CMPT 317, Term 2, 2013
Assignment 2
Question 2
Are you satised with Constraint Satisfaction?

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1 Compiling

Not required for Python

2 Execution

To execute, change the terminal directory to where this PDF file sits. Then in the terminal execute:

```
python src/Q2.py
```

3 Usage

No usage required, script is self automated

4 Explanation

The script will take in the Assignment_Constraints.txt and it already knows about the domains listed in the assignment.

The domains are: D={January 17th, 18th, ... April 9th} - {Februrary 17th, 18th, ... Februrary 24th}

The constraints are: C={January 23, January 29, February 1, February 6, February 14, February 16, March 3, March 5, March 6, March 8, March 20, April 3, April 8, April 9, A1 Due Date <A2 Due Date, A2 Due Date <A3 Due Date, A3 Due Date <A4 Due Date}

The program will search through N 0-4, and then X:0-100 for each N. Note on N, the assignments need to be atleast N days apart so if my N was 1, January 1 would be 1 N away from January 2 in this program.

Each time we increase N, we check our current Domains against our constraints and remove Domains that no longer fit. Because N is just increasing the range that is an acceptable padding between constraints, by applying arc consistency we can remove Domains that violate the constraints at N. If we removed a set A of Domains that would not fit with the constraints at N and a set B of Domains that would not fit with the constraints at N+1 we would see that $A \subseteq B$. This allows for a better time complexity and a faster search of X by not having to recheck all Domains for every interval of N.

The first Domain is always part of our solution since it is the earliest item, and now that I think about it the last Domain should technically be the last Domain of our solution because $minDomain < X < 2X < maxDomain$ could be our 4 elements. If I have time I will make this change.

We continue to loop through X until we can no longer find a X that fits in the given domain.

5 Answer

According to the script, here is the answers:

```
--- N = 0 ---
Removed 0 problematic domains from the original 75
N: 0 X: 21 giving: ['January 17', 'February 07', 'February 28', 'March 21']
N: 0 X: 22 giving: ['January 17', 'February 08', 'March 02', 'March 24']
N: 0 X: 23 giving: ['January 17', 'February 09', 'March 04', 'March 27']
N: 0 X: 24 giving: ['January 17', 'February 10', 'March 06', 'March 30']
N: 0 X: 25 giving: ['January 17', 'February 11', 'March 08', 'April 02']
N: 0 X: 26 giving: ['January 17', 'February 12', 'March 10', 'April 05']
N: 0 X: 27 giving: ['January 17', 'February 13', 'March 12', 'April 08']

--- N = 1 ---
Removed 14 problematic domains from the original 75
N: 1 X: 20 giving: ['January 17', 'February 07', 'February 27', 'March 19']
N: 1 X: 21 giving: ['January 17', 'February 07', 'February 28', 'March 21']
N: 1 X: 22 giving: ['January 17', 'February 08', 'March 02', 'March 24']
N: 1 X: 23 giving: ['January 17', 'February 09', 'March 04', 'March 27']
N: 1 X: 24 giving: ['January 17', 'February 10', 'March 07', 'March 31']
N: 1 X: 25 giving: ['January 17', 'February 11', 'March 09', 'April 04']
N: 1 X: 26 giving: ['January 17', 'February 12', 'March 10', 'April 05']

--- N = 2 ---
Removed 33 problematic domains from the original 75
N: 2 X: 20 giving: ['January 17', 'February 08', 'February 28', 'March 22']
N: 2 X: 21 giving: ['January 17', 'February 08', 'March 01', 'March 22']
```

```
N: 2 X: 22 giving: ['January 17', 'February 08', 'March 10', 'April 01']
N: 2 X: 23 giving: ['January 17', 'February 09', 'March 10', 'April 05']
N: 2 X: 24 giving: ['January 17', 'February 10', 'March 10', 'April 05']
N: 2 X: 25 giving: ['January 17', 'February 11', 'March 10', 'April 05']
N: 2 X: 26 giving: ['January 17', 'February 12', 'March 10', 'April 05']

--- N = 3 ---
Removed 47 problematic domains from the original 75
N: 3 X: 17 giving: ['January 17', 'February 09', 'February 26', 'March 15']
N: 3 X: 18 giving: ['January 17', 'February 09', 'February 27', 'March 17']
N: 3 X: 19 giving: ['January 17', 'February 09', 'February 28', 'March 23']
N: 3 X: 20 giving: ['January 17', 'February 09', 'March 11', 'March 31']

--- N = 4 ---
Removed 56 problematic domains from the original 75
N: 4 X: 17 giving: ['January 17', 'February 10', 'February 27', 'March 16']
N: 4 X: 18 giving: ['January 17', 'February 10', 'March 12', 'March 30']
```