 45, 43, 42, 42, 41, 39, 39, 37, 37, 35, 35, 33, 33, 31, 31, 28, 28, 27, 25, 23, 23, 22, 20, 20, 18, 18, 17, 16, 15, 13, 13, 11, 11, 9, 9, 7, 6, 6, 3, 3, 1, 1)

bucket9 sum:5109, content= (99, 97, 97, 95, 95, 93, 92, 92, 90, 88, 88, 88, 87, 85, 85, 84, 84, 82, 82, 81, 80, 79, 78, 78, 76, 76, 75, 74, 73, 72, 71, 70, 69, 68, 67, 66, 65, 63, 62, 61, 61, 58, 58, 58, 56, 55, 55, 53, 52, 52, 51, 50, 50, 50, 48, 47, 46, 46, 44, 44, 42, 42, 41, 39, 39, 37, 36, 36, 35, 33, 33, 31, 30, 29, 28, 27, 25, 23, 23, 22, 20, 20, 18, 18, 17, 16, 14, 14, 13, 11, 11, 9, 8, 8, 6, 6, 3, 3, 1, 1)

bucket10 sum:5109, content= (98, 98, 97, 95, 94, 94, 92, 92, 90, 88, 88, 88, 87, 85, 85, 84, 83, 83, 82, 81, 80, 79, 78, 78, 76, 76, 75, 74, 73, 72, 71, 70, 69, 68, 66, 66, 65, 64, 62, 61, 59, 59, 58, 58, 57, 55, 54, 53, 53, 52, 51, 50, 50, 49, 49, 47, 46, 46, 44, 44, 42, 42, 41, 39, 39, 37, 36, 36, 35, 33, 33, 31, 30, 29, 28, 26, 26, 23, 22, 22, 21, 20, 18, 18, 17, 15, 15, 14, 13, 11, 11, 9, 8, 8, 6, 4, 4, 3, 2, 1)

"----Comparison for the 112 example----"

****tf from benchmark was 5120(we added the number of machines) and target function from our local search is 5120"

***RESULT IS THE SAME

Run time: 0.015 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 13))

"Avegare error: 0"

"-----END 113 from 130-----"

"-----START 114 from 130-----"

"input file number 114: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_10_3.txt and solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_10_1000_3.txt"

****Data from file U_1_1000_10_3.txt: machinesNum=10 jobsNum=1000"

****SOLUTION Data from file SOL_U_1_10_1000_3.txt: machinesNum=10 jobsNum=1000 lowerBound=4926 upperBound=4926 isOptimal=1"

Content of machines summed (4926, 4926, 4926, 4926, 4926, 4925, 4925, 4925, 4925, 4925)

input selected: size 1000 sum 49255

----Our Results-----

best from Our local search found:

target function = 4936, num of machines=10, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:4926, content= (99, 99, 96, 95, 95, 93, 93, 91, 90, 89, 88, 88, 86, 86, 85, 84, 83, 83, 82, 81, 80, 78, 78, 77, 76, 75, 73, 73, 71, 70, 69, 68, 67, 66, 65, 65, 63, 62, 61, 60, 60, 57, 57, 55, 54, 53, 53, 52, 50, 49, 48, 47, 46, 45, 44, 43, 42, 41, 39, 39, 37, 37, 37, 35, 34, 33, 33, 33, 31, 30, 29, 28, 25, 24, 24, 22, 22, 20, 20, 19, 17, 17, 16, 16, 15, 14, 14, 13, 11, 11, 10, 8, 8, 7, 5, 5, 4, 2, 2, 1)

bucket2 sum:4926, content= (99, 98, 97, 95, 95, 93, 93, 91, 90, 89, 88, 87, 87, 86, 84, 84, 84, 83, 82, 81, 79, 79, 78, 77, 76, 75, 73, 73, 71, 70, 69, 68, 67, 66, 65, 65, 63, 62, 61, 60, 60, 57, 57, 55, 54, 53, 53, 52, 50, 49, 48, 47, 46, 45, 44, 43, 42, 41, 39, 39, 37, 37, 37, 35, 34, 33, 33, 32, 32, 30, 29, 28, 25, 24, 24, 22, 21, 21, 20, 19, 17, 17, 16, 16, 15, 14, 14, 13, 11, 11, 10, 8, 8, 7, 5, 5, 3, 3, 2, 1)

bucket3 sum:4926, content= (99, 98, 96, 96, 95, 93, 92, 92, 90, 89, 88, 87, 87, 86, 84, 84, 84, 83, 82, 81, 79, 79, 78, 77, 76, 75, 73, 73, 71, 70, 69, 68, 67, 66, 65, 65, 63, 62, 61, 60, 59, 58, 57, 55, 54, 53, 53, 51, 51, 49, 48, 47, 46, 45, 44, 43, 42, 40, 40, 38, 38, 37, 36, 35, 35, 33, 33, 32, 32, 30, 29, 28, 25, 24, 24, 22, 21, 21, 20, 19, 17, 17, 16, 16, 15, 14, 14, 13, 11, 11, 9, 9, 8, 6, 6, 5, 3, 3, 2, 1)

bucket4 sum:4926, content= (99, 98, 96, 96, 94, 94, 92, 92, 90, 89, 88, 87, 87, 85, 85, 84, 84, 82, 82, 82, 79, 79, 78, 77, 76, 74, 74, 72, 72, 70, 69, 67, 67, 67, 65, 65, 63, 62, 61, 60, 59, 58, 56, 56, 54, 53, 53, 51, 51, 49, 48, 47, 46, 45, 44, 43, 41, 41, 40, 38, 38, 37, 36, 35, 35, 33, 33, 32, 31, 31, 29, 27, 26, 24, 23, 23, 21, 21, 20, 18, 18, 17, 16, 16, 15, 14, 14, 13, 11, 11, 9, 9, 8, 6, 6, 4, 4, 3, 2, 1)

bucket5 sum:4926, content= (99, 98, 96, 96, 94, 94, 92, 92, 90, 89, 88, 87, 87, 85, 85, 84, 84, 82, 82, 81, 80, 78, 78, 78, 76, 74, 74, 72, 72, 70, 69, 67, 67, 67, 65, 64, 64, 62, 61, 60, 59, 58, 56, 56, 54, 53, 53, 51, 51, 49, 48, 46, 46, 45, 44, 44, 41, 41, 40, 38, 38, 37, 36, 35, 34, 34, 33, 32, 31, 31, 29, 27, 26, 24, 23, 22, 22, 21, 20, 18, 18, 17, 16, 15, 15, 15, 14, 12, 12, 11, 9, 9, 8, 6, 6, 4, 4, 3, 2, 1)

bucket6 sum:4925, content= (99, 98, 96, 96, 94, 94, 92, 91, 91, 89, 88, 87, 86, 86, 85, 84, 84, 82, 82, 81, 80, 78, 78, 78, 76, 74, 74, 72, 72, 70, 69, 67, 67, 66, 66, 64, 64, 62, 61, 60, 58, 58, 57, 56, 54, 53, 53, 51, 50, 50, 48, 46, 46, 45, 44, 43, 42, 41, 40, 38, 38, 37, 36, 35, 34, 34, 33, 32, 31, 31, 29, 27, 26, 24, 23, 22, 22, 21, 20, 18, 18, 17, 16, 15, 15, 15, 14, 12, 12, 10, 10, 9, 8, 6, 6, 4, 4, 3, 1, 1)

bucket7 sum:4925, content= (99, 98, 96, 96, 94, 94, 92, 91, 91, 89, 88, 87, 86, 86, 85, 84, 83, 83, 82, 81, 80, 78, 78, 77, 76, 75, 74, 72, 71, 70, 69, 68, 67, 66, 66, 64, 63, 62, 61, 61, 58, 58, 57, 55, 54, 54, 52, 52, 50, 50, 47, 47, 46, 45, 44, 43, 42, 41, 40, 38, 38, 37, 36, 35, 34, 34, 33, 32, 31, 31, 29, 27, 26, 24, 23, 22, 22, 21, 19, 19, 18, 17, 16, 15, 15, 15, 14, 12, 12, 10, 10, 9, 7, 7, 6, 4, 4, 3, 1, 1)

bucket8 sum:4925, content= (99, 98, 96, 96, 94, 94, 92, 91, 91, 88, 88, 88, 86, 86, 85, 84, 83, 83, 82, 81, 80, 78, 78, 76, 76, 76, 73, 73, 71, 70, 69, 68, 67, 66, 66, 64, 63, 62, 61, 61, 58, 58, 57, 55, 54, 54, 52, 52, 50, 49, 48, 47, 46, 45, 44,

43, 42, 41, 39, 39, 38, 37, 36, 35, 34, 34, 33, 32,
31, 31, 28, 28, 25, 25, 23, 22, 22, 21, 19, 19, 18, 17, 16, 15, 15, 14, 14, 13, 12, 10, 10, 8, 8, 7,
5, 5, 4, 2, 2, 1)
bucket9 sum:4925, content= (99, 97, 97, 95, 95, 93, 93, 91, 90, 90, 88, 87, 86, 86, 85, 84, 83,
83, 82, 80, 80, 79, 78, 76, 76, 75, 74, 73, 71, 70,
69, 68, 67, 66, 66, 64, 63, 62, 61, 60, 60, 58, 56, 55, 54, 54, 52, 52, 50, 49, 48, 47, 46, 45, 44,
42, 42, 41, 40, 39, 38, 37, 36, 35, 34, 34, 33, 32,
31, 30, 30, 27, 25, 25, 23, 22, 22, 20, 20, 19, 18, 16, 16, 16, 15, 14, 14, 13, 11, 11, 10, 8, 8, 7,
5, 5, 4, 2, 2, 1)
bucket10 sum:4925, content= (99, 97, 97, 95, 95, 93, 93, 91, 90, 88, 88, 88, 87, 86, 85, 84,
83, 83, 82, 80, 80, 79, 78, 76, 76, 75, 74, 73, 71, 70,
69, 68, 67, 66, 65, 65, 63, 62, 61, 60, 60, 58, 56, 55, 54, 54, 52, 52, 50, 49, 48, 47, 46, 45, 44,
42, 42, 41, 40, 39, 38, 37, 35, 35, 35, 33, 33, 33,
31, 30, 30, 26, 26, 25, 23, 22, 22, 20, 20, 19, 17, 17, 16, 16, 15, 14, 14, 13, 11, 11, 10, 8, 8, 7,
5, 5, 4, 2, 2, 1)
"----Comparison for the 113 example----"
"***tf from benchmark was 4936(we added the number of machines) and target function
from our local search is 4936"
***RESULT IS THE SAME
Run time: 0.016 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 14))

"Avegare error: 0"
"-----END 114 from 130-----"
"-----START 115 from 130-----"

"***Data from file U_1_1000_10_4.txt: machinesNum=10 jobsNum=1000"
"***SOLUTION Data from file SOL_U_1_10_1000_4.txt: machinesNum=10
jobsNum=1000 lowerBound=5119 upperBound=5119
isOptimal=1"
Content of machines summed (5119, 5119, 5119, 5119, 5119, 5119, 5118, 5118, 5118, 5118)
input selected: size 1000 sum 51186
----Our Results-----
best from Our local search found:
target function = 5129, num of machines=10, square root lms=0
machines content(number of jobs=1000):
bucket1 sum:5119, content= (99, 98, 97, 96, 96, 95, 94, 93, 92, 91, 91, 90, 89, 89, 86, 86, 86,
85, 83, 82, 80, 80, 78, 76, 76, 74, 73, 72, 72, 71,
70, 70, 68, 67, 67, 65, 65, 64, 63, 62, 61, 60, 59, 58, 58, 57, 56, 55, 55, 52, 51, 50, 49, 49, 47,
46, 45, 43, 42, 42, 40, 40, 39, 38, 37, 36, 35, 34,
33, 32, 31, 30, 29, 28, 27, 27, 26, 24, 24, 22, 21, 20, 19, 18, 18, 17, 15, 14, 12, 12, 11, 9, 9, 7,
6, 4, 3, 3, 2, 1)
bucket2 sum:5119, content= (99, 98, 97, 96, 96, 95, 94, 93, 92, 91, 91, 90, 89, 88, 87, 86, 86,
85, 83, 82, 80, 80, 78, 76, 76, 74, 73, 72, 72, 71,
70, 70, 68, 67, 67, 65, 65, 64, 63, 62, 61, 60, 59, 58, 58, 57, 56, 55, 54, 52, 52, 50, 49, 49, 46,
46, 46, 43, 42, 42, 40, 40, 39, 38, 37, 36, 35, 34,

33, 32, 31, 30, 29, 28, 27, 27, 26, 24, 24, 22, 21, 20, 19, 18, 18, 16, 16, 13, 13, 12, 11, 9, 8, 8, 6, 4, 3, 3, 2, 1)

bucket3 sum:5119, content= (99, 98, 97, 96, 96, 95, 94, 93, 92, 91, 91, 90, 89, 88, 87, 86, 86, 84, 84, 82, 80, 79, 79, 76, 76, 74, 73, 72, 72, 71, 70, 70, 68, 67, 67, 65, 65, 64, 63, 62, 61, 60, 59, 58, 58, 57, 56, 55, 54, 52, 51, 50, 50, 48, 47, 46, 45, 44, 42, 42, 40, 40, 39, 38, 37, 36, 35, 34, 33, 32, 31, 30, 29, 28, 27, 27, 25, 25, 24, 22, 21, 20, 19, 18, 18, 16, 15, 14, 13, 12, 11, 9, 8, 8, 5, 5, 3, 3, 2, 1)

bucket4 sum:5119, content= (99, 98, 97, 96, 96, 95, 94, 93, 92, 91, 91, 90, 89, 88, 87, 86, 86, 84, 84, 82, 80, 79, 78, 77, 75, 74, 73, 73, 72, 71, 70, 70, 68, 67, 66, 66, 65, 64, 63, 62, 61, 60, 59, 58, 58, 57, 56, 55, 54, 52, 51, 50, 50, 48, 47, 46, 45, 44, 42, 42, 40, 40, 39, 38, 37, 36, 35, 34, 33, 32, 31, 30, 29, 28, 27, 27, 25, 25, 24, 22, 21, 20, 19, 18, 18, 16, 15, 14, 13, 12, 11, 9, 8, 7, 6, 5, 3, 3, 2, 1)

bucket5 sum:5119, content= (99, 98, 97, 96, 96, 95, 93, 93, 92, 92, 91, 90, 89, 88, 87, 86, 85, 85, 84, 81, 81, 79, 78, 77, 75, 74, 73, 73, 72, 71, 70, 69, 69, 67, 66, 66, 65, 64, 62, 62, 61, 60, 60, 58, 57, 57, 57, 55, 54, 52, 51, 50, 50, 48, 47, 46, 45, 44, 42, 42, 40, 40, 39, 38, 37, 36, 35, 34, 33, 32, 31, 30, 29, 28, 27, 26, 26, 25, 24, 22, 21, 20, 19, 18, 18, 16, 15, 14, 13, 12, 10, 10, 8, 7, 6, 5, 3, 3, 2, 1)

bucket6 sum:5119, content= (99, 98, 97, 96, 96, 95, 93, 93, 92, 92, 91, 90, 89, 88, 87, 86, 85, 85, 83, 82, 81, 79, 78, 77, 75, 74, 73, 73, 72, 71, 70, 69, 69, 67, 66, 66, 65, 63, 63, 62, 61, 60, 60, 58, 57, 57, 57, 55, 54, 52, 51, 50, 50, 48, 47, 46, 45, 44, 42, 41, 41, 39, 39, 39, 36, 36, 36, 34, 33, 31, 31, 31, 28, 28, 27, 27, 26, 25, 23, 23, 21, 20, 19, 18, 18, 16, 15, 14, 13, 12, 10, 10, 8, 7, 6, 5, 3, 3, 2, 1)

bucket7 sum:5118, content= (99, 98, 97, 96, 96, 95, 93, 93, 92, 92, 91, 90, 89, 88, 87, 86, 85, 85, 83, 82, 81, 79, 78, 77, 75, 74, 73, 72, 72, 72, 70, 69, 69, 67, 66, 66, 65, 63, 63, 62, 61, 60, 59, 59, 57, 57, 57, 55, 53, 53, 51, 50, 49, 49, 47, 46, 45, 44, 42, 41, 41, 39, 39, 39, 36, 36, 36, 34, 32, 32, 31, 31, 28, 28, 27, 27, 26, 25, 23, 22, 21, 21, 19, 18, 17, 17, 15, 14, 13, 11, 11, 10, 8, 7, 6, 4, 4, 3, 1, 1)

bucket8 sum:5118, content= (99, 98, 97, 96, 96, 94, 94, 93, 92, 92, 91, 90, 89, 88, 87, 86, 85, 85, 83, 82, 81, 79, 78, 77, 75, 74, 73, 72, 72, 72, 70, 69, 69, 67, 66, 66, 64, 64, 63, 62, 61, 60, 59, 59, 57, 57, 57, 55, 53, 52, 52, 50, 49, 49, 47, 46, 45, 43, 43, 41, 41, 39, 39, 38, 37, 36, 35, 35, 32, 32, 31, 30, 30, 28, 27, 26, 26, 25, 23, 22, 21, 21, 19, 18, 17, 17, 15, 14, 13, 11, 11, 10, 8, 7, 6, 4, 4, 2, 2, 1)

bucket9 sum:5118, content= (99, 97, 97, 96, 96, 96, 93, 93, 92, 92, 90, 90, 90, 88, 87, 86, 85, 85, 83, 82, 81, 79, 78, 77, 74, 74, 74, 72, 72, 71, 71, 69, 68, 68, 66, 65, 65, 64, 63, 62, 61, 60, 59, 58, 58, 57, 56, 56, 53, 52, 52, 50, 49, 49, 47, 46, 45, 43, 43, 41, 40, 40, 39, 38, 37, 36, 35, 35, 32, 32, 31, 30, 28, 28, 28, 27, 26, 25, 23, 22, 21, 20, 19, 19, 17, 17, 15, 14, 12, 12, 11, 10, 8, 6, 6, 5, 4, 2, 2, 1)

bucket10 sum:5118, content= (98, 98, 97, 96, 96, 94, 94, 93, 92, 92, 91, 90, 89, 89, 87, 86, 85, 85, 83, 82, 80, 80, 77, 77, 76, 74, 73, 72, 72, 71,

