```
Step #1 - Assembly / Binning / COG Annotation
Config file config.yaml is extended by additional config specified via the
command line.
Building DAG of jobs...
Using shell: /usr/bin/bash
Provided cores: 8
Rules claiming more threads will be scaled down.
Job stats:
job                          count    min threads    max threads
------------------------    -------   ------------   -------------
all                               1              1               1
bed_orfs                          1              1               1
bedtools_split_cov                8              1               1
bowtie_align                      8              8               8
bowtie_index                      1              8               8
cat_split_annotation              1              1               1
compute_avg_cov                   1              1               1
concoct                           1              8               8
copy_fasta                        1              1               1
coverage                          1              1               1
create_bin_folders                1              1               1
cut_contigs                       1              1               1
extract_SCG_sequences             1              1               1
get_SCG_tables                    1              1               1
initial_quantity_of_bins          1              1               1
merge_contigs                     1              8               8
parse_cogs_annotation             1              1               1
prodigal                          1              1               1
reads_yaml                        1              1               1
refine                            1              8               8
rpsblast                        100              1               1
samtools_sort                     8              8               8
simplify                          1              8               8
spades                            1              8               8
split_fasta                       1              1               1
unitig_profiles                   1              8               8
total                           146              1               8

Resources before job selection: {'_cores': 8, '_nodes': 9223372036854775807}
Ready jobs (2)
Select jobs to execute...
Welcome to the CBC MILP Solver
Version: 2.10.10
Build Date: Apr 19 2023

command line - cbc /tmp/79e2f93dd88440b4b976d4b6c1e30548-pulp.mps max
timeMode elapsed branch printingOptions all solution
/tmp/79e2f93dd88440b4b976d4b6c1e30548-pulp.sol (default strategy 1)
At line 2 NAME          MODEL
At line 3 ROWS
At line 7 COLUMNS
At line 18 RHS
At line 21 BOUNDS
At line 24 ENDATA
Problem MODEL has 2 rows, 2 columns and 4 elements
Coin0008I MODEL read with 0 errors
Option for timeMode changed from cpu to elapsed
```

```
Continuous objective value is 16 - 0.00 seconds
Cgl0004I processed model has 1 rows, 2 columns (2 integer (2 of which
binary)) and 2 elements
Cutoff increment increased from 1e-05 to 1.9999
Cbc0038I Initial state - 0 integers unsatisfied sum - 0
Cbc0038I Solution found of 16
Cbc0038I Before mini branch and bound, 2 integers at bound fixed and 0
continuous
Cbc0038I Mini branch and bound did not improve solution (0.00 seconds)
Cbc0038I After 0.00 seconds - Feasibility pump exiting with objective of 16 -
took 0.00 seconds
Cbc0012I Integer solution of 16 found by feasibility pump after 0 iterations
and 0 nodes (0.00 seconds)
Cbc0001I Search completed - best objective 16, took 0 iterations and 0 nodes
(0.00 seconds)
Cbc0035I Maximum depth 0, 0 variables fixed on reduced cost
Cuts at root node changed objective from 16 to 16
Probing was tried 0 times and created 0 cuts of which 0 were active after
adding rounds of cuts (0.000 seconds)
Gomory was tried 0 times and created 0 cuts of which 0 were active after
adding rounds of cuts (0.000 seconds)
Knapsack was tried 0 times and created 0 cuts of which 0 were active after
adding rounds of cuts (0.000 seconds)
Clique was tried 0 times and created 0 cuts of which 0 were active after
adding rounds of cuts (0.000 seconds)
MixedIntegerRounding2 was tried 0 times and created 0 cuts of which 0 were
active after adding rounds of cuts (0.000 seconds)
FlowCover was tried 0 times and created 0 cuts of which 0 were active after
adding rounds of cuts (0.000 seconds)
TwoMirCuts was tried 0 times and created 0 cuts of which 0 were active after
adding rounds of cuts (0.000 seconds)
ZeroHalf was tried 0 times and created 0 cuts of which 0 were active after
adding rounds of cuts (0.000 seconds)

Result - Optimal solution found

Objective value:                16.00000000
Enumerated nodes:               0
Total iterations:               0
Time (CPU seconds):             0.00
Time (Wallclock seconds):       0.00

Option for printingOptions changed from normal to all
Total time (CPU seconds):       0.01   (Wallclock seconds):        0.00

Selected jobs (1)
Resources after job selection: {'_cores': 0, '_nodes': 9223372036854775806}

[Wed Jul 19 10:00:59 2023]
Job 7: Assembling with metaSPAdes
Reason: Missing output files: assembly/high_res/graph_pack.gfa,
assembly/spades/assembly.fasta


        /mnt/strong/tools/apps/STRONG/SPAdes/assembler/bin/spades.py --meta -
-only-assembler --save-gp -t 8 -k 77 -m 2000 -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample1/sample1_R1.fq.gz -1
```

