

## Assignment 2 RB Instances Examples

1.

- Input Parameters:
  - Number of variables (n): 4
  - Constraint tightness (p): 0.33
  - Constant  $\alpha$ : 0.8
  - Constant r: 0.7
- Generated RB Instance
  - Domain size: 3
  - Number of constraints: 4
  - Number of incompatible tuples: 3
  - Variables: {X0, X1, X2, X3}
  - Domain: {0, 1, 2}
  - Constraints (incompatible tuples):
    - (X0, X1): [(1,1), (2,1), (2,2)]
    - (X0, X2): [(1,1), (2,0), (2,1)]
    - (X1, X2): [(1,1), (1,2), (2,0)]
    - (X2, X3): [(0,2), (1,1), (2,2)]
  - Possible solution:
    - X0 = 0, X1 = 0, X2 = 0, X3 = 0

2.

- Input Parameters:
  - Number of variables (n): 6
  - Constraint tightness (p): 0.33
  - Constant  $\alpha$ : 0.8
  - Constant r: 0.7
- Generated RB Instance
  - Domain size: 4
  - Number of constraints: 8
  - Number of incompatible tuples: 5
  - Variables: {X0, X1, X2, X3, X4, X5}
  - Domain: {0, 1, 2, 3}
  - Constraints (incompatible tuples):
    - (X0, X3): [(0,3), (2,0), (2,2), (3,0), (3,1)]
    - (X0, X4): [(0,1), (1,1), (1,2), (2,1), (3,2)]
    - (X1, X2): [(1,3), (2,1), (3,0), (3,1), (3,2)]
    - (X1, X3): [(1,1), (2,0), (2,2), (2,3), (3,2)]
    - (X1, X4): [(0,0), (1,0), (1,3), (2,1), (2,3)]
    - (X2, X3): [(0,1), (1,3), (2,1), (3,1), (3,3)]
    - (X3, X5): [(0,0), (1,1), (1,3), (2,0), (3,0)]
    - (X4, X5): [(0,1), (1,0), (1,1), (1,3), (2,3)]
  - Possible solution:
    - X0 = 0, X1 = 0, X2 = 0, X3 = 0, X4 = 2, X5 = 1

3.

- Input Parameters:
  - Number of variables (n): 8
  - Constraint tightness (p): 0.33
  - Constant  $\alpha$ : 0.8
  - Constant r: 0.7
- Generated RB Instance
  - Domain size: 5
  - Number of constraints: 12
  - Number of incompatible tuples: 8
  - Variables: {X0, X1, X2, X3, X4, X5, X6, X7}
  - Domain: {0, 1, 2, 3, 4}
  - Constraints (incompatible tuples):
    - (X0, X2): [(0,2), (1,0), (1,1), (1,4), (2,2), (3,1), (3,3), (4,1)]
    - (X0, X4): [(0,0), (0,3), (1,0), (2,0), (3,0), (4,0), (4,1), (4,3)]
    - (X0, X5): [(0,1), (0,2), (0,3), (1,4), (2,1), (3,3), (4,0), (4,3)]
    - (X2, X4): [(0,0), (0,2), (0,3), (1,0), (1,2), (2,4), (3,0), (4,2)]
    - (X2, X7): [(0,0), (1,1), (1,2), (2,0), (3,2), (4,0), (4,2), (4,3)]
    - (X3, X4): [(0,4), (1,3), (1,4), (2,2), (2,4), (3,0), (3,4), (4,1)]
    - (X3, X5): [(0,3), (0,4), (1,2), (2,1), (2,4), (3,3), (4,2), (4,4)]
    - (X3, X6): [(0,0), (1,1), (1,2), (2,2), (2,3), (3,3), (4,2), (4,4)]
    - (X3, X7): [(0,0), (0,1), (1,0), (1,3), (2,3), (3,1), (3,4), (4,2)]
    - (X4, X6): [(0,3), (3,0), (3,1), (3,2), (4,0), (4,1), (4,3), (4,4)]
    - (X4, X7): [(0,2), (0,3), (1,1), (1,2), (2,4), (3,0), (3,2), (4,0)]
    - (X5, X7): [(0,4), (1,0), (1,2), (1,3), (3,3), (3,4), (4,0), (4,3)]
  - Possible solution:
    - X0 = 0, X1 = 0, X2 = 0, X3 = 0, X4 = 1, X5 = 0, X6 = 1, X7 = 3

4.

