Constraint Satisfaction Problems Tutorial

Problem 1:
Describe the following problem as a constraint satisfaction problem:

```
   S  E  N  D
+  M  O  R  E
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M  O  N  E  Y
```

Draw a constraint graph.
Describe how to apply the following methods/heuristics:

- Forward checking
- Using the most constrained variable
- Using the most constraining variable
- Using the least constraining value
- Local search using min-conflict

Problem 2:
Use Forward Checking to show that the coloring problem for Australia does not have a solution for the following initial assignment {WA = green, NT = red, V = red}.

Problem 3:
Given the following CSP:

Assign a number in each cell such that

1. Numbers take value of 1 or 2
2. Sum of numbers on every row is odd.
3. Sum of numbers on every column is even
4. Sum of all numbers is greater than 6.

Please describe a starting state such that local search with min-conflicts gets stuck with local optimum. Explain how Simulated Annealing can escape local optimum to find a global optimum solution.