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CS 4750 HW #5

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1.) 1. Zero, there is a cycle in D->C and D->F and C->F, so none of the arcs can be consistent, and the variable color set with only two options cannot be solved.
2. Multiple,
3. AC-3 Before:

       C – {r}
       A – { r, b, g }
       B – { r, b, g }
       D – {r, g }
       E – { r, b , g }
       F – { r, b, g }'

  AC – 3 After:

       C – {r}
       A – { b, g }
       B – { r, b }
       D – { g }
       E – { r, g }
       F – { b }

4. Backtracking search w/forward checking

C – {r]	- {r}	- { r }	- {r}	- {r}	- {r}	- {r}
A – {r, g, b }	- {g ,b}	- {g}	- {g}	- {g}	- {g}	- {g}
B – {r, g, b }	- {r, g, b}	- {r, b}	- {r}	- {r}	- {r}	- {r}
D – {r, g, b }	- {g, b}	- {g, b}	- {g, b}	- {g}	- {g}	- {g}
E – {r, g, b }	- {r, g, b}	- {r, g, b}	- {r, g, b}	- {r, g, b}	- {r, g}	– {r}
F – {r, g, b }	- {g, b}	- {g, b}	- {g, b}	- {b}	- {b}	- {b}

2.) 1.) Variables -> T, W, O, F, U, R

      Domains -> alldifferent(T,W,O,F,U,R)

          All variables are in range (0..9)
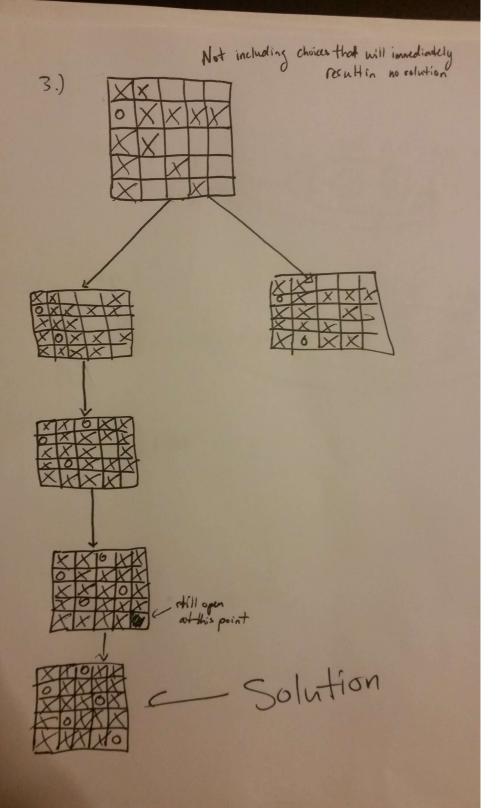
      Constraints: (X.i is a carryout)

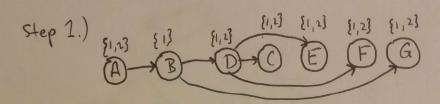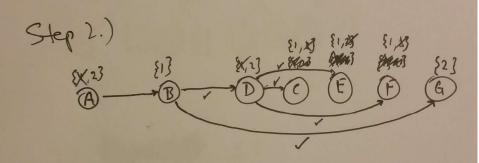$$R = O+O + 10 * X.1$$

$$X.1 + U = W+W + 10 * X.2$$

$$X.2 + O = T+T + 10 * X.3$$

$$X.3 = F$$

2) On attached paper

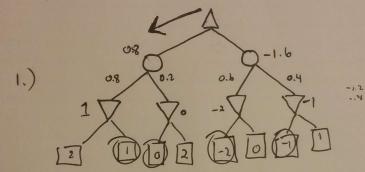3.) On attached paper

4.) On attached paper

5.) On attached paper

3.)

← still open at this point

← Solution

4.)

Step 1.)

$\{1,2\}$ $\{1\}$ $\{1,2\}$ $\{1,2\}$ $\{1,2\}$ $\{1,2\}$ $\{1,2\}$

(A) → (B) → (D) → (C) (E) (F) (G)

Step 2.)

$\{X,2\}$ $\{1\}$ $\{X,2\}$ $\{1,X\}$ $\{1,2X\}$ $\{1,X\}$ $\{2\}$

(A) → (B) → (D) (C) (E) (F) (G)

Step 3.)
A → 2
B → 1
D → 2
C → 1
E → 1
F → 1
G → 2

5.)

1.)

2.) ~~█████████~~ ≤ 1

3.) No, as the 5th leaves value is already smaller than any of the ~~██████~~ subsequent leaves.