71, 69, 68, 67, 67, 65, 65, 64, 63, 62, 61, 60, 59, 58, 58, 57, 56, 55, 55, 52, 50, 50, 50, 49, 47, 46, 45, 43, 43, 41, 40, 40, 39, 37, 37, 36, 36, 34, 33, 32, 31, 30, 28, 28, 28, 27, 26, 25, 23, 22, 21, 19, 19, 19, 18, 17, 14, 14, 13, 12, 11, 10, 8, 6, 6, 5, 3, 3, 2, 1)

"----Comparison for the 114 example----"

****tf from benchmark was 5129(we added the number of machines) and target function from our local search is 5129"

***RESULT IS THE SAME

Run time: 0.016 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 15))

"Avegare error: 0"

"-----END 115 from 130-----"

"-----START 116 from 130-----"

"input file number 116: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_10_5.txt and solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_10_1000_5.txt"

****Data from file U_1_1000_10_5.txt: machinesNum=10 jobsNum=1000"

****SOLUTION Data from file SOL_U_1_10_1000_5.txt: machinesNum=10

jobsNum=1000 lowerBound=4885 upperBound=4885

isOptimal=1"

Content of machines summed (4885, 4885, 4884, 4884, 4884, 4884, 4884, 4884, 4884, 4884)

input selected: size 1000 sum 48842

----Our Results-----

best from Our local search found:

target function = 4895, num of machines=10, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:4885, content= (99, 97, 96, 93, 93, 92, 90, 90, 89, 88, 88, 86, 85, 84, 83, 83, 81, 80, 79, 79, 77, 75, 75, 74, 73, 72, 71, 69, 69, 68,

67, 66, 65, 63, 62, 62, 61, 60, 59, 59, 57, 56, 55, 54, 53, 52, 51, 50, 50, 48, 47, 46, 45, 44, 44, 42, 42, 41, 41, 40, 39, 38, 37, 36, 35, 35, 33, 32,

32, 30, 30, 30, 28, 27, 27, 26, 25, 25, 22, 22, 20, 18, 18, 17, 16, 16, 14, 13, 13, 12, 11, 11, 9, 7, 7, 5, 4, 2, 2, 1)

bucket2 sum:4885, content= (99, 97, 96, 93, 93, 91, 91, 90, 89, 88, 87, 87, 85, 84, 83, 82, 82, 80, 79, 79, 77, 75, 75, 74, 73, 72, 71, 69, 69, 68,

67, 66, 65, 63, 62, 62, 61, 60, 59, 59, 57, 56, 55, 54, 53, 52, 51, 50, 50, 48, 47, 46, 45, 44, 43, 43, 42, 41, 41, 40, 39, 37, 37, 37, 35, 34, 34, 32,

32, 30, 30, 29, 29, 27, 27, 26, 25, 24, 23, 21, 21, 18, 18, 17, 16, 16, 14, 13, 13, 12, 11, 11, 8, 8, 6, 6, 4, 2, 2, 1)

bucket3 sum:4884, content= (99, 97, 95, 94, 93, 91, 91, 90, 89, 88, 87, 87, 85, 84, 83, 82, 82, 80, 79, 79, 76, 76, 75, 74, 73, 72, 70, 70, 69, 68,

67, 66, 65, 63, 62, 62, 61, 60, 59, 59, 57, 56, 55, 54, 53, 52, 51, 50, 50, 48, 47, 46, 45, 44, 43, 43, 42, 41, 41, 40, 39, 37, 37, 36, 36, 34, 34, 32,

32, 30, 30, 29, 29, 27, 27, 26, 25, 24, 23, 21, 21, 18, 18, 17, 16, 15, 15, 13, 13, 12, 11, 11, 8, 8, 6, 6, 3, 3, 1, 1)

bucket4 sum:4884, content= (99, 97, 95, 94, 93, 91, 91, 90, 89, 88, 87, 86, 85, 85, 83, 82, 81, 81, 79, 79, 76, 76, 75, 74, 73, 72, 70, 70, 69, 68,

67, 66, 65, 63, 62, 62, 61, 60, 59, 59, 57, 56, 55, 54, 53, 52, 51, 50, 49, 49, 47, 46, 45, 44, 43,

43, 42, 41, 41, 40, 38, 38, 37, 36, 36, 34, 34, 32,
32, 30, 30, 29, 29, 27, 27, 26, 25, 24, 23, 21, 20, 19, 18, 17, 16, 15, 15, 13, 13, 12, 11, 11, 8,
8, 6, 6, 3, 3, 1, 1)
bucket5 sum:4884, content= (98, 98, 95, 94, 92, 92, 91, 90, 89, 88, 87, 86, 85, 85, 83, 82, 81,
81, 79, 78, 77, 76, 74, 74, 74, 71, 71, 70, 69, 68,
67, 65, 65, 64, 62, 62, 61, 60, 59, 59, 57, 56, 55, 54, 53, 51, 51, 51, 49, 49, 47, 46, 45, 44, 43,
43, 42, 41, 41, 39, 39, 38, 37, 36, 36, 34, 34, 32,
32, 30, 30, 29, 28, 28, 27, 26, 25, 24, 23, 21, 20, 19, 18, 17, 16, 15, 14, 14, 13, 12, 11, 11, 8,
8, 6, 5, 4, 2, 2, 1)
bucket6 sum:4884, content= (98, 98, 95, 94, 92, 92, 91, 90, 89, 88, 87, 86, 85, 84, 84, 82, 81,
80, 80, 78, 77, 76, 74, 74, 74, 71, 71, 70, 69, 68,
67, 65, 65, 64, 62, 62, 61, 60, 59, 59, 57, 56, 55, 54, 53, 51, 51, 51, 49, 48, 48, 46, 45, 44, 43,
43, 42, 41, 41, 39, 39, 38, 37, 36, 36, 34, 34, 32,
32, 30, 30, 29, 28, 28, 27, 26, 25, 24, 23, 21, 20, 19, 17, 17, 16, 16, 14, 14, 12, 12, 12, 10, 9,
8, 6, 5, 4, 2, 2, 1)
bucket7 sum:4884, content= (98, 97, 96, 94, 92, 92, 91, 90, 89, 88, 87, 86, 85, 84, 84, 82, 81,
80, 80, 78, 77, 76, 74, 74, 73, 72, 71, 70, 69, 68,
66, 66, 65, 64, 62, 62, 61, 60, 59, 58, 58, 56, 54, 54, 53, 52, 51, 51, 49, 48, 48, 46, 44, 44, 44,
43, 42, 41, 41, 39, 39, 38, 37, 36, 36, 34, 33, 33,
31, 31, 30, 29, 28, 28, 27, 26, 25, 24, 22, 22, 20, 19, 17, 17, 16, 16, 14, 13, 13, 12, 12, 10, 9,
8, 6, 5, 4, 2, 2, 1)
bucket8 sum:4884, content= (98, 97, 96, 93, 93, 92, 90, 90, 89, 89, 87, 86, 85, 84, 84, 82, 81,
80, 80, 78, 77, 75, 75, 74, 73, 72, 71, 70, 68, 68,
68, 65, 65, 63, 63, 62, 60, 60, 60, 58, 58, 56, 54, 54, 53, 52, 51, 51, 49, 48, 47, 46, 45, 44, 44,
43, 42, 41, 40, 40, 39, 38, 37, 36, 36, 34, 33, 33,
31, 31, 30, 29, 28, 27, 27, 27, 25, 23, 23, 22, 20, 19, 17, 17, 16, 16, 14, 13, 13, 12, 12, 10, 9,
7, 7, 5, 4, 2, 2, 1)
bucket9 sum:4884, content= (98, 97, 96, 93, 93, 92, 90, 90, 89, 89, 87, 86, 85, 84, 84, 82, 81,
80, 80, 78, 77, 75, 75, 74, 72, 72, 71, 70, 69, 68,
66, 66, 65, 64, 63, 61, 61, 60, 60, 58, 57, 56, 55, 54, 53, 52, 51, 51, 49, 48, 46, 46, 45, 44, 44,
43, 42, 42, 40, 40, 39, 38, 37, 36, 35, 35, 33, 33,
31, 31, 30, 29, 28, 27, 27, 26, 26, 23, 23, 22, 20, 19, 17, 17, 16, 16, 14, 13, 13, 12, 12, 10, 9,
7, 7, 5, 4, 2, 2, 1)
bucket10 sum:4884, content= (98, 96, 96, 94, 93, 92, 90, 90, 89, 88, 88, 86, 85, 84, 83, 83,
81, 80, 80, 78, 77, 75, 75, 74, 72, 72, 71, 70, 69, 68,
66, 66, 65, 64, 63, 61, 61, 60, 59, 59, 56, 56, 55, 54, 54, 52, 51, 50, 50, 48, 46, 46, 45, 44, 44,
43, 42, 42, 40, 40, 39, 38, 37, 36, 35, 35, 33, 33,
31, 30, 30, 30, 28, 27, 27, 26, 26, 23, 23, 22, 20, 19, 17, 17, 16, 16, 14, 13, 13, 12, 12, 10, 9,
7, 7, 4, 4, 3, 2, 1)

"----Comparison for the 115 example----"

***tf from benchmark was 4895(we added the number of machines) and target function
from our local search is 4895"

***RESULT IS THE SAME

Run time: 0.015 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 16))

"Avegare error: 0"


```

"-----END 116 from 130-----"
"-----START 117 from 130-----"


```

70, 70, 68, 67, 66, 65, 63, 62, 60, 60, 58, 57, 57, 55, 55, 54, 52, 52, 50, 50, 48, 47, 46, 46, 45,
44, 44, 42, 42, 39, 38, 37, 36, 36, 34, 34, 32, 32,
30, 29, 28, 26, 26, 25, 24, 22, 22, 20, 19, 18, 17, 17, 16, 15, 15, 13, 13, 13, 10, 10, 8, 8, 7, 7,
5, 4, 4, 3, 2, 1)

bucket7 sum:4954, content= (99, 98, 97, 97, 95, 95, 94, 92, 92, 91, 90, 89, 88, 87, 86, 85, 84,
84, 82, 81, 80, 79, 79, 77, 76, 76, 75, 73, 72, 71,
70, 70, 68, 67, 66, 65, 63, 62, 60, 59, 58, 58, 56, 56, 55, 54, 52, 52, 50, 50, 48, 47, 46, 46, 45,
44, 44, 42, 42, 39, 38, 37, 36, 36, 34, 33, 33, 32,
30, 29, 28, 26, 26, 25, 24, 22, 22, 20, 19, 18, 17, 17, 16, 15, 15, 13, 13, 12, 11, 9, 9, 8, 7, 7, 5,
4, 4, 3, 2, 1)

bucket8 sum:4954, content= (99, 98, 97, 97, 95, 95, 94, 92, 92, 91, 90, 89, 88, 87, 86, 85, 84,
84, 82, 81, 80, 79, 78, 78, 76, 76, 75, 73, 72, 71,
70, 70, 67, 67, 67, 64, 64, 62, 60, 58, 58, 58, 57, 56, 55, 54, 52, 52, 50, 49, 48, 47, 47, 46, 45,
44, 44, 42, 41, 40, 38, 37, 36, 36, 34, 33, 33, 32,
30, 29, 28, 26, 26, 25, 24, 22, 22, 19, 19, 19, 17, 17, 16, 15, 15, 13, 13, 12, 11, 9, 9, 8, 7, 7, 5,
4, 4, 3, 2, 1)

bucket9 sum:4954, content= (99, 98, 97, 96, 96, 94, 94, 93, 92, 91, 90, 89, 88, 87, 86, 85, 84,
83, 82, 82, 80, 79, 78, 78, 76, 76, 75, 72, 72, 72,
70, 69, 69, 67, 65, 65, 64, 61, 61, 58, 58, 58, 57, 56, 55, 53, 53, 52, 50, 49, 48, 47, 47, 46, 45,
44, 44, 42, 40, 40, 39, 37, 36, 36, 34, 33, 33, 32,
30, 29, 27, 27, 26, 25, 23, 23, 21, 21, 19, 18, 17, 17, 16, 15, 15, 13, 13, 11, 11, 10, 9, 8, 7, 6,
6, 4, 4, 3, 2, 1)

bucket10 sum:4954, content= (99, 98, 97, 96, 96, 94, 94, 93, 92, 91, 90, 88, 88, 87, 86, 86,
84, 83, 82, 82, 79, 79, 79, 78, 76, 76, 74, 74, 72, 71,
70, 69, 69, 67, 65, 65, 64, 61, 61, 58, 58, 58, 57, 56, 55, 53, 53, 52, 50, 49, 48, 47, 47, 46, 45,
44, 44, 42, 40, 40, 39, 37, 36, 36, 34, 33, 33, 32,
30, 29, 27, 27, 26, 25, 23, 23, 21, 19, 19, 19, 18, 16, 16, 16, 14, 14, 13, 11, 11, 10, 9, 8, 7, 6,
6, 4, 4, 2, 2, 2)

"----Comparison for the 116 example----

****tf from benchmark was 4964(we added the number of machines) and target function
from our local search is 4964"

***RESULT IS THE SAME

Run time: 0 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 17))

"Avegare error: 0"

"-----END 117 from 130-----"

"-----START 118 from 130-----"

"input file number 118: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_10_7.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_10_1000_7.txt"

****Data from file U_1_1000_10_7.txt: machinesNum=10 jobsNum=1000"

****SOLUTION Data from file SOL_U_1_10_1000_7.txt: machinesNum=10
jobsNum=1000 lowerBound=5153 upperBound=5153

isOptimal=1"

Content of machines summed (5153, 5153, 5153, 5153, 5152, 5152, 5152, 5152, 5152, 5152)
input selected: size 1000 sum 51524

----Our Results-----

best from Our local search found:

target function = 5163, num of machines=10, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:5153, content= (99, 98, 97, 95, 95, 94, 93, 93, 91, 91, 90, 89, 88, 87, 86, 85, 85, 83, 83, 82, 80, 80, 79, 78, 77, 76, 74, 74, 73, 73, 71, 70, 69, 68, 67, 67, 66, 64, 64, 62, 62, 61, 60, 59, 58, 57, 57, 55, 55, 54, 53, 52, 51, 50, 49, 49, 47, 46, 45, 44, 43, 41, 40, 39, 37, 37, 36, 34, 32, 32, 30, 29, 28, 26, 25, 25, 24, 23, 22, 21, 21, 19, 18, 17, 16, 16, 15, 13, 13, 12, 11, 10, 9, 9, 8, 7, 7, 4, 3, 1)

bucket2 sum:5153, content= (99, 98, 96, 96, 95, 94, 93, 93, 91, 91, 90, 89, 88, 87, 86, 85, 85, 83, 83, 82, 80, 80, 79, 78, 77, 76, 74, 74, 73, 72, 72, 70, 69, 68, 67, 67, 65, 65, 64, 62, 62, 61, 60, 59, 58, 57, 56, 56, 55, 54, 53, 52, 51, 50, 49, 49, 47, 46, 45, 44, 42, 42, 40, 39, 37, 37, 36, 34, 32, 32, 30, 29, 27, 26, 26, 24, 24, 23, 23, 21, 21, 19, 18, 17, 16, 16, 15, 13, 13, 12, 11, 10, 9, 9, 8, 7, 6, 4, 4, 1)

bucket3 sum:5153, content= (99, 98, 96, 96, 95, 94, 93, 93, 91, 91, 90, 89, 87, 87, 87, 85, 84, 84, 83, 82, 80, 80, 79, 78, 77, 76, 74, 74, 73, 72, 72, 70, 69, 68, 67, 67, 65, 65, 64, 62, 62, 60, 60, 59, 59, 57, 56, 56, 54, 54, 53, 53, 51, 50, 49, 49, 47, 46, 45, 44, 42, 42, 40, 38, 38, 37, 35, 35, 32, 32, 30, 29, 27, 26, 26, 24, 24, 23, 23, 21, 20, 20, 18, 17, 16, 16, 14, 14, 13, 12, 11, 10, 9, 9, 8, 7, 6, 4, 3, 2)

bucket4 sum:5153, content= (99, 97, 97, 96, 95, 94, 93, 93, 91, 91, 89, 89, 88, 87, 87, 85, 84, 84, 83, 82, 80, 80, 79, 78, 77, 75, 75, 74, 73, 72, 72, 70, 69, 68, 67, 67, 65, 65, 64, 62, 61, 61, 60, 59, 58, 58, 56, 56, 54, 54, 53, 53, 51, 50, 49, 49, 47, 46, 45, 44, 42, 42, 40, 38, 38, 37, 35, 35, 32, 31, 31, 29, 27, 26, 26, 24, 24, 23, 23, 21, 20, 19, 19, 17, 16, 16, 14, 14, 13, 11, 11, 11, 9, 9, 8, 7, 6, 4, 3, 2)

bucket5 sum:5153, content= (99, 97, 97, 96, 95, 94, 93, 93, 91, 90, 90, 89, 88, 87, 87, 85, 84, 84, 83, 82, 80, 80, 79, 78, 77, 75, 75, 74, 73, 72, 72, 70, 69, 68, 67, 66, 66, 65, 64, 62, 61, 61, 60, 59, 58, 58, 56, 55, 55, 54, 53, 52, 51, 51, 49, 49, 47, 46, 45, 43, 43, 42, 40, 38, 38, 37, 35, 35, 32, 31, 31, 29, 27, 26, 26, 24, 24, 23, 22, 22, 20, 19, 19, 17, 16, 16, 14, 14, 13, 11, 11, 10, 10, 9, 8, 7, 6, 4, 3, 1, 1)

bucket6 sum:5153, content= (99, 97, 97, 96, 95, 94, 93, 92, 92, 90, 90, 89, 88, 87, 86, 86, 84, 84, 83, 81, 81, 80, 79, 78, 76, 76, 75, 74, 73, 72, 71, 70, 69, 68, 68, 66, 66, 65, 64, 62, 61, 61, 60, 59, 58, 58, 56, 55, 55, 54, 53, 52, 51, 50, 50, 48, 48, 46, 45, 43, 43, 41, 40, 39, 38, 37, 35, 34, 33, 31, 30, 30, 27, 26, 25, 25, 24, 23, 22, 22, 20, 19, 19, 17, 16, 16, 14, 14, 13, 11, 11, 10, 10, 9, 8, 7, 5, 5, 3, 1, 1)

bucket7 sum:5151, content= (99, 97, 97, 96, 95, 94, 93, 92, 92, 90, 90, 89, 88, 87, 86, 86, 84, 84, 82, 82, 81, 80, 79, 78, 76, 76, 75, 74, 73, 72, 71, 70, 69, 68, 68, 66, 66, 65, 64, 62, 61, 61, 60, 59, 58, 58, 56, 55, 55, 54, 53, 52, 51, 50, 50, 48, 48, 46, 45, 43, 43, 41, 40, 39, 38, 36, 36, 34, 33, 31, 30, 30, 27, 26, 25, 25, 24, 23, 22, 22, 20, 19, 19, 17, 16, 15, 15, 14, 12, 12, 11, 10, 10, 9, 8, 7, 5, 5, 3)

bucket8 sum:5151, content= (98, 98, 97, 96, 94, 94, 94, 92, 92, 90, 90, 89, 88, 87, 86, 86, 84,

