

```

D:\Java\jdk1.8.0_102\bin\java.exe "-javaagent:D:\IntelliJ IDEA
Community Edition 2019.2\lib\idea_rt.jar=58920: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 edu.uncc.cci.is.map_colouring.main.Main
*** Run started ***
#####
Australia Map Coloring
#####
No Heuristics used
-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 20.0
Time taken = 1.5 ms
#####
No Heuristics & Forward Checking
-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 20.0
Time taken = 0.25 ms
#####
No Heuristics & Forward Checking with propagation through
singleton domains
-----
An iteration completed
An iteration completed

```

```
An iteration completed
An iteration completed
Total number of backtracks = 12.0
Time taken = 0.15 ms
#####
MRV
-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 20.0
Time taken = 1.0 ms
#####
MRV & Forward Checking
-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 0.0
Time taken = 0.75 ms
#####
MRV & Forward Checking with propagation through singleton
domains
-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 0.0
Time taken = 0.15 ms
#####
Degree Constraint
-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 0.0
Time taken = 0.5 ms
#####
Degree Constraint & Forward Checking
-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
```

```

Total number of backtracks = 0.0
Time taken = 0.25 ms
#####
Degree Constraint & Forward Checking with propagation through
singleton domains
-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 0.0
Time taken = 0.15 ms
#####
Least Constraining Value
-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 0.0
Time taken = 0.25 ms
#####
Least Constraining Value & Forward Checking
-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 0.0
Time taken = 0.0 ms
#####
Least Constraining Value & Forward Checking with propagation
through singleton domains
-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 0.0
Time taken = 0.0 ms
#####
Number of Runs for Australia = 4

No Heuristics:
Avg No of Backtracks = 20.000000
Avg Time in Milliseconds = 1.500000 ms

No Heuristics & Forward Checking:

```

Avg No of Backtracks = 20.000000  
Avg Time in Milliseconds = 0.250000 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 = 0.000000 ms

No Heuristics & Forward Checking & propagation through  
singleton domains:

Avg No of Backtracks = 20.000000  
Avg Time in Milliseconds = 0.250000 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 = 0.000000 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 = 0.250000 ms

MRV & Forward Checking:

Avg No of Backtracks = 0.000000  
Avg Time in Milliseconds = 0.750000 ms

Degree Constraint:

Avg No of Backtracks = 0.000000  
Avg Time in Milliseconds = 0.500000 ms

#####  
USA Map Coloring

```
#####  
No Heuristics used  
-----  
An iteration completed  
An iteration completed  
An iteration completed  
An iteration completed  
Total number of backtracks = 1.2328615E7  
Time taken = 20753.0 ms  
#####  
No Heuristics & Forward Checking  
-----  
An iteration completed  
An iteration completed  
An iteration completed  
An iteration completed  
Total number of backtracks = 1.2328615E7  
Time taken = 19658.5 ms  
#####  
No Heuristics & Forward Checking with propagation through  
singleton domains  
-----  
An iteration completed  
An iteration completed  
An iteration completed  
An iteration completed  
Total number of backtracks = 7397169.0  
Time taken = 11841.6 ms  
#####  
MRV  
-----  
An iteration completed  
An iteration completed  
An iteration completed  
An iteration completed  
Total number of backtracks = 1.2328615E7  
Time taken = 22780.25 ms  
#####  
MRV & Forward Checking  
-----  
An iteration completed  
An iteration completed  
An iteration completed  
An iteration completed  
Total number of backtracks = 0.0  
Time taken = 0.75 ms  
#####  
MRV & Forward Checking with propagation through singleton
```

## domains

```

-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 0.0
Time taken = 0.15 ms
#####
Degree Constraint
-----

```

```

-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 0.0
Time taken = 0.5 ms
#####
Degree Constraint & Forward Checking
-----

```

```

-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 0.0
Time taken = 0.5 ms
#####
Degree Constraint & Forward Checking with propagation through
singleton domains
-----

```

```

-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 0.0
Time taken = 0.3 ms
#####
Least Constraining Value
-----

```

```

-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 0.0
Time taken = 0.25 ms
#####
Least Constraining Value & Forward Checking
-----

```

```

An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number of backtracks = 0.0
Time taken = 0.5 ms
#####
Least Constraining Value & Forward Checking with propagation
through singleton domains
-----
An iteration completed
An iteration completed
An iteration completed
An iteration completed
Total number 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 = 20753.000000 ms

No Heuristics & Forward Checking:
Avg No of Backtracks = 12328615.000000
Avg Time in Milliseconds = 19658.500000 ms

MRV:
Avg No of Backtracks = 12328615.000000
Avg Time in Milliseconds = 22780.250000 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 = 19736.000000 ms

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

LCV & Forward Checking:
Avg No of Backtracks = 0.000000

```

Avg Time in Milliseconds = 0.500000 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 = 0.250000 ms

MRV & Forward Checking:

Avg No of Backtracks = 0.000000

Avg Time in Milliseconds = 0.750000 ms

Degree Constraint:

Avg No of Backtracks = 0.000000

Avg Time in Milliseconds = 0.500000 ms

\*\*\* Run complete \*\*\*

Process finished with exit code 0