FIT5216: Modelling Discrete Optimization Problems
Inclass Task 17: Graph Coloring

1 Problem Statement

Given a graph defined by a number of nodes and and edge relationship

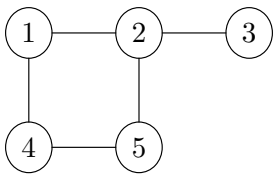
```
int: n;
set of int: NODE = 1..n;
array[int,1..2] of NODE: edge;
```

Color each node so that it has a different color from its neighbours. Build a model `color.mzn` with decisions

```
set of int: COLOR = 1..card(NODE);
array[NODE] of var COLOR: x;
```

Solve to minimize the number of colors used.

For example, given the graph shown below



one correct coloring is $x = [1, 2, 3, 2, 3]$. A coloring using the minimal number of colors 2 is $x = [4, 5, 4, 5, 4]$.

Can you add some symmetry breaking, how does it affect the model?

2 Instructions

Edit the provided `mzn` model files to solve the problems described above. Your implementations can be tested locally by using the *Run* icon in the MiniZinc IDE or by using,

```
minizinc ./modelname.mzn ./datafile.dzn
```

at the command line.