

```
D:\Java\jdk1.8.0_102\bin\java.exe "-javaagent:D:\IntelliJ IDEA Community
Edition 2019.2\lib\idea_rt.jar=58340:D:\IntelliJ IDEA Community Edition 2019
.2\bin" -Dfile.encoding=UTF-8 -classpath D:\Java\jdk1.8.0_102\jre\lib\
charsets.jar;D:\Java\jdk1.8.0_102\jre\lib\deploy.jar;D:\Java\jdk1.8.0_102\
jre\lib\ext\access-bridge-32.jar;D:\Java\jdk1.8.0_102\jre\lib\ext\cldrdata.
jar;D:\Java\jdk1.8.0_102\jre\lib\ext\dnsns.jar;D:\Java\jdk1.8.0_102\jre\lib\
ext\jaccess.jar;D:\Java\jdk1.8.0_102\jre\lib\ext\jfxrt.jar;D:\Java\jdk1.8.
0_102\jre\lib\ext\localedata.jar;D:\Java\jdk1.8.0_102\jre\lib\ext\nashorn.
jar;D:\Java\jdk1.8.0_102\jre\lib\ext\sunec.jar;D:\Java\jdk1.8.0_102\jre\lib\
ext\sunjce_provider.jar;D:\Java\jdk1.8.0_102\jre\lib\ext\sunmscapi.jar;D:\
Java\jdk1.8.0_102\jre\lib\ext\sunpkcs11.jar;D:\Java\jdk1.8.0_102\jre\lib\ext
\zipfs.jar;D:\Java\jdk1.8.0_102\jre\lib\javaws.jar;D:\Java\jdk1.8.0_102\jre\
lib\jce.jar;D:\Java\jdk1.8.0_102\jre\lib\jfr.jar;D:\Java\jdk1.8.0_102\jre\
lib\jfxswt.jar;D:\Java\jdk1.8.0_102\jre\lib\jsse.jar;D:\Java\jdk1.8.0_102\
jre\lib\management-agent.jar;D:\Java\jdk1.8.0_102\jre\lib\plugin.jar;D:\Java
\jdk1.8.0_102\jre\lib\resources.jar;D:\Java\jdk1.8.0_102\jre\lib\rt.jar;D:\
IntelliJ Projects\Project03_IS\out\production\Project03_IS is.assignment3.
main.CSPDriver
```

```
*** Run started ***
```

```
#####
```

```
Australia Map Coloring
```

```
#####
```

```
No Heuristics used
```

```
-----
A run completed
```

```
A run completed
```

```
A run completed
```

```
A run completed
```

```
Total No of backtracks is 20.0
```

```
Time taken = 1.0 ms
```

```
#####
```

```
No Heuristics & Forward Checking
```

```
-----
A run completed
```

```
A run completed
```

```
A run completed
```

```
A run completed
```

```
Total No of backtracks is 20.0
```

```
Time taken = 0.5 ms
```

```
#####
```

```
No Heuristics & Forward Checking with propagation through singleton domains
```

```
-----
A run completed
```

```
A run completed
```

```
A run completed
```

```
A run completed
```

```
Total No of backtracks = 12.0
```

```
Time taken = 0.0 ms
```

```
#####
```

```
MRV
```

```
-----
A run completed
```

```
A run completed
```

```
A run completed
```

```
A run completed
```

```
Total No of backtracks is 20.0
```

```
Time taken = 1.0 ms
```

```
#####
```