- Input Parameters:
  - Number of variables (n): 10
  - Constraint tightness (p): 0.33
  - Constant  $\alpha$ : 0.8
  - Constant r: 0.7
- Generated RB Instance
  - Domain size: 6
  - Number of constraints: 16
  - Number of incompatible tuples: 12
  - Variables: {X0, X1, X2, X3, X4, X5, X6, X7, X8, X9}
  - Domain: {0, 1, 2, 3, 4, 5}
  - Constraints (incompatible tuples):
    - (X0, X8): [(0,0), (0,4), (0,5), (1,1), (2,1), (2,3), (3,0), (3,3), (3,4), (4,0), (5,3), (5,5)]
    - (X1, X4): [(0,1), (1,0), (1,1), (1,4), (1,5), (2,1), (2,4), (3,0), (3,3), (3,4), (3,5), (4,2)]
    - (X1, X5): [(0,1), (0,2), (0,5), (1,0), (1,1), (1,5), (3,1), (3,3), (4,0), (4,5), (5,3), (5,4)]
    - (X1, X9): [(0,4), (0,5), (1,2), (1,3), (1,4), (1,5), (3,0), (3,1), (3,4), (4,0), (5,0), (5,5)]
    - (X2, X3): [(0,0), (0,1), (0,5), (2,2), (2,3), (3,0), (3,1), (3,3), (3,4), (4,1), (5,2), (5,4)]
    - (X2, X5): [(0,0), (0,1), (0,2), (1,0), (1,1), (2,1), (3,2), (3,5), (4,1), (4,3), (4,4), (4,5)]
    - (X2, X7): [(0,4), (1,3), (1,5), (2,0), (2,2), (2,4), (4,1), (5,0), (5,1), (5,2), (5,3), (5,5)]
    - (X2, X9): [(0,5), (3,0), (3,1), (3,2), (3,3), (4,0), (4,1), (4,2), (4,3), (5,0), (5,1), (5,5)]
    - (X3, X4): [(0,0), (0,5), (1,2), (1,3), (1,5), (2,1), (3,0), (3,2), (3,4), (4,1), (4,4), (5,4)]
    - (X3, X5): [(0,3), (0,5), (1,1), (1,3), (1,4), (2,3), (2,5), (4,0), (4,1), (4,3), (4,5), (5,3)]
    - (X3, X9): [(0,0), (0,1), (0,2), (0,3), (1,0), (1,2), (2,2), (3,2), (5,2), (5,3), (5,4), (5,5)]
    - (X4, X6): [(0,0), (0,3), (1,1), (2,0), (2,2), (3,0), (3,2), (3,3), (4,0), (4,2), (5,3), (5,5)]
    - (X4, X7): [(0,3), (1,4), (2,0), (2,3), (2,5), (3,3), (3,4), (5,0), (5,1), (5,3), (5,4), (5,5)]
    - (X5, X6): [(1,0), (1,1), (1,2), (2,0), (2,3), (2,5), (3,4), (3,5), (4,2), (4,3), (5,3), (5,5)]
    - (X6, X7): [(0,1), (0,2), (0,4), (1,0), (3,0), (3,5), (4,0), (4,2), (4,5), (5,3), (5,4), (5,5)]
    - (X6, X8): [(0,3), (0,4), (1,2), (1,3), (2,0), (2,5), (3,4), (3,5), (4,3), (5,0), (5,2), (5,4)]
  - Possible solution:
    - X0 = 0, X1 = 0, X2 = 0, X3 = 2, X4 = 0, X5 = 4, X6 = 1, X7 = 1, X8 = 1, X9 = 0