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/mnt/strong/tools/apps/STRONG_Runs/Test/sample2/sample2_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample3/sample3_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample4/sample4_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample5/sample5_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample6/sample6_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample7/sample7_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample8/sample8_R1.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample1/sample1_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample2/sample2_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample3/sample3_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample4/sample4_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample5/sample5_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample6/sample6_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample7/sample7_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample8/sample8_R2.fq.gz -o
assembly/spades/ &> assembly/spades.log
        cp assembly/spades//contigs.fasta assembly/spades/assembly.fasta
        cp assembly/spades//K77/saves/00_before_simplification/graph_pack*
$(dirname assembly/high_res/graph_pack.gfa)

Full Traceback (most recent call last):
  File "/mnt/strong/tools/apps/miniconda3.10/envs/STRONG/lib/python3.10/site-
packages/snakemake/executors/__init__.py", line 2561, in run_wrapper
    run(
  File "/mnt/strong/tools/apps/STRONG/SnakeNest/Assembly.snake", line 50, in
__rule_spades
  File "/mnt/strong/tools/apps/miniconda3.10/envs/STRONG/lib/python3.10/site-
packages/snakemake/shell.py", line 294, in __new__
    raise sp.CalledProcessError(retcode, cmd)
subprocess.CalledProcessError: Command 'set -euo pipefail;
        /mnt/strong/tools/apps/STRONG/SPAdes/assembler/bin/spades.py --meta -
-only-assembler --save-gp -t 8 -k 77 -m 2000 -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample1/sample1_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample2/sample2_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample3/sample3_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample4/sample4_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample5/sample5_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample6/sample6_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample7/sample7_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample8/sample8_R1.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample1/sample1_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample2/sample2_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample3/sample3_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample4/sample4_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample5/sample5_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample6/sample6_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample7/sample7_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample8/sample8_R2.fq.gz -o
assembly/spades/ &> assembly/spades.log
        cp assembly/spades//contigs.fasta assembly/spades/assembly.fasta
        cp assembly/spades//K77/saves/00_before_simplification/graph_pack*
$(dirname assembly/high_res/graph_pack.gfa)' returned non-zero exit status
127.

[Wed Jul 19 10:00:59 2023]
Error in rule spades:
    jobid: 7
```

```
    input: /mnt/strong/tools/apps/STRONG_Runs/Test/sample1/sample1_R1.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample2/sample2_R1.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample3/sample3_R1.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample4/sample4_R1.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample5/sample5_R1.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample6/sample6_R1.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample7/sample7_R1.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample8/sample8_R1.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample1/sample1_R2.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample2/sample2_R2.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample3/sample3_R2.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample4/sample4_R2.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample5/sample5_R2.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample6/sample6_R2.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample7/sample7_R2.fq.gz,
/mnt/strong/tools/apps/STRONG_Runs/Test/sample8/sample8_R2.fq.gz
    output: assembly/spades/assembly.fasta, assembly/high_res/graph_pack.gfa
    log: assembly/spades.log (check log file(s) for error details)
    shell:

        /mnt/strong/tools/apps/STRONG/SPAdes/assembler/bin/spades.py --meta -
-only-assembler --save-gp -t 8 -k 77 -m 2000 -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample1/sample1_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample2/sample2_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample3/sample3_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample4/sample4_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample5/sample5_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample6/sample6_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample7/sample7_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample8/sample8_R1.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample1/sample1_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample2/sample2_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample3/sample3_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample4/sample4_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample5/sample5_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample6/sample6_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample7/sample7_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample8/sample8_R2.fq.gz -o
assembly/spades/ &> assembly/spades.log
        cp assembly/spades//contigs.fasta assembly/spades/assembly.fasta
        cp assembly/spades//K77/saves/00_before_simplification/graph_pack*
$(dirname assembly/high_res/graph_pack.gfa)

        (one of the commands exited with non-zero exit code; note that
snakemake uses bash strict mode!)

Full Traceback (most recent call last):
  File "/mnt/strong/tools/apps/miniconda3.10/envs/STRONG/lib/python3.10/site-
packages/snakemake/executors/__init__.py", line 2561, in run_wrapper
    run(
  File "/mnt/strong/tools/apps/STRONG/SnakeNest/Assembly.snake", line 50, in
__rule_spades
  File "/mnt/strong/tools/apps/miniconda3.10/envs/STRONG/lib/python3.10/site-
packages/snakemake/shell.py", line 294, in __new__
    raise sp.CalledProcessError(retcode, cmd)
subprocess.CalledProcessError: Command 'set -euo pipefail;
```

```
        /mnt/strong/tools/apps/STRONG/SPAdes/assembler/bin/spades.py --meta -
-only-assembler --save-gp -t 8 -k 77 -m 2000 -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample1/sample1_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample2/sample2_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample3/sample3_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample4/sample4_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample5/sample5_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample6/sample6_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample7/sample7_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample8/sample8_R1.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample1/sample1_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample2/sample2_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample3/sample3_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample4/sample4_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample5/sample5_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample6/sample6_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample7/sample7_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample8/sample8_R2.fq.gz -o
assembly/spades/ &> assembly/spades.log
        cp assembly/spades//contigs.fasta assembly/spades/assembly.fasta
        cp assembly/spades//K77/saves/00_before_simplification/graph_pack*
$(dirname assembly/high_res/graph_pack.gfa)' returned non-zero exit status
127.

During handling of the above exception, another exception occurred:

Traceback (most recent call last):
  File "/mnt/strong/tools/apps/miniconda3.10/envs/STRONG/lib/python3.10/site-
packages/snakemake/executors/__init__.py", line 656, in _callback
    raise ex
  File
"/mnt/strong/tools/apps/miniconda3.10/envs/STRONG/lib/python3.10/concurrent/f
utures/thread.py", line 58, in run
    result = self.fn(*self.args, **self.kwargs)
  File "/mnt/strong/tools/apps/miniconda3.10/envs/STRONG/lib/python3.10/site-
packages/snakemake/executors/__init__.py", line 642, in cached_or_run
    run_func(*args)
  File "/mnt/strong/tools/apps/miniconda3.10/envs/STRONG/lib/python3.10/site-
packages/snakemake/executors/__init__.py", line 2597, in run_wrapper
    raise RuleException(
snakemake.exceptions.RuleException: CalledProcessError in file
/mnt/strong/tools/apps/STRONG/SnakeNest/Assembly.snake, line 22:
Command 'set -euo pipefail;
        /mnt/strong/tools/apps/STRONG/SPAdes/assembler/bin/spades.py --meta -
-only-assembler --save-gp -t 8 -k 77 -m 2000 -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample1/sample1_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample2/sample2_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample3/sample3_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample4/sample4_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample5/sample5_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample6/sample6_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample7/sample7_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample8/sample8_R1.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample1/sample1_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample2/sample2_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample3/sample3_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample4/sample4_R2.fq.gz -2
```

