Exercise: Python Constraint Satisfaction Problem

Use the following pseudocode to complete the attached file `contraints_template.py`, remember to incorporate the other methods already present in the file.

```
function RECURSIVE-BACKTRACKING(assignment, csp)
    if assignment is complete then return assignment
    var ← SELECT-UNASSIGNED-VARIABLE(VARIABLES[csp], assignment, csp)
    for each value in ORDER-DOMAIN-VALUES(var, assignment, csp)
        if value is consistent with assignment given CONSTRAINTS[csp]
            add {var = value} to assignment
            result ← RECURSIVE-BACKTRACKING(assignment, csp)
            if result ≠ failure then return result
            remove {var = value} from assignment
    return failure
```

Exercise: Python Constraint Satisfaction Problem solution

See the attached file `constraints.py`, it contains a Python program to solve constraint satisfaction problems

1. What is returned by `create_australia_csp()`?
2. What is returned by `backtracking_search()`?
3. What is the purpose of `assignment` variable?
4. What is the purpose of `variable` variable?
5. What is the purpose of the following statement?

   ```
   for value in self.order_domain_values(variable, assignment)
   ```

6. What would the following do?

   ```
   if self.is_consistent('Q', 'Red', 'NT': 'Blue', 'NSW': 'green'):
           assignment[variable] = value
   ```

7. What would then `assignment` be?
8. What is the effect of `del assignment[variable]`?

Homework

Modify the program from the exercise to use:

- The map of South America on the last slide
- 4 colors (red, green, blue and yellow)

Challenge

Implement forward checking and arc consistency for the previous exercise


Costa Rica
Panamá
Venezuela
Guyana
Suriname
Guyane (Fr)
Colombia
Ecuador
Perú
Brasil
Bolivia
Paraguay
Uruguay
Chile
Argentina
1000 km
600 mi
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