Column 1

```
BEGIN_PROGRESS
fes;timeMS;f
1;6;267
5;7;235
10;7;230
20;7;227
25;7;205
40;7;200
84;8;180
END_PROGRESS
```

Progress of the Algorithm over Time
fes ... consumed objective function evaluations
timeMS ... consumed runtime in milliseconds
f ... objective value of the fes-th evaluated solution
Here, only moves improving the best-so-far solution are logged.
The 10th solution that was evaluated had objective value 230. Its evaluation was completed 7ms after the begin of the run.

```
BEGIN_STATE
totalFEs: 84
totalTimeMillis: 8
bestF: 180
lastImprovementFE: 84
lastImprovementTimeMillis: 8
END_STATE
```

End State at the end of the optimization run
- total consumed FEs
- total consumed runtime in milliseconds (ms)
- best objective value encountered
- FE when the last improvement took place
- ms when the last improvement took place

```
BEGIN_SETUP
p.name: LoggingProcessWithSearchSpace
p.class: moptipy.api._process_ss_log._ProcessSSLog
p.lowerBound: 180
p.upperBound: 482
p.maxTimeMillis: 120000
p.goalF: 180
p.randSeed: 6526669205530947346
p.randSeed(hex): 0x5a9363100a272f12
p.randGenType: numpy.random._generator.Generator
p.randBitGenType: numpy.random._pcg64.PCG64
a.name: rls_swap2
a.class: moptipy.algorithms.so.rls.RLS
a.op0.name: shuffle
a.op0.class: moptipy.operators.permutations.
    op0_shuffle.Op0Shuffle
a.op1.name: swap2
a.op1.class: moptipy.operators.permutations.op1_swap2.Op1Swap2
y.name: gantt_demo
y.class: moptipy.examples.jssp.gantt_space.GanttSpace
y.shape: (5, 4, 3)
```

Algorithm and Problem Instance Information
- maximum runtime, if specified
- goal objective value, if specified
- random seed (decimal)
- random seed (hexadecimal)
- algorithm name
- algorithm class
- nullary operator
- unary operator
- solution space setup

Column 2

```
y.dtype: h
y.inst.name: demo
y.inst.class: moptipy.examples.jssp.instance.Instance
y.inst.machines: 5
y.inst.jobs: 4
y.inst.makespanLowerBound: 180
y.inst.makespanUpperBound: 482
y.inst.dtype: b
f.name: makespan
f.class: moptipy.examples.jssp.makespan.Makespan
f.lowerBound: 180
f.upperBound: 482
x.name: perm4w5r
x.class: moptipy.spaces.permutations.Permutations
x.nvars: 20
x.dtype: b
x.min: 0
x.max: 3
x.repetitions: 5
g.name: operation_based_encoding
g.class: moptipy.examples.jssp.
    ob_encoding.OperationBasedEncoding
g.dtypeMachineIdx: b
g.dtypeJobIdx: b
g.dtypeJobTime: h
END_SETUP
BEGIN_SYS_INFO
session.start: 2023-06-20 04:51:52.514777+00:00
session.node: home
session.procesId: 0x3d08
session.cpuAffinity: 4;5
session.ipAddress: 192.168.1.109
version.Pillow: 9.4.0
version.contourpy: 1.0.6
version.cycler: 0.11.0
version.fonttools: 4.38.0
version.joblib: 1.2.0
version.kiwisolver: 1.4.4
version.llvmlite: 0.40.0
```

- objective function
- lower and/or upper bound of objective function, if any
- search space setup
- decoder from search to solution space
- **Information about the System Running the Experiment**
- versions of libaries used

Column 3

```
version.matplotlib: 3.7.1
version.moptipy: 0.9.76
version.numba: 0.57.0
version.numpy: 1.24.3
version.packaging: 21.3
version.pdfo: 1.3.1
version.psutil: 5.9.5
version.pyparsing: 3.0.9
version.pythondateutil: 2.8.2
version.scikitlearn: 1.2.2
version.scipy: 1.10.1
version.six: 1.16.0
version.threadpoolctl: 3.1.0
hardware.machine: x86_64
hardware.nPhysicalCpus: 8
hardware.nLogicalCpus: 16
hardware.cpuMhz: (2200MHz..3700MHz)*16
hardware.byteOrder: little
hardware.cpu: AMD Ryzen 7 2700X Eight-Core Processor
hardware.memSize: 33595326464
python.version: 3.10.6 (main, May 29 2023, 11:10:38)
    [GCC 11.3.0]
python.implementation: CPython
os.name: Linux
os.release: 5.19.0-45-generic
os.version: 46~22.04.1-Ubuntu SMP PREEMPT_DYNAMIC Wed Jun 7
15:06:04 UTC 20
END_SYS_INFO
BEGIN_RESULT_X
2;1;3;1;0;0;2;0;1;2;3;1;0;2;1;3;0;3;2;3
END_RESULT_X
BEGIN_RESULT_Y
1;20;30;0;30;40;3;145;165;2;170;180;1;0;20;0;40;60;2;60;80;3;16
5;180;2;0;30;0;60;80;1;80;130;3;130;145;1;30;60;3;60;90;0;90;13
0;2;130;170;3;0;50;2;80;92;1;130;160;0;160;170
END_RESULT_Y
```

- information about system hardware
- Python interpreter infos
- operating system information
- **Best Encoded Solution (if any)**
- **Best Discovered Point in the Solution Space**