```
/mnt/strong/tools/apps/STRONG_Runs/Test/sample5/sample5_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample6/sample6_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample7/sample7_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample8/sample8_R2.fq.gz -o
assembly/spades/ &> assembly/spades.log
        cp assembly/spades//contigs.fasta assembly/spades/assembly.fasta
        cp assembly/spades//K77/saves/00_before_simplification/graph_pack*
$(dirname assembly/high_res/graph_pack.gfa)' returned non-zero exit status
127.
  File "/mnt/strong/tools/apps/STRONG/SnakeNest/Assembly.snake", line 22, in
__rule_spades

RuleException:
CalledProcessError in file
/mnt/strong/tools/apps/STRONG/SnakeNest/Assembly.snake, line 22:
Command 'set -euo pipefail;
        /mnt/strong/tools/apps/STRONG/SPAdes/assembler/bin/spades.py --meta -
-only-assembler --save-gp -t 8 -k 77 -m 2000 -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample1/sample1_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample2/sample2_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample3/sample3_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample4/sample4_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample5/sample5_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample6/sample6_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample7/sample7_R1.fq.gz -1
/mnt/strong/tools/apps/STRONG_Runs/Test/sample8/sample8_R1.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample1/sample1_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample2/sample2_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample3/sample3_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample4/sample4_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample5/sample5_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample6/sample6_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample7/sample7_R2.fq.gz -2
/mnt/strong/tools/apps/STRONG_Runs/Test/sample8/sample8_R2.fq.gz -o
assembly/spades/ &> assembly/spades.log
        cp assembly/spades//contigs.fasta assembly/spades/assembly.fasta
        cp assembly/spades//K77/saves/00_before_simplification/graph_pack*
$(dirname assembly/high_res/graph_pack.gfa)' returned non-zero exit status
127.
  File "/mnt/strong/tools/apps/STRONG/SnakeNest/Assembly.snake", line 22, in
__rule_spades
  File
"/mnt/strong/tools/apps/miniconda3.10/envs/STRONG/lib/python3.10/concurrent/f
utures/thread.py", line 58, in run
Resources before job selection: {'_cores': 8, '_nodes': 9223372036854775807}
Ready jobs (1)
Select jobs to execute...
Using greedy selector because only single job has to be scheduled.
Selected jobs (1)
Resources after job selection: {'_cores': 7, '_nodes': 9223372036854775806}

[Wed Jul 19 10:00:59 2023]
rule reads_yaml:
    output: samples.yaml
    jobid: 33
    reason: Missing output files: samples.yaml
    resources: tmpdir=/tmp
```

Config file config.yaml is extended by additional config specified via the
command line.
Building DAG of jobs...
Using shell: /usr/bin/bash
Provided cores: 8
Rules claiming more threads will be scaled down.
Select jobs to execute...
[Wed Jul 19 10:00:59 2023]
Finished job 33.
1 of 146 steps (1%) done
Exiting because a job execution failed. Look above for error message
Complete log: .snakemake/log/2023-07-19T100058.643637.snakemake.log
unlocking
removing lock
removing lock
removed all locks
Traceback (most recent call last):
  File "/mnt/strong/tools/apps/STRONG/./bin/STRONG", line 94, in <module>
    call_snake(["--snakefile", "SnakeNest/SCogSubGraph.snake"])
  File "/mnt/strong/tools/apps/STRONG/./bin/STRONG", line 83, in call_snake
    subprocess.check_call(base_params + extra_params, stdout=sys.stdout,
stderr=sys.stderr)
  File
"/mnt/strong/tools/apps/miniconda3.10/envs/STRONG/lib/python3.10/subprocess.p
y", line 369, in check_call
    raise CalledProcessError(retcode, cmd)
subprocess.CalledProcessError: Command '['snakemake', '--directory',
'/mnt/strong/tools/apps/STRONG_Runs/TestResults', '--cores', '8', '--config',
'LOCAL_DIR=/mnt/strong/tools/apps/STRONG', '--
configfile=/mnt/strong/tools/apps/STRONG_Runs/TestResults/config.yaml', '--
latency-wait', '120', '-k', '-p', '-r', '--verbose', '--snakefile',
'SnakeNest/SCogSubGraph.snake']' returned non-zero exit status 1.