**Written Homework No. 2**

### Constraint Satisfaction Problems (CSPs)

### Guidelines

1. The submission deadline is set to: **Tuesday 14th February 2017 @ 11:59 PM**
2. **Team-based submission is required with 5 members per team**.
3. The submitted solution must **contain a table with the name, id and the contribution of each team member**. The contribution of each member is measured in terms: i) Number of hours spent. ii) Number of Questions solved. iii) Which questions were solved.

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| --- | --- | --- | --- | --- |
| **Name** | **ID** | **Contribution** | | |
| **No. of hours** | **No. of Questions solved** | **Question numbers** |
| **Ahmed Abdullah** | **2222222** | **8** | **3** |  |
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### Question 1 [Green Design] [20 Points]

You are in charge of setting up a greenhouse. There are several plant types: a (C)orpse flower, a (R)ose, a (S)unflower, a (T)ulip, and a (V)ampire plant. There are 5 exhibit slots in a line, numbered 1 to 5, with slot 1 being next to the greenhouse door. You have the following constraints: No two plants may be in the same square.

1. The rose cannot be adjacent to the corpse flower, or its scent will be ruined (the corpse flower feels the same way).
2. The vampire plant cannot be adjacent to the rose, sunflower, or tulip, or it will snack on them.
3. There must be at least two squares between the vampire plant and the sunflower; the sun burns!
4. The rose must be closer to the door than the corpse flower, or visitors will refuse to enter the exhibit.

We will formalize this problem as a binary CSP.

1. Give the constraint on the rose and corpse flower explicitly. Note that this single constraint is spread out between several lines of the description above. [**2 Points**]
2. List all pairs of variables (**A**, **B**) which have a constraint other than **A ≠ B** constraint and state briefly what the constraints are, e.g. “**(A ≠ B − 2) ∧ (A < B)**”. Do not add to the problem constraints that are consequences of the above-stated ones (e.g., the CSP does not state that the vampire plant must be adjacent to corpse flower even though that is a true consequence of the given constraints). [**3 Points**]
3. What will the remaining domains be after arc consistency in enforced? Cross out all filtered values. **Note:** Be careful to only enforce arc consistency. [**3 Points**]
4. Which variable or variables would be assigned first according to MRV using the domains above? [**3 Points**]
5. Assume that we assign T = 3 and then enforce arc consistency. What will the remaining domains be? Cross out all filtered values. [**6 Points**]
6. List all solutions to this CSP with T = 3 or state than none exist. [**3 Points**]