MRV & Forward Checking

A run completed

A run completed

A run completed

A run completed

Total No of backtracks is 0.0

Time taken = 0.5 ms

#####

MRV & Forward Checking with propagation through singleton domains

A run completed

A run completed

A run completed

A run completed

Total No of backtracks = 0.0

Time taken = 0.15 ms

#####

Degree Constraint

A run completed

A run completed

A run completed

A run completed

Total No of backtracks is 0.0

Time taken = 0.25 ms

#####

Degree Constraint & Forward Checking

A run completed

A run completed

A run completed

A run completed

Total No of backtracks is 0.0

Time taken = 0.25 ms

#####

Degree Constraint & Forward Checking with propagation through singleton domains

A run completed

A run completed

A run completed

A run completed

Total No of backtracks = 0.0

Time taken = 0.15 ms

#####

Least Constraining Value

A run completed

A run completed

A run completed

A run completed

Total No of backtracks is 0.0

Time taken = 0.0 ms

#####

Least Constraining Value & Forward Checking

A run completed

```

A run completed
A run completed
A run completed
Total No of backtracks is 0.0
Time taken = 0.25 ms
#####
Least Constraining Value & Forward Checking with propagation through
singleton domains
-----
A run completed
A run completed
A run completed
A run completed
Total No of backtracks = 0.0
Time taken = 0.15 ms
#####
Number of Runs for Australia = 4

No Heuristics:
Avg No of Backtracks = 20.000000
Avg Time in Milliseconds = 1.000000 ms

No Heuristics & Forward Checking:
Avg No of Backtracks = 20.000000
Avg Time in Milliseconds = 0.500000 ms

MRV:
Avg No of Backtracks = 20.000000
Avg Time in Milliseconds = 1.000000 ms

LCV & Forward Checking & propagation through singleton domains:
Avg No of Backtracks = 0.000000
Avg Time in Milliseconds = 0.250000 ms

No Heuristics & Forward Checking & propagation through singleton domains:
Avg No of Backtracks = 20.000000
Avg Time in Milliseconds = 0.000000 ms

Degree Constraint & Forward Checking & propagation through singleton domains
:
Avg No of Backtracks = 0.000000
Avg Time in Milliseconds = 0.250000 ms

LCV & Forward Checking:
Avg No of Backtracks = 0.000000
Avg Time in Milliseconds = 0.250000 ms

MRV & Forward Checking & propagation through singleton domains:
Avg No of Backtracks = 0.000000
Avg Time in Milliseconds = 0.250000 ms

Degree Constraint & Forward Checking:
Avg No of Backtracks = 0.000000
Avg Time in Milliseconds = 0.250000 ms

LCV:
Avg No of Backtracks = 0.000000
Avg Time in Milliseconds = 0.000000 ms

```

MRV & Forward Checking:

Avg No of Backtracks = 0.000000

Avg Time in Milliseconds = 0.500000 ms

Degree Constraint:

Avg No of Backtracks = 0.000000

Avg Time in Milliseconds = 0.250000 ms

#####

USA Map Coloring

#####

No Heuristics used

A run completed

A run completed

A run completed

A run completed

Total No of backtracks is 1.2328615E7

Time taken = 20214.25 ms

#####

No Heuristics & Forward Checking

A run completed

A run completed

A run completed

A run completed

Total No of backtracks is 1.2328615E7

Time taken = 19345.25 ms

#####

No Heuristics & Forward Checking with propagation through singleton domains

A run completed

A run completed

A run completed

A run completed

Total No of backtracks = 7397169.0

Time taken = 11580.3 ms

#####

MRV

A run completed

A run completed

A run completed

A run completed

Total No of backtracks is 1.2328615E7

Time taken = 22398.25 ms

#####

MRV & Forward Checking

A run completed

A run completed

A run completed

A run completed

Total No of backtracks is 0.0

Time taken = 0.5 ms

#####

MRV & Forward Checking with propagation through singleton domains

```
A run completed
A run completed
A run completed
A run completed
Total No of backtracks = 0.0
Time taken = 0.15 ms
#####
Degree Constraint
-----

A run completed
A run completed
A run completed
A run completed
Total No of backtracks is 0.0
Time taken = 0.5 ms
#####
Degree Constraint & Forward Checking
-----

A run completed
A run completed
A run completed
A run completed
Total No of backtracks is 0.0
Time taken = 0.5 ms
#####
Degree Constraint & Forward Checking with propagation through singleton
domains
-----

A run completed
A run completed
A run completed
A run completed
Total No of backtracks = 0.0
Time taken = 0.4499999999999996 ms
#####
Least Constraining Value
-----

A run completed
A run completed
A run completed
A run completed
Total No of backtracks is 0.0
Time taken = 0.0 ms
#####
Least Constraining Value & Forward Checking
-----

A run completed
A run completed
A run completed
A run completed
Total No of backtracks is 0.0
Time taken = 0.25 ms
#####
Least Constraining Value & Forward Checking with propagation through
singleton domains
-----

A run completed
A run completed
```

```
A run completed
A run completed
Total No of backtracks = 0.0
Time taken = 0.15 ms
#####
Number of Runs for USA = 4

No Heuristics:
Avg No of Backtracks = 12328615.000000
Avg Time in Milliseconds = 20214.250000 ms

No Heuristics & Forward Checking:
Avg No of Backtracks = 12328615.000000
Avg Time in Milliseconds = 19345.250000 ms

MRV:
Avg No of Backtracks = 12328615.000000
Avg Time in Milliseconds = 22398.250000 ms

LCV & Forward Checking & propagation through singleton domains:
Avg No of Backtracks = 0.000000
Avg Time in Milliseconds = 0.250000 ms

No Heuristics & Forward Checking & propagation through singleton domains:
Avg No of Backtracks = 12328615.000000
Avg Time in Milliseconds = 19300.500000 ms

Degree Constraint & Forward Checking & propagation through singleton domains
:
Avg No of Backtracks = 0.000000
Avg Time in Milliseconds = 0.750000 ms

LCV & Forward Checking:
Avg No of Backtracks = 0.000000
Avg Time in Milliseconds = 0.250000 ms

MRV & Forward Checking & propagation through singleton domains:
Avg No of Backtracks = 0.000000
Avg Time in Milliseconds = 0.250000 ms

Degree Constraint & Forward Checking:
Avg No of Backtracks = 0.000000
Avg Time in Milliseconds = 0.500000 ms

LCV:
Avg No of Backtracks = 0.000000
Avg Time in Milliseconds = 0.000000 ms

MRV & Forward Checking:
Avg No of Backtracks = 0.000000
Avg Time in Milliseconds = 0.500000 ms

Degree Constraint:
Avg No of Backtracks = 0.000000
Avg Time in Milliseconds = 0.500000 ms

*** Run complete ***
```

Process finished with exit code 0