84, 82, 82, 81, 79, 79, 79, 76, 76, 75, 74, 73, 72,
71, 70, 69, 68, 67, 67, 66, 65, 63, 63, 61, 61, 60, 59, 58, 58, 56, 55, 55, 54, 53, 52, 51, 50, 50,
48, 48, 46, 45, 43, 43, 41, 40, 39, 38, 36, 36, 34,
33, 31, 30, 29, 28, 26, 25, 25, 24, 23, 22, 22, 20, 19, 19, 16, 16, 16, 15, 14, 12, 12, 11, 10, 10,
9, 8, 7, 5, 5, 3)
bucket9 sum:5152, content= (98, 98, 97, 95, 95, 94, 93, 93, 92, 90, 90, 89, 88, 87, 86, 85, 85,
83, 83, 82, 81, 79, 79, 79, 76, 76, 75, 74, 73, 72,
71, 70, 69, 68, 67, 67, 66, 65, 63, 63, 61, 61, 60, 59, 58, 57, 57, 55, 55, 54, 53, 52, 51, 50, 50,
48, 47, 46, 45, 44, 43, 41, 40, 39, 38, 36, 36, 33,
33, 32, 30, 28, 28, 27, 25, 25, 24, 23, 22, 21, 21, 19, 18, 18, 16, 15, 15, 13, 13, 12, 11, 10, 9,
9, 8, 7, 7, 4, 2, 2)
bucket10 sum:5152, content= (98, 98, 97, 95, 95, 94, 93, 93, 92, 90, 90, 89, 88, 87, 86, 85,
85, 83, 83, 82, 80, 80, 79, 78, 77, 76, 75, 73, 73, 73,
71, 70, 69, 68, 67, 67, 66, 64, 64, 63, 61, 61, 60, 59, 58, 57, 57, 55, 55, 54, 53, 51, 51, 51, 50,
48, 47, 46, 45, 44, 43, 40, 40, 39, 38, 37, 36, 33,
33, 32, 30, 28, 28, 27, 25, 25, 24, 23, 22, 21, 21, 19, 18, 18, 16, 15, 15, 13, 13, 12, 11, 10, 9,
9, 8, 7, 7, 4, 2, 2)
"----Comparison for the 117 example----"
"****tf from benchmark was 5163(we added the number of machines) and target function
from our local search is 5163"
***RESULT IS THE SAME
Run time: 0.016 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 18))

"Avegare error: 0"
"-----END 118 from 130-----"
"-----START 119 from 130-----"
"input file number 119: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_10_8.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_10_1000_8.txt"
"***Data from file U_1_1000_10_8.txt: machinesNum=10 jobsNum=1000"
"***SOLUTION Data from file SOL_U_1_10_1000_8.txt: machinesNum=10
jobsNum=1000 lowerBound=4855 upperBound=4855
isOptimal=1"
Content of machines summed (4855, 4855, 4855, 4855, 4855, 4855, 4854, 4854, 4854, 4854)
input selected: size 1000 sum 48546
----Our Results-----
best from Our local search found:
target function = 4865, num of machines=10, square root lms=0
machines content(number of jobs=1000):
bucket1 sum:4855, content= (99, 98, 96, 95, 95, 93, 92, 91, 90, 89, 89, 88, 87, 86, 85, 84, 83,
82, 81, 79, 78, 77, 77, 75, 74, 74, 71, 70, 69, 69,
68, 67, 66, 65, 64, 62, 61, 60, 60, 58, 58, 57, 56, 55, 54, 53, 52, 50, 49, 48, 48, 47, 46, 45, 44,
43, 42, 41, 40, 39, 39, 38, 37, 36, 35, 33, 31, 30,
29, 29, 28, 26, 26, 24, 23, 22, 22, 20, 19, 19, 16, 16, 16, 14, 14, 13, 12, 11, 9, 9, 8, 7, 7, 5, 5,
4, 3, 3, 2, 1)
bucket2 sum:4855, content= (99, 97, 97, 95, 94, 94, 92, 91, 90, 89, 89, 88, 87, 86, 85, 84, 83,
82, 80, 80, 78, 77, 76, 76, 74, 73, 72, 70, 69, 69,

68, 67, 66, 65, 63, 63, 61, 60, 60, 58, 58, 57, 56, 55, 54, 53, 51, 50, 50, 48, 48, 47, 46, 44, 44,
44, 42, 41, 40, 39, 39, 38, 37, 36, 35, 33, 31, 30,
29, 29, 28, 26, 26, 24, 23, 22, 22, 20, 19, 19, 16, 16, 15, 15, 14, 13, 12, 11, 9, 9, 8, 7, 7, 5, 5,
4, 3, 3, 2, 1)
bucket3 sum:4855, content= (99, 97, 97, 95, 94, 94, 92, 91, 90, 89, 89, 88, 87, 86, 85, 84, 83,
82, 80, 80, 78, 77, 76, 76, 74, 73, 72, 70, 69, 69,
67, 67, 67, 65, 63, 63, 61, 60, 59, 59, 58, 57, 56, 55, 54, 53, 51, 50, 50, 48, 48, 47, 46, 44, 44,
44, 42, 41, 40, 39, 39, 37, 37, 36, 36, 32, 32, 30,
29, 29, 28, 26, 25, 25, 23, 22, 22, 20, 19, 19, 16, 16, 15, 15, 14, 13, 12, 10, 10, 9, 8, 7, 7, 5, 4,
4, 4, 3, 2, 1)
bucket4 sum:4855, content= (99, 97, 96, 96, 94, 94, 91, 91, 91, 89, 89, 88, 87, 86, 85, 84, 83,
82, 80, 80, 78, 77, 76, 75, 75, 73, 72, 70, 69, 69,
67, 67, 66, 66, 63, 63, 61, 60, 59, 59, 58, 57, 56, 55, 54, 53, 51, 50, 50, 48, 48, 47, 46, 44, 44,
43, 43, 41, 40, 39, 38, 38, 37, 36, 35, 33, 31, 31,
29, 29, 27, 27, 25, 25, 23, 22, 22, 20, 19, 18, 17, 16, 15, 15, 14, 13, 12, 10, 10, 9, 8, 7, 7, 5, 4,
4, 4, 3, 2, 1)
bucket5 sum:4855, content= (99, 97, 96, 96, 94, 93, 92, 91, 90, 90, 89, 88, 87, 85, 85, 85, 82,
82, 81, 79, 79, 77, 76, 75, 75, 73, 72, 70, 69, 69,
67, 67, 66, 66, 63, 62, 62, 60, 59, 59, 58, 57, 56, 55, 54, 53, 51, 50, 50, 48, 48, 47, 45, 45, 44,
43, 43, 40, 40, 40, 38, 38, 37, 36, 35, 33, 31, 30,
30, 29, 27, 27, 25, 24, 24, 22, 21, 21, 19, 18, 17, 16, 15, 15, 14, 13, 12, 10, 10, 9, 8, 7, 6, 6, 4,
4, 4, 3, 2, 1)
bucket6 sum:4855, content= (99, 97, 96, 96, 94, 93, 92, 91, 90, 90, 89, 88, 87, 85, 85, 85, 82,
82, 81, 79, 79, 77, 76, 75, 75, 73, 71, 71, 69, 68,
68, 67, 66, 66, 63, 62, 62, 60, 59, 59, 58, 57, 56, 55, 54, 52, 52, 50, 50, 48, 47, 47, 46, 45, 44,
43, 42, 41, 40, 40, 38, 38, 37, 36, 35, 33, 31, 30,
30, 28, 28, 27, 25, 24, 23, 23, 21, 21, 19, 18, 17, 16, 15, 15, 14, 13, 12, 10, 10, 8, 8, 8, 6, 6, 4,
4, 4, 3, 2, 1)
bucket7 sum:4854, content= (99, 97, 96, 95, 95, 93, 92, 91, 90, 90, 89, 88, 86, 86, 85, 84, 83,
82, 81, 79, 78, 78, 76, 75, 75, 72, 72, 71, 69, 68,
68, 67, 66, 65, 64, 62, 61, 61, 59, 59, 58, 57, 56, 55, 54, 52, 52, 50, 49, 49, 47, 47, 46, 45, 44,
43, 42, 41, 40, 40, 38, 38, 37, 36, 34, 33, 32, 30,
30, 28, 28, 27, 25, 24, 23, 23, 21, 20, 20, 18, 17, 16, 15, 15, 14, 13, 12, 10, 10, 8, 8, 8, 6, 6, 4,
4, 3, 3, 3)
bucket8 sum:4854, content= (98, 98, 96, 95, 95, 93, 92, 91, 90, 90, 89, 88, 86, 86, 85, 84, 83,
82, 81, 79, 78, 78, 76, 75, 75, 72, 72, 71, 69, 68,
68, 67, 66, 65, 64, 62, 61, 60, 60, 59, 58, 57, 56, 55, 53, 53, 52, 50, 49, 49, 47, 47, 46, 45, 44,
43, 42, 41, 40, 39, 39, 38, 37, 36, 34, 33, 32, 30,
30, 28, 28, 26, 26, 24, 23, 23, 21, 20, 20, 18, 17, 16, 15, 15, 14, 13, 11, 11, 9, 9, 8, 8, 6, 6, 4,
4, 3, 3, 2, 1)
bucket9 sum:4854, content= (98, 98, 96, 95, 95, 92, 92, 91, 91, 90, 89, 88, 86, 86, 85, 83, 83,
82, 81, 80, 78, 78, 76, 75, 74, 74, 71, 71, 69, 68,
68, 67, 66, 65, 64, 62, 61, 60, 60, 59, 58, 56, 56, 56, 53, 53, 52, 50, 49, 49, 47, 47, 46, 45, 44,
43, 42, 41, 40, 39, 39, 38, 37, 36, 34, 33, 32, 30,
30, 28, 28, 26, 26, 24, 23, 23, 21, 20, 20, 18, 17, 16, 15, 14, 14, 14, 11, 11, 9, 9, 8, 8, 6, 5, 5,
4, 3, 3, 2, 1)

bucket10 sum:4854, content= (98, 98, 96, 95, 95, 92, 92, 91, 91, 90, 89, 87, 87, 86, 85, 83, 83, 82, 81, 80, 78, 77, 77, 75, 74, 74, 71, 70, 70, 68, 68, 67, 66, 64, 64, 63, 61, 60, 60, 58, 58, 57, 56, 55, 54, 53, 52, 50, 49, 48, 48, 47, 46, 45, 44, 43, 41, 41, 40, 40, 39, 38, 37, 36, 33, 33, 32, 31, 30, 28, 28, 26, 26, 24, 23, 22, 22, 20, 20, 18, 17, 16, 15, 14, 14, 13, 12, 11, 9, 9, 8, 7, 7, 5, 5, 4, 3, 3, 1, 1, 1)

"----Comparison for the 118 example----"

****tf from benchmark was 4865(we added the number of machines) and target function from our local search is 4865"

***RESULT IS THE SAME

Run time: 0.016 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 19))

"Avegare error: 0"

"-----END 119 from 130-----"

"-----START 120 from 130-----"

"input file number 120: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_10_9.txt and solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_10_1000_9.txt"

****Data from file U_1_1000_10_9.txt: machinesNum=10 jobsNum=1000"

****SOLUTION Data from file SOL_U_1_10_1000_9.txt: machinesNum=10

jobsNum=1000 lowerBound=4886 upperBound=4886

isOptimal=1"

Content of machines summed (4886, 4886, 4886, 4886, 4886, 4886, 4886, 4886, 4885, 4885)

input selected: size 1000 sum 48858

----Our Results-----

best from Our local search found:

target function = 4896, num of machines=10, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:4886, content= (99, 98, 96, 95, 94, 93, 93, 90, 89, 89, 88, 86, 84, 83, 82, 82, 80, 79, 79, 78, 76, 76, 75, 74, 73, 72, 71, 70, 70, 68, 68, 67, 65, 64, 63, 62, 61, 60, 59, 58, 57, 57, 56, 55, 54, 52, 52, 52, 50, 49, 47, 47, 46, 45, 43, 43, 41, 41, 40, 39, 39, 37, 36, 35, 35, 33, 33, 32, 31, 30, 29, 29, 28, 27, 26, 26, 25, 23, 22, 21, 20, 19, 19, 17, 17, 16, 15, 13, 12, 11, 10, 9, 9, 7, 5, 5, 4, 3, 2, 1)

bucket2 sum:4886, content= (99, 98, 96, 95, 94, 93, 93, 90, 89, 89, 87, 87, 84, 83, 82, 82, 80, 79, 79, 77, 77, 76, 75, 74, 73, 72, 71, 70, 69, 69, 68, 66, 66, 64, 63, 62, 61, 60, 59, 58, 57, 57, 56, 55, 53, 53, 52, 51, 51, 49, 47, 47, 46, 45, 43, 43, 41, 41, 40, 39, 39, 37, 36, 35, 35, 33, 33, 32, 31, 30, 29, 29, 28, 27, 26, 26, 25, 23, 22, 21, 20, 19, 19, 17, 17, 16, 15, 13, 12, 11, 10, 9, 8, 8, 5, 5, 4, 3, 2, 1)

bucket3 sum:4886, content= (99, 97, 97, 95, 94, 93, 93, 90, 89, 89, 87, 87, 84, 83, 82, 81, 81, 79, 79, 77, 77, 76, 75, 74, 73, 72, 71, 70, 69, 69, 68, 66, 66, 64, 63, 62, 61, 60, 59, 58, 57, 57, 56, 55, 53, 53, 52, 51, 51, 49, 47, 47, 46, 44, 44, 43, 41, 41, 40, 39, 39, 37, 36, 35, 35, 33, 33, 31, 31, 31, 29, 29, 28, 27, 26, 26, 24, 24, 22, 21, 20, 19, 19, 17, 17, 16, 14, 14, 12, 11, 10, 9, 8, 7, 5, 5, 5, 3, 2, 1)

bucket4 sum:4886, content= (99, 97, 97, 95, 94, 93, 92, 91, 89, 88, 88, 86, 84, 84, 82, 81, 80,

80, 79, 77, 77, 76, 75, 74, 73, 72, 71, 70, 69, 69,
67, 67, 66, 64, 63, 62, 61, 59, 59, 59, 57, 57, 56, 54, 54, 53, 52, 51, 51, 49, 47, 47, 45, 45, 44,
42, 42, 41, 40, 39, 38, 38, 36, 35, 34, 34, 32, 32,
31, 30, 30, 28, 28, 27, 27, 26, 24, 24, 22, 21, 20, 19, 18, 18, 17, 15, 15, 14, 12, 11, 10, 9, 8, 7,
5, 5, 5, 3, 2, 1)

bucket5 sum:4886, content= (99, 97, 97, 95, 94, 93, 92, 91, 89, 88, 88, 86, 84, 84, 82, 81, 80,
80, 79, 77, 77, 76, 75, 74, 73, 72, 71, 70, 69, 69,
67, 67, 65, 65, 63, 62, 61, 59, 59, 59, 57, 57, 55, 55, 54, 53, 52, 51, 50, 50, 47, 46, 46, 45, 44,
42, 42, 41, 40, 39, 38, 38, 36, 35, 34, 34, 32, 32,
31, 30, 30, 28, 28, 27, 27, 25, 25, 23, 23, 21, 20, 19, 18, 18, 17, 15, 15, 14, 12, 11, 10, 9, 8, 7,
5, 5, 4, 4, 2, 1)

bucket6 sum:4886, content= (99, 97, 96, 96, 94, 93, 92, 90, 90, 88, 88, 86, 84, 84, 82, 81, 80,
80, 79, 77, 77, 76, 75, 74, 73, 72, 71, 70, 69, 69,
67, 67, 65, 64, 63, 62, 61, 60, 59, 59, 57, 57, 55, 55, 54, 53, 52, 51, 50, 50, 47, 46, 46, 45, 44,
42, 42, 41, 40, 39, 38, 37, 37, 35, 34, 34, 32, 32,
31, 30, 29, 29, 28, 27, 27, 25, 25, 23, 22, 22, 20, 19, 18, 18, 17, 15, 15, 14, 12, 11, 10, 9, 8, 6,
6, 5, 4, 4, 2, 1)

bucket7 sum:4886, content= (98, 98, 96, 96, 94, 93, 92, 90, 90, 88, 88, 86, 84, 84, 82, 81, 80,
80, 78, 78, 77, 76, 75, 74, 73, 72, 71, 70, 69, 69,
67, 67, 65, 64, 63, 62, 61, 60, 59, 58, 58, 57, 55, 55, 54, 53, 52, 51, 50, 49, 48, 46, 46, 45, 44,
42, 42, 41, 40, 39, 38, 37, 37, 35, 34, 33, 33, 32,
31, 30, 29, 29, 28, 27, 27, 25, 25, 23, 22, 21, 20, 20, 18, 18, 17, 15, 15, 13, 13, 11, 10, 9, 8, 6,
6, 5, 4, 4, 2, 1)

bucket8 sum:4886, content= (98, 98, 96, 96, 94, 93, 92, 90, 89, 89, 88, 85, 85, 83, 83, 81, 80,
80, 78, 78, 77, 76, 75, 74, 73, 72, 70, 70, 70, 68,
68, 67, 65, 64, 63, 62, 61, 60, 59, 58, 58, 56, 56, 55, 54, 52, 52, 52, 50, 49, 47, 47, 46, 45, 44,
42, 42, 41, 40, 39, 38, 37, 37, 35, 34, 33, 33, 32,
31, 30, 29, 29, 28, 27, 27, 25, 25, 23, 22, 21, 20, 20, 18, 18, 16, 16, 15, 13, 13, 11, 10, 9, 8, 6,
6, 5, 4, 4, 2, 1)

bucket9 sum:4885, content= (98, 98, 96, 95, 95, 93, 92, 90, 89, 89, 88, 85, 85, 83, 83, 81, 80,
79, 79, 78, 76, 76, 75, 75, 73, 71, 71, 70, 70, 68,
68, 67, 65, 64, 63, 62, 61, 60, 59, 58, 57, 57, 56, 55, 54, 52, 52, 52, 50, 48, 48, 47, 46, 45, 44,
42, 41, 41, 41, 39, 38, 37, 36, 36, 34, 33, 33, 32,
31, 30, 29, 29, 28, 27, 27, 25, 25, 23, 22, 21, 20, 19, 19, 18, 16, 16, 15, 13, 12, 12, 9, 9, 9, 6,
6, 5, 4, 2, 2, 2)

bucket10 sum:4885, content= (98, 98, 96, 95, 94, 94, 91, 91, 89, 89, 88, 85, 85, 83, 83, 81,
80, 79, 79, 78, 76, 76, 75, 74, 73, 72, 71, 70, 70, 68,
68, 67, 65, 63, 63, 62, 61, 60, 59, 59, 57, 57, 56, 55, 54, 52, 52, 52, 50, 48, 48, 47, 46, 45, 43,
43, 41, 41, 40, 40, 38, 37, 36, 36, 34, 33, 33, 32,
31, 30, 29, 29, 28, 27, 26, 26, 25, 23, 22, 20, 20, 20, 19, 18, 16, 16, 15, 13, 12, 11, 11, 9, 8, 6,
6, 5, 4, 2, 2, 2)

