**HW 2: Part 3**

1. [9] Problems 6.2 Parts (a) – (c) only from the course reference text.
2. Variables: knight1, knight2, knight3,…, knight*k*
3. Values: {odd row numbers between 1 and n OR even row numbers between 1 and n}, {odd column numbers between 1 and n OR even column numbers between 1 and n}
4. Constraints:

No two kings:

* In the same row, one column over (touching in a row)
* In the same column, one row down (touching in a column)
* Touching in a diagonal

1. [20] You are in charge of scheduling for computer science classes that meet Mondays, Wednesdays, and Fridays. There are 5 classes that meet on these days and 3 professors who will be teaching these classes. You are constrained by the fact that each professor can teach only one class at a time. The classes are:

• Class 1 - Intro to Programming: meets from 8:00-9:00am

• Class 2 - Intro to Artificial Intelligence: meets from 8:30-9:30am

• Class 3 - Natural Language Processing: meets from 9:05-10:00am

• Class 4 - Computer Vision: meets from 9:05-10:00am

• Class 5 - Machine Learning: meets from 9:35-10:30am

The professors are:

• Professor A, who is available to teach Classes 3 and 4.

• Professor B, who is available to teach Classes 2, 3, 4, and 5.

• Professor C, who is available to teach Classes 1, 2, 3, 4, 5.

1. [5] Formulate this problem as a CSP in which each course is assigned a professor who is available to teach that course.

Variables: Class 1, Class 2, Class 3, Class 4, Class 5

Domains: Class 1: {Professor C}

Class 2: {Professor B, Professor C}

Class 3: {Professor A, Professor B, Professor C}

Class 4: {Professor A, Professor B, Professor C}

Class 5: {Professor B, Professor C

Constraints: C1 ≠ C2, C2 ≠ C3, C2 ≠ C4, C3 ≠ C4, C3 ≠ C5, C4 ≠ C5

1. [3] Draw the constraint graph for this CSP.
2. [7] Assume that courses are assigned in increasing order (so C1 first, then C2…) and professors are assigned in alphabetic order (so A, then B…). Show the search tree that yields from applying backtracking with forward checking and arc-consistency on this CSP.

Constraints: C1 ≠ C2, C2 ≠ C3, C2 ≠ C4, C3 ≠ C4, C3 ≠ C5, C4 ≠ C5

Class 1: {Prof C} Prof C

Class 2: {Prof B, Prof C}

Class 3: {Prof A, Prof B, Prof C}

Class 4: {Prof A, Prof B, Prof C}

Class 5: {Prof B, Prof C}

Class 1: {Prof C} Prof C

Class 2: {Prof B} Prof B

Class 3: {Prof A, Prof B, Prof C}

Class 4: {Prof A, Prof B, Prof C}

Class 5: {Prof B, Prof C}

Class 1: {Prof C} Prof C

Class 2: {Prof B} Prof B

Class 3: {Prof A, Prof C}

Class 4: {Prof A, Prof C}

Class 5: {Prof B, Prof C}

Class 1: {Prof C} Prof C

Class 2: {Prof B} Prof B

Class 3: {Prof A} Prof A

Class 4: {Prof C} Prof C

Class 5: {Prof B} Prof B

Class 1: {Prof C} Prof C

Class 2: {Prof B} Prof B

Class 3: {Prof A} Prof A

Class 4: {Prof C} Prof C

Class 5: {Prof B}

Class 1: {Prof C} Prof C

Class 2: {Prof B} Prof B

Class 3: {Prof A, Prof C} Prof A

Class 4: {Prof A, Prof C}

Class 5: {Prof B, Prof C}

1. [5] Give all solutions to this problem.

Class 1: Professor A

Class 2: Professor B

Class 3: Professor A

Class 4: Professor C

Class 5: Professor B

Class 1: Professor A

Class 2: Professor B

Class 3: Professor C

Class 4: Professor A

Class 5: Professor B