"----Comparison for the 119 example----"

"***tf from benchmark was 4896(we added the number of machines) and target function
from our local search is 4896"

***RESULT IS THE SAME

Run time: 0 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 20))

"Avegare error: 0"

"-----END 120 from 130-----"

"-----START 121 from 130-----"

"input file number 121: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_25_0.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_25_1000_0.txt"

***Data from file U_1_1000_25_0.txt: machinesNum=25 jobsNum=1000"

***SOLUTION Data from file SOL_U_1_25_1000_0.txt: machinesNum=25

jobsNum=1000 lowerBound=2025 upperBound=2025

isOptimal=1"

Content of machines summed (2025, 2025, 2025, 2025, 2025, 2025, 2025, 2025, 2025, 2025,
2025, 2025, 2024, 2024, 2025, 2025, 2024, 2024,
2024, 2024, 2024, 2024, 2024, 2024, 2024)

input selected: size 1000 sum 50614

----Our Results-----

best from Our local search found:

target function = 2050, num of machines=25, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:2025, content= (99, 95, 93, 91, 89, 87, 84, 82, 80, 76, 75, 72, 70, 66, 65, 61, 58,
57, 54, 51, 50, 46, 44, 43, 40, 37, 36, 33, 29, 27,
26, 22, 20, 18, 14, 12, 10, 7, 4, 2)

bucket2 sum:2025, content= (99, 95, 93, 91, 89, 87, 84, 82, 80, 76, 75, 72, 70, 66, 65, 61, 58,
57, 54, 51, 50, 46, 44, 43, 40, 37, 35, 34, 29, 27,
26, 22, 20, 18, 14, 12, 10, 7, 4, 2)

bucket3 sum:2025, content= (99, 95, 93, 91, 89, 87, 84, 82, 80, 76, 75, 72, 70, 66, 65, 61, 58,
56, 55, 51, 50, 46, 44, 43, 40, 37, 35, 34, 29, 27,
26, 22, 20, 18, 14, 12, 10, 7, 4, 2)

bucket4 sum:2025, content= (99, 95, 93, 91, 89, 87, 84, 82, 79, 77, 75, 72, 69, 67, 64, 62, 58,
56, 55, 51, 49, 47, 44, 43, 40, 37, 35, 33, 30, 27,
25, 23, 20, 18, 14, 12, 10, 7, 4, 2)

bucket5 sum:2025, content= (99, 95, 93, 91, 89, 87, 84, 82, 79, 77, 75, 72, 69, 67, 64, 62, 58,
56, 55, 51, 49, 47, 44, 43, 40, 37, 35, 33, 30, 27,
25, 23, 20, 18, 14, 12, 10, 7, 4, 2)

bucket6 sum:2025, content= (99, 95, 93, 91, 89, 86, 85, 82, 79, 77, 75, 72, 69, 67, 64, 62, 58,
56, 54, 52, 49, 47, 44, 43, 40, 37, 35, 33, 30, 27,
25, 23, 20, 18, 14, 12, 9, 8, 4, 2)

bucket7 sum:2025, content= (99, 94, 94, 91, 89, 86, 85, 82, 79, 77, 75, 72, 69, 67, 64, 62, 58,
56, 54, 52, 49, 47, 44, 43, 40, 37, 35, 33, 30, 27,
25, 23, 20, 18, 14, 12, 9, 8, 4, 2)

bucket8 sum:2025, content= (99, 94, 94, 91, 89, 86, 85, 82, 79, 77, 75, 72, 69, 67, 64, 62, 58,
56, 54, 52, 49, 47, 44, 43, 39, 38, 35, 33, 30, 27,
25, 23, 20, 18, 14, 12, 9, 8, 4, 2)

bucket9 sum:2025, content= (99, 94, 94, 90, 90, 86, 85, 82, 79, 77, 75, 72, 69, 67, 64, 61, 59,
56, 54, 52, 49, 47, 44, 43, 39, 38, 35, 33, 30, 27,
25, 23, 20, 17, 15, 12, 9, 8, 4, 2)

bucket10 sum:2025, content= (99, 94, 94, 90, 90, 86, 85, 82, 79, 77, 74, 73, 69, 67, 64, 61,

59, 56, 54, 52, 49, 47, 44, 42, 41, 37, 35, 32, 31, 27,
25, 23, 20, 17, 15, 12, 9, 8, 4, 2)
bucket11 sum:2025, content= (98, 95, 94, 90, 90, 86, 85, 82, 79, 77, 74, 73, 69, 67, 63, 63,
58, 56, 54, 52, 49, 47, 44, 42, 39, 39, 35, 32, 31, 26,
26, 23, 20, 17, 15, 12, 9, 7, 5, 2)
bucket12 sum:2025, content= (98, 95, 94, 90, 90, 86, 85, 81, 80, 77, 74, 73, 69, 67, 63, 63,
57, 57, 54, 52, 48, 48, 44, 42, 39, 39, 35, 32, 31, 26,
26, 23, 20, 17, 15, 12, 9, 7, 5, 2)
bucket13 sum:2025, content= (98, 95, 94, 90, 90, 86, 85, 81, 80, 77, 74, 73, 69, 67, 63, 61,
60, 56, 54, 52, 48, 47, 45, 42, 39, 39, 35, 32, 31, 26,
26, 23, 19, 19, 13, 13, 9, 6, 6, 2)
bucket14 sum:2025, content= (98, 95, 94, 90, 89, 87, 85, 81, 80, 77, 74, 73, 69, 66, 65, 61,
59, 56, 54, 52, 48, 47, 45, 42, 39, 39, 35, 32, 30, 28,
25, 23, 19, 19, 13, 13, 9, 6, 6, 2)
bucket15 sum:2025, content= (98, 95, 94, 90, 89, 87, 85, 81, 80, 77, 74, 73, 68, 68, 63, 61,
60, 56, 54, 52, 48, 47, 45, 42, 39, 39, 35, 32, 30, 28,
25, 23, 19, 19, 13, 13, 9, 6, 6, 2)
bucket16 sum:2025, content= (98, 95, 93, 92, 89, 86, 85, 81, 80, 77, 74, 72, 70, 66, 65, 61,
59, 56, 54, 52, 48, 47, 45, 42, 39, 38, 36, 32, 30, 28,
24, 24, 19, 17, 16, 12, 8, 8, 5, 1, 1)
bucket17 sum:2025, content= (97, 96, 93, 92, 89, 86, 85, 81, 80, 76, 76, 71, 70, 66, 65, 61,
59, 56, 53, 53, 48, 47, 45, 42, 39, 38, 36, 32, 30, 28,
24, 23, 21, 17, 15, 11, 10, 6, 6, 1, 1)
bucket18 sum:2025, content= (97, 96, 93, 92, 88, 87, 84, 83, 78, 78, 74, 71, 70, 68, 63, 61,
60, 56, 53, 53, 48, 46, 45, 44, 39, 38, 35, 31, 31, 28,
24, 23, 21, 17, 15, 11, 10, 6, 5, 3)
bucket19 sum:2025, content= (97, 96, 93, 92, 88, 87, 84, 83, 78, 78, 74, 71, 70, 68, 63, 61,
60, 55, 55, 52, 48, 46, 45, 42, 41, 38, 34, 34, 30, 26,
26, 23, 19, 17, 15, 13, 8, 8, 5, 1, 1)
bucket20 sum:2023, content= (97, 96, 93, 92, 88, 87, 84, 83, 78, 78, 74, 71, 70, 66, 66, 61,
57, 57, 55, 52, 48, 46, 45, 42, 41, 38, 34, 34, 29, 28,
24, 22, 21, 17, 15, 13, 8, 8, 5)
bucket21 sum:2025, content= (97, 96, 92, 92, 88, 88, 84, 83, 78, 78, 74, 71, 70, 66, 66, 61,
57, 57, 55, 51, 50, 46, 45, 42, 39, 38, 36, 31, 31, 28,
24, 22, 21, 17, 15, 13, 8, 8, 4, 3)
bucket22 sum:2022, content= (97, 96, 92, 92, 88, 88, 84, 83, 78, 78, 74, 71, 70, 66, 65, 60,
60, 57, 53, 53, 48, 46, 45, 41, 41, 38, 36, 31, 31, 28,
24, 22, 21, 17, 15, 13, 8, 8, 4)
bucket23 sum:2022, content= (97, 96, 92, 92, 88, 88, 83, 83, 80, 76, 76, 71, 70, 66, 65, 60,
60, 55, 55, 51, 50, 46, 45, 41, 41, 38, 34, 34, 29, 28,
24, 22, 21, 16, 16, 11, 10, 8, 4)
bucket24 sum:2024, content= (97, 96, 92, 92, 88, 87, 86, 81, 80, 76, 76, 70, 70, 66, 65, 60,
60, 57, 53, 51, 51, 45, 45, 41, 41, 36, 36, 34, 29, 28,
26, 22, 21, 16, 15, 11, 10, 8, 3, 3)
bucket25 sum:2023, content= (96, 96, 94, 92, 88, 87, 83, 83, 80, 76, 73, 73, 70, 66, 65, 60,
60, 57, 53, 51, 50, 45, 45, 44, 39, 36, 36, 34, 29, 28,

54, 52, 50, 46, 45, 42, 40, 36, 36, 31, 28, 26, 24,
21, 19, 17, 14, 13, 10, 8, 6, 4, 2)
bucket9 sum:1931, content= (98, 96, 92, 90, 87, 84, 82, 80, 76, 75, 71, 69, 66, 64, 61, 60, 56,
54, 52, 50, 46, 45, 42, 40, 36, 36, 30, 29, 26, 24,
21, 19, 17, 14, 13, 10, 8, 6, 4, 2)
bucket10 sum:1931, content= (98, 96, 92, 90, 87, 84, 82, 80, 76, 75, 71, 68, 67, 64, 61, 60,
56, 54, 51, 51, 46, 45, 41, 41, 36, 36, 30, 29, 26, 24,
21, 19, 17, 14, 13, 10, 8, 6, 4, 2)
bucket11 sum:1931, content= (98, 96, 92, 90, 87, 83, 83, 79, 77, 75, 71, 68, 67, 64, 61, 60,
56, 54, 51, 49, 47, 46, 41, 41, 36, 36, 30, 29, 26, 24,
21, 19, 17, 14, 13, 10, 8, 6, 4, 2)
bucket12 sum:1931, content= (98, 96, 92, 90, 86, 85, 82, 79, 77, 75, 71, 68, 67, 64, 61, 59,
57, 53, 52, 49, 47, 46, 41, 41, 36, 34, 33, 28, 26, 24,
21, 19, 17, 14, 13, 10, 8, 6, 4, 2)
bucket13 sum:1931, content= (98, 96, 92, 90, 86, 85, 82, 79, 77, 75, 70, 70, 66, 63, 62, 59,
57, 53, 52, 49, 47, 46, 41, 40, 38, 34, 32, 28, 26, 24,
21, 18, 18, 14, 12, 11, 8, 6, 4, 2)
bucket14 sum:1931, content= (98, 96, 92, 90, 86, 85, 82, 79, 77, 75, 70, 70, 66, 63, 62, 59,
57, 53, 52, 49, 47, 46, 41, 40, 38, 34, 32, 28, 25, 25,
21, 18, 18, 14, 12, 11, 8, 6, 4, 2)
bucket15 sum:1931, content= (98, 96, 92, 90, 86, 85, 82, 79, 77, 75, 70, 70, 66, 63, 62, 59,
57, 53, 52, 49, 47, 46, 41, 40, 38, 34, 32, 27, 27, 23,
22, 18, 18, 14, 12, 11, 8, 6, 4, 2)
bucket16 sum:1931, content= (97, 97, 91, 91, 86, 85, 82, 79, 77, 75, 70, 70, 66, 63, 62, 59,
57, 53, 52, 49, 47, 45, 43, 40, 36, 34, 32, 29, 25, 25,
20, 20, 17, 14, 12, 11, 8, 6, 3, 3)
bucket17 sum:1931, content= (97, 96, 93, 90, 86, 85, 81, 81, 76, 73, 73, 68, 67, 63, 62, 59,
57, 53, 52, 49, 47, 45, 43, 40, 36, 34, 32, 29, 25, 25,
20, 20, 17, 14, 12, 11, 7, 7, 3, 3)
bucket18 sum:1931, content= (97, 96, 93, 90, 86, 85, 81, 81, 76, 73, 72, 70, 65, 65, 61, 59,
57, 53, 52, 48, 48, 45, 43, 39, 38, 34, 32, 27, 27, 23,
22, 18, 18, 14, 12, 11, 7, 7, 3, 3)
bucket19 sum:1931, content= (97, 94, 94, 91, 85, 85, 83, 79, 77, 73, 72, 70, 65, 65, 61, 59,
57, 53, 52, 48, 48, 44, 44, 39, 38, 33, 30, 30, 27, 23,
22, 18, 17, 15, 12, 11, 7, 7, 3, 3)
bucket20 sum:1931, content= (97, 94, 94, 90, 88, 83, 83, 78, 77, 76, 70, 70, 65, 65, 61, 59,
56, 55, 51, 48, 48, 44, 43, 39, 39, 33, 30, 29, 27, 25,
20, 20, 17, 13, 13, 11, 7, 6, 5, 2)
bucket21 sum:1931, content= (97, 94, 94, 89, 89, 83, 83, 78, 77, 76, 70, 70, 65, 63, 63, 59,
56, 55, 51, 48, 48, 44, 43, 39, 39, 33, 30, 29, 27, 25,
20, 20, 17, 13, 13, 10, 9, 6, 3, 3)
bucket22 sum:1931, content= (97, 94, 94, 89, 88, 85, 81, 81, 76, 73, 72, 68, 67, 63, 63, 58,
58, 53, 52, 48, 48, 44, 43, 39, 38, 33, 33, 29, 25, 25,
20, 20, 17, 13, 13, 10, 9, 6, 3, 2, 1)
bucket23 sum:1931, content= (97, 94, 94, 89, 88, 85, 81, 78, 78, 73, 73, 67, 67, 65, 62, 58,
58, 52, 52, 51, 47, 44, 43, 39, 38, 33, 30, 29, 27, 23,

```

23, 18, 17, 15, 12, 9, 9, 6, 5, 2)
bucket24 sum:1929, content= (97, 94, 93, 91, 88, 83, 81, 81, 77, 73, 72, 67, 67, 65, 62, 58,
56, 55, 52, 48, 48, 44, 43, 39, 38, 33, 33, 27, 27, 23,
23, 18, 17, 15, 11, 11, 9, 6, 3, 1)
bucket25 sum:1929, content= (97, 94, 93, 91, 88, 83, 81, 81, 77, 73, 72, 67, 67, 65, 60, 60,
55, 55, 52, 51, 47, 44, 43, 39, 36, 36, 30, 29, 27, 23,
22, 18, 16, 16, 11, 11, 9, 5, 5)
"----Comparison for the 121 example----"
"***tf from benchmark was 1956(we added the number of machines) and target function
from our local search is 1956"
***RESULT IS THE SAME
Run time: 0.031 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 22))

"Avegare error: 0"
"-----END 122 from 130-----"
"-----START 123 from 130-----"
"input file number 123: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_25_2.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_25_1000_2.txt"
"***Data from file U_1_1000_25_2.txt: machinesNum=25 jobsNum=1000"
"***SOLUTION Data from file SOL_U_1_25_1000_2.txt: machinesNum=25
jobsNum=1000 lowerBound=2027 upperBound=2027
isOptimal=1"
Content of machines summed (2027, 2027, 2027, 2027, 2027, 2027, 2026, 2026, 2026, 2027,
2026, 2026, 2026, 2026, 2026, 2026, 2026, 2026, 2025,
2025, 2025, 2025, 2025, 2025, 2026, 2026)
input selected: size 1000 sum 50651
----Our Results-----
best from Our local search found:
target function = 2052, num of machines=25, square root lms=0
machines content(number of jobs=1000):
bucket1 sum:2027, content= (99, 96, 94, 91, 88, 86, 84, 82, 81, 78, 75, 74, 70, 68, 64, 62, 59,
58, 54, 51, 49, 45, 44, 40, 38, 35, 33, 31, 28, 27,
24, 23, 20, 18, 16, 13, 11, 9, 7, 2)
bucket2 sum:2027, content= (99, 96, 93, 92, 88, 86, 84, 82, 81, 78, 75, 74, 70, 68, 63, 63, 59,
58, 54, 51, 48, 46, 44, 40, 38, 35, 33, 31, 28, 27,
24, 23, 20, 18, 16, 13, 11, 9, 7, 2)
bucket3 sum:2027, content= (99, 96, 93, 91, 88, 87, 84, 82, 81, 78, 75, 74, 70, 68, 63, 63, 59,
57, 55, 51, 48, 46, 43, 40, 39, 35, 33, 31, 28, 27,
24, 23, 20, 18, 16, 13, 11, 9, 7, 2)
bucket4 sum:2027, content= (99, 96, 93, 91, 88, 87, 84, 82, 81, 78, 75, 74, 70, 68, 63, 62, 60,
57, 55, 51, 48, 46, 43, 40, 38, 36, 33, 31, 28, 26,
25, 23, 20, 18, 16, 13, 11, 9, 7, 2)
bucket5 sum:2027, content= (99, 96, 93, 91, 88, 87, 84, 82, 80, 79, 75, 74, 70, 67, 64, 62, 60,
57, 55, 51, 48, 46, 43, 40, 38, 36, 33, 31, 28, 26,
25, 23, 20, 18, 16, 13, 11, 9, 6, 3)
bucket6 sum:2027, content= (99, 96, 93, 91, 88, 87, 84, 82, 80, 79, 75, 74, 70, 67, 64, 62, 60,

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57, 54, 52, 48, 46, 42, 41, 37, 37, 33, 31, 28, 26,
25, 23, 20, 18, 16, 13, 11, 9, 6, 3)
bucket7 sum:2027, content= (99, 95, 94, 91, 88, 87, 84, 82, 80, 79, 75, 74, 70, 67, 64, 62, 60,
57, 54, 52, 48, 46, 42, 41, 37, 37, 33, 31, 28, 26,
25, 23, 20, 18, 16, 12, 12, 9, 6, 3)
bucket8 sum:2027, content= (99, 95, 94, 91, 88, 87, 84, 82, 80, 79, 75, 73, 70, 69, 63, 62, 60,
56, 55, 52, 48, 46, 42, 41, 37, 37, 33, 31, 27, 27,
25, 23, 20, 18, 16, 12, 12, 9, 6, 3)
bucket9 sum:2027, content= (99, 95, 94, 91, 88, 87, 84, 82, 80, 79, 75, 73, 70, 67, 65, 62, 60,
56, 55, 52, 48, 45, 44, 40, 37, 36, 34, 31, 27, 27,
25, 23, 20, 18, 15, 14, 11, 9, 6, 3)
bucket10 sum:2027, content= (98, 97, 93, 90, 89, 87, 84, 82, 80, 78, 76, 73, 70, 67, 65, 62,
60, 56, 55, 52, 48, 45, 44, 40, 37, 36, 34, 30, 29, 26,
25, 23, 20, 18, 15, 14, 11, 9, 6, 3)
bucket11 sum:2027, content= (98, 97, 93, 90, 89, 87, 83, 83, 80, 78, 76, 73, 70, 67, 65, 61,
61, 56, 55, 52, 48, 45, 44, 40, 37, 36, 34, 30, 29, 26,
25, 23, 20, 17, 17, 12, 12, 9, 5, 4)
bucket12 sum:2027, content= (98, 97, 93, 90, 89, 87, 83, 83, 80, 78, 76, 73, 70, 67, 65, 61,
61, 56, 55, 52, 48, 45, 44, 40, 37, 36, 34, 30, 29, 26,
24, 24, 19, 19, 15, 14, 11, 9, 5, 4)
bucket13 sum:2027, content= (98, 97, 93, 90, 89, 87, 83, 83, 80, 78, 76, 73, 70, 67, 65, 61,
61, 56, 55, 50, 49, 47, 42, 41, 37, 36, 34, 30, 29, 26,
24, 24, 19, 19, 15, 14, 11, 9, 5, 3, 1)
bucket14 sum:2027, content= (98, 97, 93, 90, 89, 87, 83, 83, 80, 77, 77, 72, 71, 67, 65, 61,
60, 58, 54, 50, 49, 47, 42, 41, 37, 36, 34, 30, 29, 26,
24, 23, 21, 17, 17, 12, 12, 9, 4, 4, 1)
bucket15 sum:2027, content= (98, 97, 92, 92, 88, 87, 83, 83, 79, 79, 76, 72, 71, 67, 65, 61,
60, 58, 54, 50, 49, 47, 42, 41, 37, 36, 34, 30, 29, 26,
24, 23, 21, 17, 17, 12, 11, 10, 4, 4, 1)
bucket16 sum:2027, content= (98, 97, 92, 92, 88, 86, 85, 82, 79, 79, 76, 72, 71, 67, 65, 61,
60, 58, 54, 50, 49, 47, 42, 40, 39, 35, 34, 30, 29, 26,
24, 23, 21, 17, 15, 14, 11, 10, 4, 4, 1)
bucket17 sum:2027, content= (98, 95, 95, 90, 89, 86, 85, 82, 79, 79, 76, 72, 71, 66, 65, 63,
59, 58, 54, 50, 49, 47, 42, 40, 39, 35, 34, 30, 29, 26,
24, 22, 22, 17, 15, 14, 11, 9, 7, 3)
bucket18 sum:2027, content= (98, 95, 95, 90, 89, 86, 85, 81, 81, 77, 77, 72, 71, 66, 65, 63,
59, 58, 54, 50, 49, 47, 42, 40, 39, 35, 34, 30, 29, 26,
24, 22, 21, 19, 15, 14, 11, 8, 7, 1, 1, 1)
bucket19 sum:2025, content= (98, 95, 94, 92, 88, 86, 85, 81, 81, 77, 77, 72, 71, 66, 65, 63,
59, 58, 54, 50, 49, 47, 41, 41, 39, 35, 33, 32, 27, 27,
24, 22, 21, 19, 15, 14, 10, 8, 8, 1)
bucket20 sum:2024, content= (98, 95, 94, 92, 88, 86, 85, 81, 81, 77, 76, 75, 69, 66, 65, 63,
59, 58, 53, 53, 47, 47, 41, 41, 39, 35, 33, 30, 30, 26,
24, 22, 21, 19, 15, 14, 10, 8, 8)
bucket21 sum:2023, content= (98, 95, 94, 92, 88, 86, 83, 83, 81, 77, 76, 72, 72, 66, 65, 63,
59, 58, 53, 53, 47, 47, 41, 41, 39, 35, 33, 30, 29, 27,

24, 22, 21, 19, 15, 14, 10, 8, 7)
bucket22 sum:2024, content= (97, 97, 94, 90, 89, 86, 83, 83, 81, 77, 76, 72, 71, 69, 64, 61,
59, 59, 53, 53, 47, 45, 44, 40, 39, 35, 32, 32, 29, 26,
24, 22, 21, 19, 14, 14, 10, 10, 7)
bucket23 sum:2023, content= (97, 97, 94, 90, 88, 88, 83, 83, 79, 79, 76, 72, 71, 66, 65, 63,
59, 58, 53, 53, 47, 44, 44, 41, 39, 35, 32, 32, 29, 26,
24, 22, 21, 17, 17, 14, 10, 8, 7)
bucket24 sum:2023, content= (97, 97, 94, 90, 88, 85, 85, 83, 81, 77, 76, 72, 71, 69, 64, 61,
59, 58, 55, 50, 49, 44, 44, 41, 39, 35, 32, 32, 29, 25,
25, 22, 21, 17, 17, 14, 10, 8, 7)
bucket25 sum:2023, content= (97, 97, 94, 89, 89, 85, 85, 83, 81, 77, 76, 72, 70, 69, 64, 63,
59, 58, 53, 49, 49, 47, 44, 40, 39, 35, 32, 32, 27, 27,
25, 22, 19, 19, 17, 14, 10, 8, 7)
"----Comparison for the 122 example----"
"***tf from benchmark was 2052(we added the number of machines) and target function
from our local search is 2052"
***RESULT IS THE SAME
Run time: 0.016 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 23))

"Avegare error: 0"
"-----END 123 from 130-----"
"-----START 124 from 130-----"

"***Data from file U_1_1000_25_3.txt: machinesNum=25 jobsNum=1000"
"***SOLUTION Data from file SOL_U_1_25_1000_3.txt: machinesNum=25
jobsNum=1000 lowerBound=2024 upperBound=2024
isOptimal=1"
Content of machines summed (2024, 2023, 2023, 2023, 2023, 2023, 2024, 2024, 2024, 2023,
2023, 2023, 2023, 2023, 2023, 2023, 2023, 2023, 2023,
2022, 2024, 2024, 2024, 2024, 2023, 2023)
input selected: size 1000 sum 50582
----Our Results-----
best from Our local search found:
target function = 2049, num of machines=25, square root lms=0
machines content(number of jobs=1000):
bucket1 sum:2024, content= (99, 96, 94, 93, 90, 88, 84, 82, 79, 77, 74, 73, 71, 68, 66, 62, 60,
57, 53, 50, 49, 46, 43, 41, 39, 37, 33, 30, 29, 25,
24, 23, 19, 18, 15, 12, 11, 7, 5, 2)
bucket2 sum:2024, content= (99, 96, 94, 93, 90, 87, 85, 82, 79, 77, 74, 73, 71, 68, 66, 62, 60,
57, 53, 50, 49, 46, 43, 41, 39, 37, 33, 30, 29, 25,
24, 23, 19, 18, 15, 12, 11, 7, 5, 2)
bucket3 sum:2024, content= (99, 96, 94, 93, 90, 87, 85, 81, 80, 76, 75, 73, 71, 68, 66, 62, 60,
57, 53, 50, 49, 46, 43, 41, 39, 37, 33, 30, 28, 26,
24, 23, 19, 18, 15, 12, 11, 7, 5, 2)
bucket4 sum:2024, content= (99, 96, 94, 93, 90, 87, 85, 81, 80, 76, 75, 73, 71, 68, 66, 62, 60,

57, 53, 50, 49, 46, 43, 41, 39, 37, 33, 30, 28, 26,
24, 23, 19, 18, 15, 12, 10, 8, 5, 2)
bucket5 sum:2024, content= (99, 96, 94, 92, 91, 87, 84, 82, 80, 76, 75, 73, 71, 68, 65, 63, 60,
57, 53, 50, 49, 46, 43, 41, 39, 37, 33, 30, 28, 26,
24, 23, 19, 18, 15, 12, 10, 8, 5, 2)
bucket6 sum:2024, content= (99, 96, 94, 92, 91, 87, 84, 82, 80, 76, 75, 73, 71, 68, 65, 63, 60,
57, 53, 50, 49, 46, 43, 41, 39, 37, 33, 30, 28, 26,
24, 22, 20, 18, 15, 12, 10, 8, 5, 2)
bucket7 sum:2024, content= (98, 97, 94, 92, 91, 87, 84, 82, 80, 76, 75, 73, 71, 68, 65, 63, 60,
57, 53, 50, 49, 46, 43, 41, 39, 37, 33, 30, 28, 26,
24, 22, 20, 18, 15, 12, 10, 8, 4, 3)
bucket8 sum:2024, content= (98, 97, 94, 92, 91, 87, 84, 82, 80, 76, 74, 74, 70, 69, 65, 63, 60,
56, 54, 50, 49, 45, 43, 42, 39, 37, 33, 29, 29, 26,
24, 22, 20, 18, 15, 12, 10, 8, 4, 3)
bucket9 sum:2024, content= (98, 97, 94, 92, 91, 87, 84, 82, 80, 76, 74, 74, 70, 69, 65, 63, 59,
58, 52, 51, 49, 45, 43, 42, 38, 38, 32, 31, 28, 26,
24, 22, 20, 18, 14, 13, 10, 8, 4, 3)
bucket10 sum:2024, content= (98, 96, 95, 92, 91, 87, 84, 82, 80, 76, 74, 74, 70, 69, 65, 63,
59, 56, 55, 50, 49, 45, 43, 42, 38, 38, 32, 31, 28, 26,
24, 22, 20, 18, 14, 13, 10, 8, 4, 3)
bucket11 sum:2024, content= (98, 96, 95, 92, 91, 87, 84, 82, 80, 76, 74, 74, 70, 69, 65, 63,
59, 56, 55, 50, 49, 45, 43, 42, 38, 37, 33, 31, 28, 26,
24, 22, 20, 18, 14, 13, 10, 7, 6, 2)
bucket12 sum:2024, content= (98, 96, 95, 92, 91, 87, 84, 82, 80, 76, 74, 74, 70, 69, 64, 64,
59, 56, 54, 51, 48, 47, 43, 41, 38, 37, 33, 31, 28, 26,
24, 22, 20, 17, 16, 12, 10, 7, 6, 2)
bucket13 sum:2024, content= (98, 96, 95, 92, 91, 86, 86, 81, 79, 77, 74, 73, 71, 69, 64, 64,
59, 56, 54, 51, 48, 47, 43, 41, 38, 36, 34, 31, 27, 27,
24, 22, 20, 17, 16, 11, 11, 7, 4, 4)
bucket14 sum:2024, content= (98, 96, 95, 92, 91, 86, 86, 81, 79, 77, 74, 73, 71, 69, 64, 64,
59, 56, 54, 51, 48, 47, 43, 40, 39, 36, 34, 31, 27, 27,
24, 21, 21, 17, 14, 14, 10, 7, 4, 4)
bucket15 sum:2024, content= (98, 96, 95, 92, 91, 86, 86, 81, 79, 77, 74, 73, 71, 68, 66, 63,
59, 56, 54, 51, 48, 47, 43, 40, 39, 35, 35, 31, 27, 26,
25, 21, 21, 17, 14, 14, 10, 7, 4, 4)
bucket16 sum:2024, content= (98, 96, 95, 92, 90, 88, 84, 82, 78, 77, 75, 72, 72, 67, 66, 64,
58, 58, 54, 50, 48, 45, 44, 42, 38, 35, 34, 32, 27, 26,
25, 21, 21, 17, 14, 14, 9, 9, 4, 3)
bucket17 sum:2024, content= (98, 96, 95, 92, 90, 88, 84, 82, 78, 77, 75, 72, 72, 67, 66, 64,
58, 58, 52, 52, 48, 45, 44, 42, 38, 35, 34, 32, 27, 26,
25, 21, 20, 19, 14, 13, 9, 7, 6, 3)
bucket18 sum:2024, content= (98, 95, 95, 93, 90, 88, 83, 83, 78, 77, 75, 72, 72, 67, 66, 64,
58, 58, 52, 52, 48, 45, 44, 42, 38, 35, 34, 32, 27, 26,
25, 21, 20, 19, 14, 13, 9, 7, 6, 2, 1)
bucket19 sum:2024, content= (98, 95, 95, 93, 89, 89, 83, 83, 78, 77, 75, 72, 72, 67, 66, 63,
60, 56, 52, 52, 50, 45, 43, 42, 38, 35, 34, 32, 27, 26,

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25, 21, 20, 17, 16, 13, 9, 7, 6, 1, 1, 1)
bucket20 sum:2024, content= (98, 95, 95, 93, 89, 89, 83, 83, 78, 77, 75, 72, 72, 67, 66, 62,
61, 55, 55, 51, 48, 45, 44, 42, 38, 35, 34, 32, 27, 26,
25, 21, 20, 17, 16, 13, 9, 6, 6, 4)
bucket21 sum:2022, content= (97, 97, 95, 91, 91, 88, 83, 82, 81, 76, 74, 72, 72, 67, 66, 62,
61, 55, 55, 51, 48, 45, 44, 42, 38, 35, 34, 32, 27, 26,
25, 21, 20, 17, 16, 11, 11, 6, 6, 1, 1)
bucket22 sum:2020, content= (97, 97, 94, 93, 89, 89, 83, 82, 78, 78, 75, 72, 72, 67, 66, 62,
61, 55, 55, 51, 48, 45, 44, 42, 38, 35, 33, 32, 29, 25,
25, 21, 20, 17, 16, 11, 11, 6, 6)
bucket23 sum:2020, content= (97, 97, 94, 93, 89, 88, 83, 83, 78, 77, 76, 72, 72, 67, 66, 61,
61, 58, 52, 51, 50, 44, 44, 40, 40, 35, 33, 32, 29, 25,
25, 21, 19, 19, 14, 14, 9, 6, 6)
bucket24 sum:2020, content= (97, 97, 94, 93, 89, 88, 83, 83, 78, 77, 76, 72, 71, 69, 66, 61,
60, 58, 52, 51, 48, 47, 43, 40, 40, 35, 33, 32, 29, 25,
24, 23, 19, 16, 16, 14, 9, 6, 6)
bucket25 sum:2020, content= (97, 97, 94, 93, 89, 88, 83, 83, 78, 77, 76, 72, 71, 69, 66, 61,
60, 58, 52, 51, 47, 47, 44, 40, 40, 35, 33, 32, 29, 25,
23, 23, 19, 19, 14, 11, 11, 9, 4)
"----Comparison for the 123 example----"
"***tf from benchmark was 2049(we added the number of machines) and target function
from our local search is 2049"
***RESULT IS THE SAME
Run time: 0.031 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 24))

"Avegare error: 0"
"-----END 124 from 130-----"
"-----START 125 from 130-----"
"input file number 125: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_25_4.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_25_1000_4.txt"
"***Data from file U_1_1000_25_4.txt: machinesNum=25 jobsNum=1000"
"***SOLUTION Data from file SOL_U_1_25_1000_4.txt: machinesNum=25
jobsNum=1000 lowerBound=2008 upperBound=2008
isOptimal=1"
Content of machines summed (2008, 2008, 2008, 2008, 2008, 2008, 2008, 2008, 2008, 2008,
2008, 2008, 2008, 2008, 2008, 2008, 2008, 2008, 2008, 2008, 2008, 2008, 2008, 2008,
2008, 2008, 2008, 2008, 2008, 2008, 2008, 2007, 2007)
input selected: size 1000 sum 50198
----Our Results-----
best from Our local search found:
target function = 2033, num of machines=25, square root lms=0
machines content(number of jobs=1000):
bucket1 sum:2008, content= (99, 96, 94, 91, 90, 86, 83, 81, 79, 76, 75, 72, 70, 67, 64, 62, 59,
58, 54, 53, 50, 47, 45, 42, 38, 36, 33, 30, 27, 25,
23, 21, 19, 17, 15, 11, 10, 6, 3, 1)
bucket2 sum:2008, content= (99, 96, 94, 91, 90, 86, 83, 81, 79, 76, 75, 72, 70, 67, 64, 62, 59,
58, 54, 53, 50, 47, 45, 42, 38, 36, 33, 30, 27, 25,
23, 21, 19, 17, 15, 11, 10, 6, 3, 1)

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58, 54, 53, 50, 47, 45, 42, 38, 36, 33, 30, 27, 25,
23, 21, 19, 17, 15, 11, 10, 6, 3, 1)
bucket3 sum:2008, content= (99, 96, 94, 91, 90, 86, 83, 81, 79, 76, 75, 72, 70, 67, 64, 62, 59,
58, 54, 53, 50, 47, 45, 42, 38, 36, 33, 30, 27, 24,
24, 21, 19, 17, 15, 11, 9, 7, 3, 1)
bucket4 sum:2008, content= (99, 95, 95, 91, 89, 87, 83, 81, 79, 76, 74, 73, 70, 67, 64, 62, 59,
58, 54, 53, 50, 47, 45, 42, 38, 36, 33, 30, 27, 24,
24, 21, 19, 17, 15, 11, 9, 7, 3, 1)
bucket5 sum:2008, content= (99, 95, 95, 91, 89, 87, 83, 81, 79, 76, 74, 73, 70, 67, 64, 62, 59,
58, 54, 53, 50, 47, 45, 42, 38, 36, 33, 29, 28, 24,
23, 22, 19, 17, 15, 11, 9, 7, 3, 1)
bucket6 sum:2008, content= (99, 95, 95, 91, 89, 87, 83, 81, 79, 76, 74, 73, 70, 67, 64, 62, 59,
57, 55, 53, 50, 47, 45, 41, 39, 36, 33, 29, 28, 24,
23, 22, 19, 17, 15, 11, 9, 7, 3, 1)
bucket7 sum:2008, content= (99, 95, 95, 91, 89, 87, 83, 81, 78, 77, 74, 73, 70, 67, 64, 62, 59,
57, 55, 53, 50, 47, 45, 41, 39, 36, 32, 30, 28, 24,
23, 22, 19, 17, 15, 11, 9, 7, 2, 2)
bucket8 sum:2008, content= (99, 95, 94, 92, 89, 87, 83, 81, 78, 77, 74, 73, 70, 67, 64, 62, 59,
57, 55, 52, 51, 47, 44, 43, 38, 36, 32, 30, 28, 24,
23, 22, 19, 16, 16, 11, 9, 7, 2, 2)
bucket9 sum:2008, content= (98, 96, 94, 92, 89, 87, 82, 82, 78, 77, 74, 73, 70, 66, 65, 62, 59,
57, 55, 52, 51, 47, 44, 43, 38, 36, 32, 30, 28, 24,
23, 22, 19, 16, 15, 12, 8, 8, 2, 2)
bucket10 sum:2008, content= (98, 96, 94, 92, 89, 87, 82, 82, 78, 77, 74, 72, 71, 66, 65, 62,
59, 57, 55, 52, 51, 47, 44, 41, 40, 36, 32, 30, 28, 24,
23, 22, 19, 16, 15, 12, 8, 7, 4, 1)
bucket11 sum:2008, content= (98, 96, 94, 92, 89, 87, 82, 82, 78, 77, 74, 72, 71, 66, 65, 62,
59, 57, 55, 52, 51, 47, 44, 41, 40, 36, 32, 30, 28, 24,
23, 22, 18, 17, 14, 13, 8, 7, 4, 1)
bucket12 sum:2008, content= (98, 96, 94, 92, 89, 87, 82, 82, 78, 77, 74, 72, 71, 66, 65, 61,
60, 57, 55, 52, 51, 47, 44, 41, 40, 36, 32, 30, 28, 24,
23, 21, 20, 16, 14, 13, 8, 7, 4, 1)
bucket13 sum:2008, content= (98, 96, 93, 93, 88, 88, 82, 82, 78, 77, 74, 72, 71, 65, 65, 63,
59, 57, 55, 52, 51, 47, 44, 41, 40, 35, 34, 29, 27, 25,
23, 21, 20, 16, 14, 13, 8, 6, 4, 2)
bucket14 sum:2008, content= (98, 96, 93, 93, 88, 88, 82, 82, 78, 77, 74, 72, 70, 68, 64, 61,
60, 57, 55, 52, 51, 47, 44, 41, 39, 37, 31, 31, 27, 25,
23, 21, 20, 16, 14, 12, 10, 6, 4, 1)
bucket15 sum:2008, content= (97, 97, 93, 93, 88, 88, 82, 81, 79, 77, 73, 73, 70, 68, 64, 61,
60, 56, 56, 52, 50, 48, 44, 41, 39, 37, 31, 31, 27, 25,
23, 21, 20, 16, 14, 12, 10, 6, 4, 1)
bucket16 sum:2008, content= (97, 97, 93, 93, 88, 86, 84, 81, 79, 76, 75, 72, 70, 68, 63, 63,
59, 56, 56, 52, 50, 48, 44, 41, 39, 37, 31, 30, 29, 24,
23, 21, 20, 16, 14, 12, 10, 6, 4, 1)
bucket17 sum:2008, content= (97, 97, 93, 92, 90, 86, 83, 81, 79, 76, 75, 72, 69, 69, 63, 63,
58, 58, 55, 52, 49, 48, 46, 41, 39, 35, 34, 29, 27, 25,

23, 21, 20, 16, 14, 12, 10, 6, 4, 1)
bucket18 sum:2008, content= (97, 97, 93, 92, 90, 86, 83, 81, 79, 76, 75, 72, 69, 69, 63, 63, 58, 58, 55, 52, 49, 48, 46, 41, 39, 35, 34, 29, 27, 25, 23, 21, 20, 16, 14, 11, 10, 5, 5, 2)
bucket19 sum:2008, content= (97, 96, 95, 92, 88, 86, 84, 81, 79, 76, 75, 72, 69, 69, 63, 63, 58, 58, 54, 53, 49, 48, 46, 41, 38, 35, 35, 29, 26, 26, 23, 21, 20, 16, 14, 11, 10, 5, 5, 2)
bucket20 sum:2008, content= (97, 96, 95, 92, 88, 85, 85, 80, 80, 76, 75, 72, 69, 68, 65, 61, 60, 56, 54, 54, 49, 48, 46, 40, 38, 37, 34, 29, 26, 26, 23, 21, 20, 16, 13, 13, 10, 5, 4, 2)
bucket21 sum:2008, content= (97, 96, 95, 92, 88, 85, 85, 80, 80, 76, 75, 72, 69, 68, 65, 61, 60, 56, 54, 54, 49, 48, 44, 43, 38, 35, 34, 30, 26, 26, 22, 22, 20, 16, 13, 13, 10, 5, 4, 2)
bucket22 sum:2008, content= (97, 96, 95, 91, 90, 85, 84, 80, 80, 76, 75, 71, 71, 68, 63, 61, 61, 56, 54, 54, 49, 48, 44, 43, 38, 35, 34, 30, 26, 25, 24, 21, 18, 18, 13, 13, 10, 5, 4, 2)
bucket23 sum:2008, content= (97, 96, 95, 91, 90, 85, 84, 80, 80, 76, 75, 71, 71, 68, 63, 61, 61, 56, 54, 54, 49, 48, 44, 43, 37, 37, 34, 29, 26, 25, 24, 21, 18, 17, 16, 10, 10, 5, 5, 2)
bucket24 sum:2007, content= (97, 96, 95, 90, 90, 85, 83, 82, 80, 76, 75, 71, 71, 68, 63, 61, 61, 56, 54, 53, 52, 46, 44, 43, 37, 37, 31, 31, 29, 24, 22, 22, 18, 17, 16, 10, 10, 5, 4, 2)
bucket25 sum:2007, content= (97, 96, 95, 90, 90, 85, 83, 82, 80, 75, 75, 73, 69, 65, 65, 63, 60, 58, 54, 53, 49, 48, 44, 43, 37, 37, 31, 31, 29, 24, 22, 22, 18, 17, 16, 10, 10, 5, 4, 2)
"----Comparison for the 124 example----"
"***tf from benchmark was 2033(we added the number of machines) and target function from our local search is 2033"
***RESULT IS THE SAME
Run time: 0.016 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 25))

"Avegare error: 0"
"-----END 125 from 130-----"
"-----START 126 from 130-----"

"***Data from file U_1_1000_25_5.txt: machinesNum=25 jobsNum=1000"
"***SOLUTION Data from file SOL_U_1_25_1000_5.txt: machinesNum=25 jobsNum=1000 lowerBound=1959 upperBound=1959 isOptimal=1"
Content of machines summed (1958, 1958, 1958, 1958, 1958, 1958, 1958, 1959, 1959, 1959, 1959, 1959, 1959, 1958, 1958, 1958, 1958, 1958, 1958, 1958, 1958, 1959, 1959)
input selected: size 1000 sum 48959
----Our Results-----
best from Our local search found:

target function = 1984, num of machines=25, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:1959, content= (99, 95, 92, 89, 87, 84, 83, 81, 78, 75, 72, 71, 68, 65, 62, 59, 58, 54, 52, 49, 47, 45, 42, 39, 37, 34, 31, 29, 27, 26,

22, 21, 19, 16, 13, 13, 10, 8, 5, 2)

bucket2 sum:1959, content= (99, 95, 92, 89, 87, 84, 83, 81, 78, 75, 72, 71, 67, 66, 62, 59, 58, 54, 52, 49, 47, 45, 42, 39, 37, 34, 31, 29, 27, 26,

22, 21, 18, 17, 13, 13, 10, 8, 5, 2)

bucket3 sum:1959, content= (99, 95, 92, 89, 87, 84, 83, 81, 78, 75, 72, 71, 67, 65, 63, 59, 58, 54, 52, 49, 47, 45, 42, 39, 37, 34, 31, 29, 27, 25,

23, 21, 18, 17, 13, 13, 10, 8, 5, 2)

bucket4 sum:1959, content= (99, 95, 92, 89, 87, 84, 83, 81, 78, 75, 72, 71, 67, 65, 63, 59, 58, 54, 52, 49, 47, 44, 43, 39, 37, 34, 31, 29, 27, 25,

23, 21, 18, 16, 14, 13, 10, 8, 5, 2)

bucket5 sum:1959, content= (99, 95, 92, 89, 87, 84, 83, 81, 78, 75, 72, 71, 67, 65, 63, 59, 57, 55, 52, 49, 47, 44, 43, 39, 37, 34, 31, 29, 27, 25,

23, 21, 18, 16, 14, 13, 10, 8, 5, 2)

bucket6 sum:1959, content= (99, 95, 92, 89, 87, 84, 83, 81, 77, 76, 72, 71, 67, 65, 63, 59, 57, 55, 52, 49, 47, 44, 43, 39, 37, 34, 31, 29, 27, 25,

23, 21, 18, 16, 14, 13, 10, 8, 5, 2)

bucket7 sum:1959, content= (98, 96, 92, 89, 87, 84, 83, 81, 77, 76, 72, 71, 67, 65, 62, 60, 57, 55, 51, 50, 47, 44, 43, 39, 37, 34, 31, 29, 27, 25,

23, 21, 18, 16, 14, 13, 10, 8, 5, 2)

bucket8 sum:1959, content= (98, 96, 92, 89, 87, 84, 83, 81, 77, 75, 73, 71, 67, 65, 62, 60, 57, 55, 51, 50, 46, 45, 43, 39, 37, 33, 32, 29, 27, 25,

23, 21, 18, 16, 14, 13, 9, 9, 5, 1, 1)

bucket9 sum:1959, content= (98, 96, 92, 89, 86, 85, 83, 81, 77, 75, 73, 71, 67, 65, 62, 60, 57, 54, 53, 49, 46, 45, 43, 39, 37, 33, 32, 29, 27, 25,

23, 21, 18, 16, 14, 13, 9, 9, 5, 1, 1)

bucket10 sum:1959, content= (98, 96, 91, 90, 86, 85, 82, 82, 77, 74, 73, 72, 67, 64, 64, 59, 57, 54, 51, 50, 48, 44, 43, 39, 37, 33, 32, 29, 27, 25,

23, 21, 18, 16, 14, 13, 9, 9, 5, 1, 1)

bucket11 sum:1959, content= (98, 96, 91, 90, 86, 85, 82, 82, 77, 74, 73, 71, 68, 64, 64, 59, 57, 54, 51, 50, 48, 44, 42, 40, 36, 35, 31, 29, 27, 25,

23, 21, 18, 16, 14, 13, 9, 9, 4, 3)

bucket12 sum:1959, content= (98, 96, 91, 90, 86, 85, 82, 81, 79, 74, 73, 71, 67, 64, 64, 59, 57, 54, 51, 50, 48, 44, 41, 40, 38, 33, 32, 29, 27, 25,

23, 20, 19, 16, 14, 12, 10, 9, 4, 3)

bucket13 sum:1959, content= (98, 96, 91, 90, 86, 85, 82, 81, 79, 74, 73, 71, 67, 64, 64, 59, 57, 54, 51, 50, 46, 46, 41, 40, 38, 33, 32, 29, 26, 26,

23, 20, 19, 16, 14, 12, 10, 8, 6, 1, 1)

bucket14 sum:1958, content= (98, 96, 91, 90, 86, 85, 82, 81, 79, 74, 73, 71, 67, 64, 64, 59, 56, 56, 51, 50, 46, 45, 41, 40, 38, 33, 32, 29, 26, 26,

22, 22, 18, 16, 14, 12, 10, 7, 7, 1)

bucket15 sum:1957, content= (97, 97, 91, 90, 86, 85, 82, 80, 80, 74, 73, 70, 68, 64, 64, 59, 56, 56, 51, 49, 46, 46, 41, 40, 38, 33, 32, 29, 26, 26,

22, 22, 17, 17, 14, 12, 10, 7, 7)
bucket16 sum:1959, content= (97, 97, 91, 90, 86, 85, 82, 80, 80, 74, 73, 70, 68, 64, 64, 58,
58, 54, 51, 50, 46, 46, 41, 40, 38, 33, 32, 28, 28, 25,
22, 22, 17, 17, 14, 12, 10, 7, 6, 3)
bucket17 sum:1959, content= (97, 97, 91, 90, 86, 85, 82, 80, 79, 74, 73, 70, 69, 64, 62, 61,
56, 56, 51, 49, 46, 45, 43, 40, 36, 35, 31, 28, 28, 25,
22, 22, 17, 17, 14, 11, 11, 7, 6, 3)
bucket18 sum:1959, content= (97, 95, 93, 90, 86, 84, 83, 80, 79, 74, 73, 70, 69, 64, 62, 61,
56, 54, 53, 49, 46, 45, 43, 39, 36, 35, 31, 30, 26, 26,
22, 20, 19, 17, 14, 11, 11, 7, 6, 3)
bucket19 sum:1959, content= (97, 95, 93, 90, 86, 84, 83, 80, 79, 74, 73, 69, 69, 66, 61, 61,
56, 53, 53, 50, 46, 45, 43, 38, 38, 33, 32, 28, 28, 26,
22, 20, 19, 17, 14, 11, 11, 7, 6, 3)
bucket20 sum:1959, content= (97, 95, 93, 89, 88, 84, 82, 80, 79, 74, 73, 69, 69, 66, 61, 60,
58, 53, 53, 48, 48, 45, 41, 40, 36, 35, 30, 30, 28, 24,
24, 20, 19, 15, 15, 11, 11, 7, 6, 3)
bucket21 sum:1958, content= (97, 95, 93, 88, 88, 83, 83, 82, 79, 74, 73, 69, 68, 66, 61, 60,
58, 53, 53, 48, 48, 45, 41, 40, 36, 35, 30, 30, 28, 24,
24, 20, 19, 15, 15, 11, 11, 7, 4, 4)
bucket22 sum:1959, content= (97, 94, 94, 88, 88, 83, 83, 82, 77, 76, 73, 69, 68, 66, 61, 60,
58, 53, 53, 48, 48, 45, 41, 40, 35, 35, 32, 28, 28, 26,
22, 20, 19, 17, 14, 11, 10, 9, 4, 4)
bucket23 sum:1955, content= (97, 94, 93, 91, 86, 83, 83, 82, 76, 76, 73, 69, 69, 66, 61, 60,
58, 53, 53, 48, 48, 45, 40, 40, 38, 32, 32, 30, 28, 24,
24, 20, 19, 15, 15, 11, 10, 9, 4)
bucket24 sum:1955, content= (97, 94, 93, 91, 85, 85, 83, 80, 76, 76, 73, 72, 68, 64, 61, 61,
58, 53, 53, 48, 48, 45, 40, 40, 38, 32, 32, 30, 28, 24,
24, 20, 19, 15, 15, 11, 10, 9, 4)
bucket25 sum:1955, content= (97, 94, 92, 91, 85, 85, 83, 82, 76, 76, 73, 69, 69, 66, 61, 58,
58, 56, 51, 50, 46, 45, 43, 38, 38, 32, 32, 30, 26, 26,
22, 22, 19, 15, 15, 11, 10, 9, 4)
"----Comparison for the 125 example----"
"***tf from benchmark was 1984(we added the number of machines) and target function
from our local search is 1984"
***RESULT IS THE SAME
Run time: 0.031 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 26))

"Avegare error: 0"
"-----END 126 from 130-----"
"-----START 127 from 130-----"

"***Data from file U_1_1000_25_6.txt: machinesNum=25 jobsNum=1000"
"***SOLUTION Data from file SOL_U_1_25_1000_6.txt: machinesNum=25
jobsNum=1000 lowerBound=2033 upperBound=2033
isOptimal=1"

Content of machines summed (2033, 2033, 2033, 2033, 2033, 2033, 2033, 2033, 2033, 2033,
2033, 2032, 2032, 2032, 2032, 2032, 2032, 2032, 2033,
2032, 2032, 2032, 2032, 2032, 2032, 2032)

input selected: size 1000 sum 50812

----Our Results-----

best from Our local search found:

target function = 2058, num of machines=25, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:2033, content= (99, 96, 93, 91, 88, 85, 83, 82, 79, 77, 74, 73, 70, 67, 65, 62, 60,
58, 56, 53, 52, 48, 46, 43, 40, 38, 35, 33, 28, 27,
24, 23, 19, 17, 15, 12, 10, 7, 4, 1)

bucket2 sum:2033, content= (99, 96, 93, 91, 88, 85, 83, 82, 79, 77, 74, 73, 70, 67, 65, 62, 60,
58, 56, 53, 52, 48, 46, 43, 40, 38, 35, 33, 28, 27,
24, 23, 19, 17, 15, 12, 9, 8, 4, 1)

bucket3 sum:2033, content= (99, 96, 93, 91, 88, 85, 83, 81, 80, 77, 74, 73, 70, 67, 65, 62, 60,
58, 56, 53, 51, 49, 46, 43, 40, 38, 35, 33, 28, 27,
24, 23, 19, 17, 15, 12, 9, 8, 4, 1)

bucket4 sum:2033, content= (99, 96, 93, 91, 88, 85, 83, 81, 80, 77, 74, 73, 70, 67, 65, 62, 60,
58, 56, 53, 51, 49, 46, 43, 40, 38, 35, 33, 28, 27,
24, 22, 20, 17, 15, 12, 9, 8, 4, 1)

bucket5 sum:2033, content= (99, 96, 93, 90, 89, 85, 83, 81, 80, 77, 74, 73, 70, 67, 65, 62, 60,
58, 56, 53, 51, 49, 46, 43, 40, 38, 35, 32, 29, 27,
24, 22, 20, 17, 15, 12, 9, 8, 4, 1)

bucket6 sum:2033, content= (99, 96, 93, 90, 89, 85, 83, 81, 80, 77, 74, 73, 70, 67, 65, 62, 60,
58, 56, 53, 51, 49, 45, 44, 40, 38, 35, 32, 29, 27,
24, 22, 20, 17, 15, 12, 9, 7, 5, 1)

bucket7 sum:2033, content= (99, 96, 93, 90, 89, 85, 83, 81, 80, 77, 74, 73, 70, 67, 65, 62, 60,
58, 56, 53, 51, 49, 45, 44, 40, 38, 35, 32, 29, 27,
24, 22, 20, 17, 15, 12, 9, 7, 5, 1)

bucket8 sum:2033, content= (99, 96, 93, 90, 89, 85, 83, 81, 80, 76, 75, 73, 70, 67, 64, 63, 60,
58, 56, 53, 51, 49, 45, 42, 41, 39, 35, 32, 29, 27,
24, 22, 20, 17, 15, 12, 9, 7, 5, 1)

bucket9 sum:2033, content= (99, 96, 93, 90, 89, 85, 83, 81, 79, 78, 74, 73, 70, 66, 66, 62, 60,
58, 56, 53, 51, 49, 45, 42, 41, 39, 35, 32, 29, 27,
24, 22, 20, 17, 15, 12, 9, 7, 5, 1)

bucket10 sum:2033, content= (98, 97, 93, 90, 88, 86, 83, 81, 79, 76, 76, 72, 71, 66, 66, 62,
60, 58, 56, 53, 51, 49, 45, 42, 41, 39, 34, 33, 29, 26,
25, 22, 20, 17, 15, 11, 10, 7, 5, 1)

bucket11 sum:2033, content= (98, 96, 94, 90, 88, 86, 83, 81, 79, 76, 76, 72, 71, 66, 66, 62,
60, 58, 56, 53, 51, 49, 45, 42, 41, 38, 36, 32, 29, 26,
25, 22, 20, 17, 15, 11, 10, 7, 5, 1)

bucket12 sum:2033, content= (98, 96, 94, 90, 88, 86, 83, 81, 79, 76, 76, 72, 71, 66, 64, 63,
61, 58, 56, 53, 51, 48, 46, 42, 41, 38, 36, 32, 29, 26,
25, 22, 19, 18, 14, 13, 9, 6, 6, 1)

bucket13 sum:2032, content= (98, 96, 94, 90, 88, 86, 83, 81, 79, 76, 76, 72, 71, 66, 64, 63,
61, 58, 56, 53, 51, 48, 46, 42, 41, 38, 36, 31, 30, 26,

25, 22, 19, 18, 14, 13, 9, 6, 6)

bucket14 sum:2032, content= (98, 96, 93, 91, 88, 86, 83, 81, 79, 76, 76, 72, 70, 68, 64, 63, 59, 59, 55, 54, 50, 50, 45, 42, 40, 39, 36, 31, 30, 26, 25, 22, 19, 17, 16, 11, 10, 6, 4, 2)

bucket15 sum:2032, content= (98, 96, 92, 92, 87, 87, 82, 82, 79, 76, 75, 74, 70, 66, 64, 63, 61, 57, 57, 53, 50, 50, 44, 44, 40, 38, 36, 31, 30, 26, 25, 21, 21, 16, 14, 14, 8, 8, 4, 1)

bucket16 sum:2032, content= (98, 95, 94, 91, 87, 86, 84, 81, 79, 76, 75, 72, 71, 68, 64, 63, 59, 59, 55, 54, 50, 48, 47, 42, 40, 39, 36, 31, 28, 28, 25, 21, 21, 16, 14, 14, 8, 8, 4, 1)

bucket17 sum:2032, content= (98, 95, 94, 91, 87, 86, 84, 81, 78, 78, 75, 72, 70, 68, 64, 62, 59, 59, 57, 53, 50, 48, 47, 41, 41, 39, 36, 31, 28, 28, 25, 21, 19, 18, 14, 13, 10, 6, 4, 2)

bucket18 sum:2032, content= (98, 95, 94, 91, 87, 86, 84, 81, 78, 78, 75, 72, 70, 68, 64, 62, 59, 59, 55, 55, 50, 48, 47, 41, 41, 39, 34, 33, 28, 28, 25, 21, 19, 18, 14, 13, 10, 6, 4, 2)

bucket19 sum:2032, content= (98, 95, 94, 91, 87, 85, 84, 82, 78, 78, 75, 72, 70, 68, 64, 62, 59, 59, 55, 54, 52, 48, 46, 41, 41, 39, 34, 33, 28, 28, 24, 23, 19, 16, 16, 13, 8, 8, 3, 2)

bucket20 sum:2032, content= (98, 95, 94, 91, 87, 85, 84, 82, 78, 78, 75, 72, 69, 69, 64, 61, 61, 59, 55, 52, 52, 48, 47, 41, 41, 39, 34, 33, 28, 27, 25, 23, 19, 16, 16, 13, 8, 8, 3, 2)

bucket21 sum:2032, content= (98, 94, 94, 91, 90, 85, 82, 82, 78, 78, 75, 72, 69, 69, 64, 61, 61, 59, 55, 52, 52, 48, 46, 44, 40, 37, 37, 31, 28, 27, 25, 23, 19, 16, 16, 13, 8, 8, 3, 2)

bucket22 sum:2032, content= (97, 97, 92, 91, 90, 84, 84, 81, 78, 78, 75, 72, 69, 69, 64, 61, 61, 59, 55, 52, 52, 48, 46, 44, 40, 37, 34, 34, 28, 27, 25, 23, 19, 16, 16, 13, 8, 8, 3, 2)

bucket23 sum:2032, content= (97, 97, 92, 91, 90, 84, 84, 81, 78, 78, 75, 72, 69, 68, 63, 63, 61, 59, 55, 52, 52, 47, 47, 44, 40, 37, 34, 33, 31, 26, 24, 23, 18, 18, 14, 13, 10, 6, 3, 3)

bucket24 sum:2032, content= (97, 97, 92, 91, 87, 87, 82, 82, 80, 76, 75, 71, 71, 68, 63, 63, 61, 57, 57, 52, 52, 47, 47, 44, 40, 37, 34, 33, 31, 26, 23, 23, 18, 18, 16, 11, 11, 6, 3, 3)

bucket25 sum:2032, content= (97, 97, 92, 91, 87, 87, 82, 82, 80, 76, 74, 74, 69, 68, 63, 63, 61, 57, 57, 52, 52, 47, 47, 44, 40, 37, 34, 33, 31, 26, 23, 23, 18, 18, 16, 11, 11, 6, 2, 2, 2)

"----Comparison for the 126 example----"

***tf from benchmark was 2058(we added the number of machines) and target function from our local search is 2058"

***RESULT IS THE SAME

Run time: 0.031 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 27))

"Avegare error: 0"

"-----END 127 from 130-----"

"-----START 128 from 130-----"

"input file number 128: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_25_7.txt and solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_25_1000_7.txt"

***Data from file U_1_1000_25_7.txt: machinesNum=25 jobsNum=1000

***SOLUTION Data from file SOL_U_1_25_1000_7.txt: machinesNum=25

jobsNum=1000 lowerBound=1966 upperBound=1966

```
isOptimal=1"
```

Content of machines summed (1966, 1966, 1966, 1966, 1966, 1966, 1966, 1965, 1965, 1965, 1965, 1965, 1965, 1965, 1965, 1965, 1965, 1965, 1965,

1965, 1965, 1965, 1965, 1965, 1965, 1965)

input selected: size 1000 sum 49132

----Our Results-----

best from Our local search found:

target function = 1991, num of machines=25, square root lms=0

machines content(number of jobs=1000):

```
bucket1 sum:1966, content=(99, 93, 92, 89, 87, 84, 81, 80, 77, 75, 71, 68, 67, 64, 62, 60, 57,
54, 53, 51, 48, 46, 44, 43, 38, 36, 34, 32, 29, 26,
```

24, 22, 19, 16, 14, 11, 8, 7, 3, 2)

bucket2 sum:1966, content= (99, 93, 92, 89, 87, 84, 81, 80, 77, 75, 71, 68, 67, 64, 62, 60, 56, 55, 53, 51, 48, 46, 44, 42, 39, 36, 34, 32, 29, 26,

24, 22, 19, 16, 14, 11, 8, 7, 3, 2)

```
bucket3 sum:1966, content=(99, 93, 92, 89, 87, 84, 81, 80, 77, 75, 71, 68, 67, 64, 62, 60, 56,
55, 53, 51, 48, 46, 44, 42, 39, 36, 34, 32, 28, 27,
```

24, 22, 19, 16, 14, 11, 8, 7, 3, 2)

```
bucket4 sum:1966, content= (99, 93, 92, 89, 87, 84, 81, 80, 77, 75, 71, 68, 66, 65, 62, 60, 56,
55, 53, 51, 48, 46, 44, 42, 39, 36, 34, 32, 28, 27,
```

24, 22, 19, 16, 14, 11, 8, 7, 3, 2)

```
bucket5 sum:1966, content=(99, 93, 92, 89, 87, 84, 81, 80, 77, 75, 71, 68, 66, 65, 62, 60, 56,
55, 53, 51, 48, 46, 44, 42, 39, 36, 34, 32, 28, 27,
```

24, 22, 19, 16, 14, 11, 8, 7, 3, 2)

```
bucket6 sum:1966, content=(99, 93, 92, 89, 87, 84, 81, 80, 77, 75, 71, 68, 66, 64, 63, 60, 56,
55, 53, 50, 49, 46, 44, 42, 39, 36, 34, 32, 28, 27,
```

24, 22, 19, 16, 14, 11, 8, 7, 3, 2)

bucket7 sum:1966, content=(98, 93, 93, 89, 87, 84, 81, 80, 77, 75, 71, 68, 66, 64, 63, 60, 56, 55, 53, 50, 49, 46, 44, 42, 39, 36, 34, 31, 29, 27,

24, 22, 19, 16, 14, 11, 8, 7, 3, 2)

bucket8 sum:1966, content=(98, 93, 93, 89, 87, 83, 82, 79, 78, 74, 72, 68, 66, 64, 63, 59, 57, 55, 53, 50, 49, 46, 44, 41, 40, 36, 34, 31, 29, 26,

25, 22, 19, 16, 13, 12, 8, 6, 4, 1, 1)

bucket9 sum:1966, content=(98, 93, 93, 89, 87, 83, 82, 79, 78, 74, 71, 69, 66, 64, 63, 59, 57, 55, 53, 50, 49, 46, 44, 41, 40, 36, 34, 31, 29, 26,

25, 22, 19, 16, 13, 11, 9, 6, 4, 1, 1)

```
bucket10 sum:1966, content=(97, 94, 93, 89, 87, 83, 82, 79, 78, 74, 71, 69, 66, 64, 62, 61,
56, 55, 53, 50, 49, 46, 44, 41, 40, 36, 34, 31, 29, 26,
```

25, 21, 20, 16, 13, 11, 9, 6, 4, 1, 1)

bucket11 sum:1966, content=(97, 94, 93, 88, 88, 83, 82, 79, 78, 74, 71, 69, 66, 64, 62, 59, 58, 55, 53, 50, 48, 47, 44, 41, 39, 37, 34, 31, 29, 26,

25, 21, 20, 15, 15, 10, 9, 6, 4, 1, 1)
 bucket12 sum:1966, content= (97, 94, 92, 90, 87, 83, 82, 79, 78, 73, 72, 69, 66, 64, 62, 59, 58, 55, 53, 50, 48, 47, 44, 41, 39, 37, 34, 31, 29, 26,
 25, 21, 20, 15, 13, 12, 9, 6, 4, 1, 1)
 bucket13 sum:1964, content= (97, 94, 92, 90, 86, 85, 81, 79, 78, 73, 72, 69, 66, 64, 62, 59, 58, 55, 53, 50, 48, 47, 44, 41, 39, 37, 34, 31, 29, 26,
 24, 23, 19, 15, 13, 12, 9, 6, 4)
 bucket14 sum:1964, content= (97, 94, 92, 90, 86, 85, 81, 79, 78, 73, 72, 69, 66, 64, 62, 59, 58, 55, 53, 49, 49, 47, 44, 41, 38, 38, 34, 31, 29, 26,
 24, 23, 19, 15, 13, 12, 9, 6, 4)
 bucket15 sum:1965, content= (97, 94, 92, 88, 88, 85, 81, 79, 78, 73, 72, 69, 66, 64, 61, 61, 57, 55, 53, 49, 49, 47, 44, 41, 38, 38, 33, 33, 28, 26,
 24, 23, 18, 17, 13, 10, 10, 6, 3, 2)
 bucket16 sum:1965, content= (97, 93, 93, 88, 88, 85, 81, 79, 78, 73, 72, 69, 65, 65, 61, 61, 57, 55, 52, 51, 48, 47, 44, 41, 38, 38, 33, 33, 28, 26,
 24, 23, 18, 17, 13, 10, 10, 6, 3, 2)
 bucket17 sum:1965, content= (97, 93, 93, 88, 88, 83, 83, 79, 77, 76, 70, 68, 67, 64, 61, 61, 57, 54, 54, 49, 49, 47, 43, 43, 38, 37, 33, 33, 28, 26,
 24, 23, 18, 17, 13, 10, 10, 6, 3, 2)
 bucket18 sum:1964, content= (96, 95, 92, 88, 88, 83, 83, 79, 77, 73, 73, 68, 67, 63, 63, 59, 57, 56, 52, 51, 48, 47, 43, 43, 38, 37, 33, 33, 28, 25,
 25, 23, 18, 17, 13, 10, 9, 8, 3)
 bucket19 sum:1965, content= (96, 95, 91, 90, 86, 85, 82, 79, 76, 76, 70, 70, 65, 65, 61, 61, 57, 54, 52, 52, 48, 47, 43, 43, 38, 37, 33, 31, 30, 25,
 25, 23, 18, 17, 13, 10, 9, 8, 2, 2)
 bucket20 sum:1965, content= (96, 95, 91, 90, 86, 85, 82, 78, 78, 73, 73, 68, 67, 63, 63, 59, 57, 56, 52, 51, 48, 46, 45, 41, 38, 38, 33, 31, 30, 25,
 25, 21, 20, 17, 13, 10, 9, 5, 5, 2)
 bucket21 sum:1965, content= (96, 95, 91, 90, 86, 85, 82, 78, 78, 73, 73, 68, 67, 63, 63, 58, 58, 56, 52, 51, 48, 46, 45, 41, 38, 37, 34, 31, 29, 28,
 24, 21, 18, 18, 13, 10, 9, 5, 5, 2)
 bucket22 sum:1965, content= (96, 95, 91, 90, 86, 85, 81, 80, 76, 76, 70, 70, 65, 65, 61, 61, 57, 54, 52, 51, 49, 46, 45, 40, 40, 35, 35, 31, 29, 28,
 24, 21, 18, 17, 12, 12, 9, 5, 5, 2)
 bucket23 sum:1964, content= (96, 95, 91, 90, 86, 85, 81, 80, 76, 76, 70, 70, 65, 65, 61, 61, 57, 54, 52, 51, 49, 46, 45, 40, 40, 35, 35, 30, 30, 28,
 23, 20, 20, 15, 15, 12, 9, 5, 5)
 bucket24 sum:1964, content= (96, 95, 91, 90, 85, 85, 80, 80, 78, 76, 70, 70, 65, 65, 61, 61, 57, 54, 52, 51, 49, 46, 45, 40, 40, 35, 35, 30, 30, 28,
 23, 20, 20, 15, 15, 12, 9, 5, 5)
 bucket25 sum:1965, content= (96, 93, 93, 90, 85, 85, 80, 80, 78, 76, 70, 67, 67, 65, 63, 58, 58, 54, 54, 51, 47, 47, 45, 40, 40, 35, 35, 30, 30, 28,
 23, 20, 20, 15, 15, 12, 8, 5, 5, 2)

"----Comparison for the 127 example----"

"***tf from benchmark was 1991(we added the number of machines) and target function from our local search is 1991"

***RESULT IS THE SAME

Run time: 0.016 seconds

"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 28))

"Avegare error: 0"

"-----END 128 from 130-----"

"-----START 129 from 130-----"

"input file number 129: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_25_8.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_25_1000_8.txt"

***Data from file U_1_1000_25_8.txt: machinesNum=25 jobsNum=1000"

***SOLUTION Data from file SOL_U_1_25_1000_8.txt: machinesNum=25

jobsNum=1000 lowerBound=2025 upperBound=2025

isOptimal=1"

Content of machines summed (2024, 2024, 2024, 2024, 2025, 2025, 2025, 2025, 2024, 2024,
2024, 2024, 2024, 2024, 2024, 2024, 2024, 2024, 2024,
2024, 2024, 2024, 2024, 2024, 2023, 2023)

input selected: size 1000 sum 50602

----Our Results-----

best from Our local search found:

target function = 2050, num of machines=25, square root lms=0

machines content(number of jobs=1000):

bucket1 sum:2025, content= (99, 96, 94, 90, 88, 85, 84, 81, 79, 76, 75, 72, 69, 66, 64, 62, 60,
57, 56, 52, 50, 47, 45, 43, 40, 38, 35, 32, 29, 28,
24, 23, 20, 16, 16, 11, 10, 7, 4, 2)

bucket2 sum:2025, content= (99, 96, 94, 90, 88, 85, 84, 81, 79, 76, 75, 72, 69, 66, 64, 62, 60,
57, 56, 52, 50, 47, 45, 43, 40, 38, 35, 32, 29, 28,
24, 23, 20, 16, 15, 12, 10, 7, 4, 2)

bucket3 sum:2025, content= (99, 95, 95, 90, 88, 85, 84, 81, 79, 76, 75, 72, 69, 66, 64, 62, 60,
57, 56, 52, 50, 47, 45, 43, 40, 38, 35, 31, 30, 28,
24, 23, 20, 16, 15, 12, 10, 7, 4, 2)

bucket4 sum:2025, content= (99, 95, 94, 90, 89, 85, 84, 81, 79, 76, 75, 72, 69, 66, 64, 62, 60,
57, 56, 52, 50, 47, 45, 43, 40, 38, 35, 31, 30, 27,
25, 23, 20, 16, 15, 12, 10, 7, 4, 2)

bucket5 sum:2025, content= (99, 95, 94, 90, 88, 86, 83, 82, 79, 76, 75, 72, 69, 66, 64, 62, 60,
57, 56, 52, 50, 47, 45, 43, 40, 38, 35, 31, 30, 27,
25, 22, 21, 16, 15, 12, 10, 6, 5, 2)

bucket6 sum:2025, content= (99, 95, 94, 90, 88, 86, 83, 81, 80, 76, 75, 72, 69, 66, 64, 62, 60,
57, 56, 52, 50, 47, 45, 43, 40, 38, 35, 31, 30, 27,
25, 22, 21, 16, 15, 12, 10, 6, 5, 2)

bucket7 sum:2025, content= (99, 95, 93, 91, 88, 86, 83, 81, 79, 77, 75, 72, 68, 67, 64, 62, 60,
56, 56, 53, 50, 47, 45, 43, 39, 38, 36, 31, 30, 27,
25, 22, 20, 17, 15, 12, 10, 6, 5, 1, 1)

bucket8 sum:2025, content= (99, 95, 93, 91, 88, 86, 83, 81, 79, 77, 75, 71, 70, 66, 64, 62, 60,
56, 56, 53, 50, 46, 46, 43, 39, 38, 36, 31, 30, 27,
25, 22, 20, 17, 14, 13, 10, 6, 5, 1, 1)

bucket9 sum:2025, content= (99, 95, 93, 91, 88, 86, 83, 81, 79, 77, 75, 71, 70, 66, 64, 62, 60,
56, 56, 52, 51, 46, 46, 42, 41, 37, 36, 31, 30, 27,

25, 22, 20, 17, 14, 13, 9, 7, 5, 1, 1)
bucket10 sum:2025, content= (98, 96, 93, 91, 88, 86, 83, 81, 78, 78, 74, 73, 68, 67, 64, 61, 60, 58, 55, 52, 51, 46, 46, 42, 41, 37, 35, 32, 30, 27, 25, 22, 20, 17, 14, 12, 11, 6, 5, 1, 1)
bucket11 sum:2023, content= (98, 96, 93, 91, 87, 87, 83, 81, 78, 78, 74, 73, 68, 67, 64, 61, 60, 58, 55, 52, 51, 46, 46, 42, 41, 37, 35, 32, 30, 27, 24, 23, 20, 17, 14, 12, 11, 6, 5)
bucket12 sum:2023, content= (98, 96, 93, 91, 87, 87, 83, 81, 78, 77, 76, 71, 70, 66, 64, 61, 60, 58, 55, 52, 51, 46, 46, 42, 41, 37, 35, 32, 30, 27, 24, 23, 20, 17, 14, 12, 9, 7, 6)
bucket13 sum:2023, content= (98, 96, 93, 91, 87, 87, 83, 81, 78, 77, 76, 71, 70, 66, 63, 63, 59, 58, 55, 52, 50, 48, 45, 42, 41, 37, 35, 32, 30, 27, 24, 23, 19, 18, 14, 12, 9, 7, 6)
bucket14 sum:2023, content= (98, 96, 93, 91, 87, 87, 83, 80, 80, 77, 74, 73, 68, 67, 63, 63, 59, 58, 55, 52, 50, 48, 45, 42, 41, 37, 34, 33, 30, 27, 24, 23, 19, 18, 14, 11, 11, 7, 5)
bucket15 sum:2024, content= (98, 96, 92, 92, 87, 87, 83, 80, 80, 77, 74, 73, 68, 67, 63, 63, 59, 58, 55, 52, 50, 48, 45, 42, 41, 37, 34, 33, 30, 26, 26, 22, 19, 18, 14, 11, 11, 7, 4, 2)
bucket16 sum:2024, content= (98, 96, 92, 91, 89, 86, 82, 82, 78, 77, 76, 71, 70, 66, 63, 63, 59, 58, 55, 51, 51, 48, 45, 42, 41, 37, 34, 33, 30, 26, 26, 22, 19, 18, 14, 11, 11, 7, 4, 2)
bucket17 sum:2024, content= (98, 96, 92, 91, 89, 86, 82, 82, 78, 77, 76, 71, 70, 65, 64, 63, 59, 58, 55, 51, 51, 48, 45, 42, 41, 37, 34, 33, 30, 26, 26, 22, 19, 18, 14, 11, 11, 7, 4, 2)
bucket18 sum:2024, content= (98, 96, 92, 91, 89, 86, 82, 82, 78, 77, 74, 74, 68, 65, 65, 63, 59, 58, 55, 51, 51, 48, 44, 44, 39, 38, 34, 32, 31, 26, 26, 22, 19, 18, 13, 13, 9, 7, 4, 3)
bucket19 sum:2024, content= (98, 96, 92, 91, 89, 86, 82, 82, 78, 77, 74, 73, 67, 67, 65, 63, 59, 58, 54, 53, 50, 48, 44, 42, 41, 38, 34, 32, 29, 29, 24, 23, 19, 18, 13, 13, 9, 7, 4, 3)
bucket20 sum:2024, content= (97, 97, 92, 90, 89, 86, 84, 80, 80, 77, 74, 73, 67, 67, 64, 63, 59, 58, 54, 53, 49, 49, 44, 42, 41, 38, 34, 32, 29, 29, 23, 23, 21, 17, 13, 13, 9, 7, 4, 3)
bucket21 sum:2024, content= (97, 97, 92, 90, 89, 85, 85, 80, 80, 77, 74, 73, 67, 67, 64, 63, 59, 58, 54, 53, 49, 48, 46, 42, 41, 36, 36, 32, 29, 28, 23, 23, 21, 17, 13, 13, 9, 7, 4, 3)
bucket22 sum:2023, content= (97, 97, 92, 90, 89, 85, 84, 82, 78, 77, 74, 73, 67, 67, 65, 61, 61, 58, 54, 53, 49, 48, 46, 41, 41, 38, 33, 33, 29, 28, 26, 22, 19, 17, 16, 11, 9, 7, 4, 2)
bucket23 sum:2023, content= (97, 97, 92, 90, 89, 85, 84, 82, 78, 76, 76, 71, 70, 65, 65, 61, 61, 58, 54, 53, 49, 48, 44, 44, 39, 39, 33, 33, 29, 28, 26, 22, 18, 18, 16, 11, 8, 8, 3, 3)
bucket24 sum:2023, content= (97, 97, 92, 90, 89, 85, 84, 82, 78, 76, 76, 71, 70, 65, 65, 61, 61, 56, 56, 53, 49, 48, 44, 44, 39, 39, 33, 33, 29, 28, 26, 21, 21, 17, 13, 13, 8, 8, 3, 3)

```

bucket25 sum:2023, content= (97, 97, 92, 90, 89, 85, 84, 82, 78, 76, 76, 71, 70, 65, 65, 61,
60, 59, 54, 53, 49, 48, 44, 44, 39, 38, 36, 32, 29, 28,
23, 23, 21, 17, 13, 13, 8, 8, 3, 3)
"----Comparison for the 128 example----"
"***tf from benchmark was 2050(we added the number of machines) and target function
from our local search is 2050"
***RESULT IS THE SAME
Run time: 0.031 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 29))

"Avegare error: 0"
"-----END 129 from 130-----"
"-----START 130 from 130-----"
"input file number 130: inputName=C:/algo/h/docs/benchMark/all/U_1_1000_25_9.txt and
solutionName=C:/algo/h/docs/benchMark/all/SOL_U_1_25_1000_9.txt"
"***Data from file U_1_1000_25_9.txt: machinesNum=25 jobsNum=1000"
"***SOLUTION Data from file SOL_U_1_25_1000_9.txt: machinesNum=25
jobsNum=1000 lowerBound=2048 upperBound=2048
isOptimal=1"
Content of machines summed (2048, 2048, 2048, 2048, 2048, 2048, 2048, 2048, 2048, 2048,
2047, 2047, 2047, 2047, 2047, 2047, 2047, 2047, 2047, 2047,
2047, 2047, 2047, 2047, 2047, 2047, 2047)
input selected: size 1000 sum 51185
----Our Results-----
best from Our local search found:
target function = 2073, num of machines=25, square root lms=0
machines content(number of jobs=1000):
bucket1 sum:2048, content= (99, 97, 96, 93, 91, 88, 85, 84, 81, 79, 76, 73, 71, 67, 64, 61, 60,
56, 54, 51, 49, 46, 44, 42, 40, 37, 36, 34, 30, 28,
25, 24, 21, 18, 15, 12, 9, 8, 3, 1)
bucket2 sum:2048, content= (99, 97, 96, 93, 91, 88, 85, 84, 81, 79, 76, 73, 71, 67, 64, 61, 60,
56, 54, 51, 49, 46, 44, 42, 40, 37, 36, 34, 30, 28,
25, 24, 21, 18, 14, 13, 9, 8, 3, 1)
bucket3 sum:2048, content= (99, 97, 96, 93, 90, 89, 85, 84, 81, 79, 76, 73, 71, 67, 64, 61, 60,
56, 54, 51, 49, 46, 44, 42, 40, 37, 36, 34, 30, 27,
26, 24, 21, 18, 14, 13, 9, 7, 4, 1)
bucket4 sum:2048, content= (99, 97, 96, 93, 90, 88, 86, 84, 81, 79, 76, 73, 71, 67, 64, 61, 60,
56, 54, 51, 49, 46, 44, 42, 40, 37, 36, 34, 30, 27,
26, 24, 21, 18, 14, 13, 9, 7, 4, 1)
bucket5 sum:2048, content= (99, 97, 96, 93, 90, 88, 86, 84, 81, 79, 76, 72, 72, 67, 64, 61, 59,
57, 54, 51, 48, 47, 44, 42, 40, 37, 36, 34, 30, 27,
26, 24, 21, 18, 14, 13, 9, 7, 4, 1)
bucket6 sum:2048, content= (99, 97, 96, 93, 90, 88, 86, 84, 81, 79, 76, 72, 72, 67, 64, 61, 59,
57, 54, 51, 48, 47, 44, 42, 40, 37, 36, 34, 29, 28,
26, 24, 21, 18, 13, 13, 10, 7, 4, 1)
bucket7 sum:2048, content= (99, 97, 96, 93, 90, 88, 86, 84, 81, 79, 76, 72, 71, 68, 64, 61, 59,
57, 53, 52, 48, 47, 44, 42, 40, 37, 36, 34, 29, 28,

```

26, 24, 21, 18, 13, 13, 10, 7, 4, 1)
bucket8 sum:2048, content= (99, 97, 96, 93, 90, 88, 86, 84, 81, 79, 76, 72, 71, 68, 64, 61, 59, 56, 55, 51, 48, 47, 44, 42, 40, 37, 36, 33, 31, 27, 26, 24, 21, 18, 13, 13, 10, 6, 5, 1)
bucket9 sum:2048, content= (99, 97, 96, 93, 90, 88, 86, 84, 81, 78, 77, 72, 71, 68, 63, 62, 59, 56, 55, 51, 48, 47, 44, 42, 40, 37, 36, 33, 31, 27, 26, 23, 22, 17, 15, 12, 10, 6, 5, 1)
bucket10 sum:2048, content= (99, 97, 96, 93, 90, 88, 86, 84, 81, 78, 77, 72, 71, 68, 63, 62, 59, 56, 55, 50, 49, 47, 44, 42, 39, 38, 35, 35, 29, 28, 26, 23, 22, 17, 15, 12, 10, 6, 5, 1)
bucket11 sum:2047, content= (99, 97, 96, 92, 91, 87, 86, 85, 81, 78, 77, 72, 71, 68, 63, 62, 59, 56, 55, 50, 49, 47, 44, 42, 39, 38, 35, 33, 32, 27, 26, 23, 22, 17, 15, 12, 10, 6, 5)
bucket12 sum:2047, content= (99, 97, 95, 94, 89, 89, 86, 83, 82, 78, 76, 74, 70, 68, 63, 62, 59, 56, 55, 50, 49, 47, 44, 42, 39, 38, 35, 33, 32, 27, 26, 23, 21, 19, 13, 13, 10, 6, 4, 1)
bucket13 sum:2047, content= (99, 97, 95, 94, 89, 89, 86, 83, 82, 78, 76, 74, 70, 68, 63, 62, 59, 56, 55, 50, 49, 47, 44, 42, 39, 38, 35, 33, 32, 27, 26, 23, 21, 17, 16, 12, 10, 6, 3, 2)
bucket14 sum:2047, content= (99, 97, 95, 94, 89, 89, 85, 85, 81, 78, 76, 74, 70, 68, 63, 62, 59, 55, 55, 52, 48, 46, 45, 42, 39, 38, 35, 33, 32, 27, 26, 23, 20, 19, 15, 12, 10, 6, 3, 2)
bucket15 sum:2047, content= (99, 96, 96, 94, 89, 89, 85, 85, 80, 79, 76, 74, 70, 67, 65, 61, 59, 55, 55, 52, 48, 46, 45, 41, 41, 37, 35, 33, 32, 27, 26, 23, 20, 19, 15, 12, 10, 6, 3, 2)
bucket16 sum:2047, content= (98, 98, 95, 94, 89, 89, 85, 83, 83, 78, 75, 75, 70, 67, 65, 60, 60, 55, 55, 50, 49, 48, 43, 43, 39, 38, 35, 33, 32, 27, 26, 23, 20, 19, 15, 12, 10, 5, 5, 1)
bucket17 sum:2047, content= (98, 98, 95, 92, 92, 87, 86, 83, 82, 79, 75, 75, 70, 67, 63, 63, 58, 58, 53, 50, 49, 48, 43, 43, 39, 38, 35, 33, 32, 27, 25, 25, 20, 17, 16, 11, 11, 5, 5, 1)
bucket18 sum:2047, content= (98, 98, 95, 92, 92, 87, 86, 83, 82, 79, 75, 75, 70, 66, 65, 62, 58, 58, 53, 50, 49, 46, 45, 43, 39, 38, 35, 33, 32, 27, 25, 25, 20, 17, 16, 11, 10, 8, 3, 1)
bucket19 sum:2047, content= (98, 98, 95, 92, 92, 87, 86, 83, 82, 79, 75, 75, 70, 66, 65, 62, 58, 58, 53, 50, 49, 46, 45, 41, 41, 38, 35, 33, 32, 27, 25, 25, 20, 17, 16, 11, 9, 8, 3, 2)
bucket20 sum:2047, content= (98, 98, 95, 92, 92, 87, 86, 83, 80, 80, 77, 74, 70, 66, 65, 62, 58, 58, 53, 50, 49, 46, 45, 41, 41, 38, 35, 33, 31, 28, 25, 25, 19, 19, 15, 11, 9, 8, 3, 2)
bucket21 sum:2047, content= (98, 98, 95, 92, 92, 87, 86, 83, 80, 80, 77, 74, 69, 69, 63, 62, 58, 58, 52, 52, 49, 46, 45, 41, 41, 37, 35, 33, 31, 28, 25, 23, 22, 17, 16, 11, 9, 8, 3, 2)
bucket22 sum:2047, content= (98, 98, 95, 92, 91, 89, 85, 83, 80, 79, 78, 74, 69, 69, 63, 60, 60, 58, 52, 52, 49, 46, 45, 41, 39, 38, 37, 32, 31, 28, 25, 23, 22, 17, 16, 11, 9, 8, 3, 2)

```
bucket23 sum:2047, content= (98, 96, 96, 94, 91, 87, 86, 83, 80, 79, 78, 74, 69, 66, 65, 60,
60, 58, 55, 50, 49, 46, 43, 43, 39, 38, 37, 32, 31, 28,
25, 23, 22, 17, 16, 11, 9, 8, 3, 2)
bucket24 sum:2047, content= (98, 96, 96, 94, 91, 87, 86, 83, 80, 79, 78, 74, 69, 66, 65, 60,
60, 58, 55, 50, 49, 46, 43, 43, 39, 38, 37, 32, 29, 29,
26, 23, 22, 17, 15, 13, 9, 8, 2, 2)
bucket25 sum:2047, content= (98, 96, 96, 94, 91, 87, 86, 83, 80, 79, 77, 75, 69, 66, 65, 60,
60, 58, 52, 52, 49, 46, 45, 41, 41, 37, 35, 35, 29, 29,
25, 22, 22, 19, 15, 11, 9, 8, 2, 2, 1)
"----Comparison for the 129 example----"
"***tf from benchmark was 2073(we added the number of machines) and target function
from our local search is 2073"
***RESULT IS THE SAME
Run time: 0.031 seconds
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 30))

"Avegare error: 0"
"-----END 130 from 130-----"
"Correct (size-numberCorrect):" QMap((10, 10)(50, 29)(100, 29)(500, 30)(1000, 30))

"Total Avegare error: 0"
"Total time: 15851.7 seconds"
"number of input=130. distribution=NU. range=[1, 100] #jobs=all. #machines=all"
```