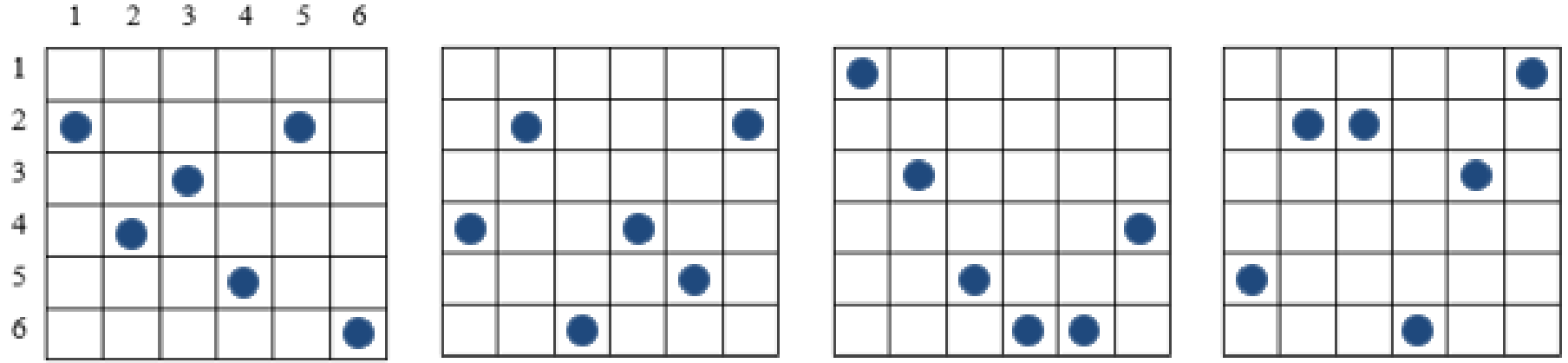
AI
Graded assessments – Corrected versions
M2-GLSD + M1-AIBD
2024/2025

Test 1 /03 pts

Genetic Algorithm

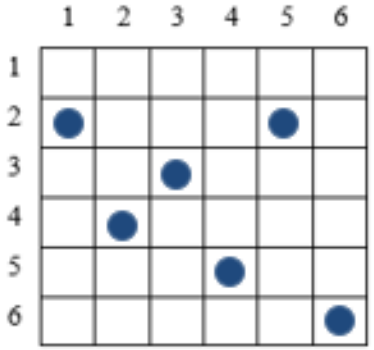
Exercise: 6-Queens

- Solve the 6-Queens problem using a genetic algorithm (one iteration). The initial population is represented by the following four states.
- Detail your solution by specifying:
  - Adaptation function
  - Probability of selection
  - Evolution process diagram

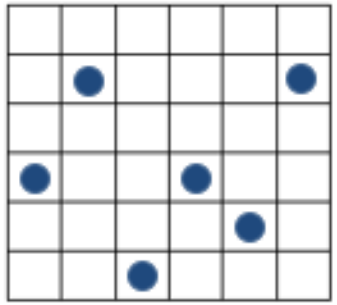


Genetic Algorithm

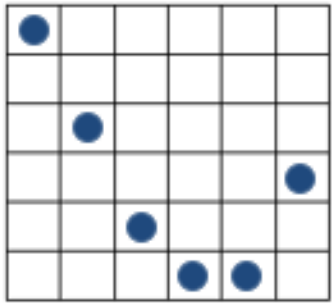
Exercise: 6-Queens



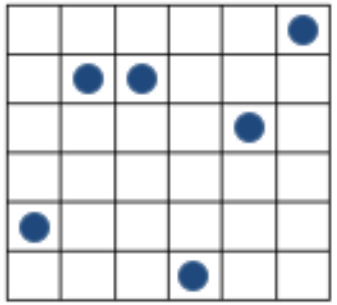
A : 243526



B : 426452



C : 135664



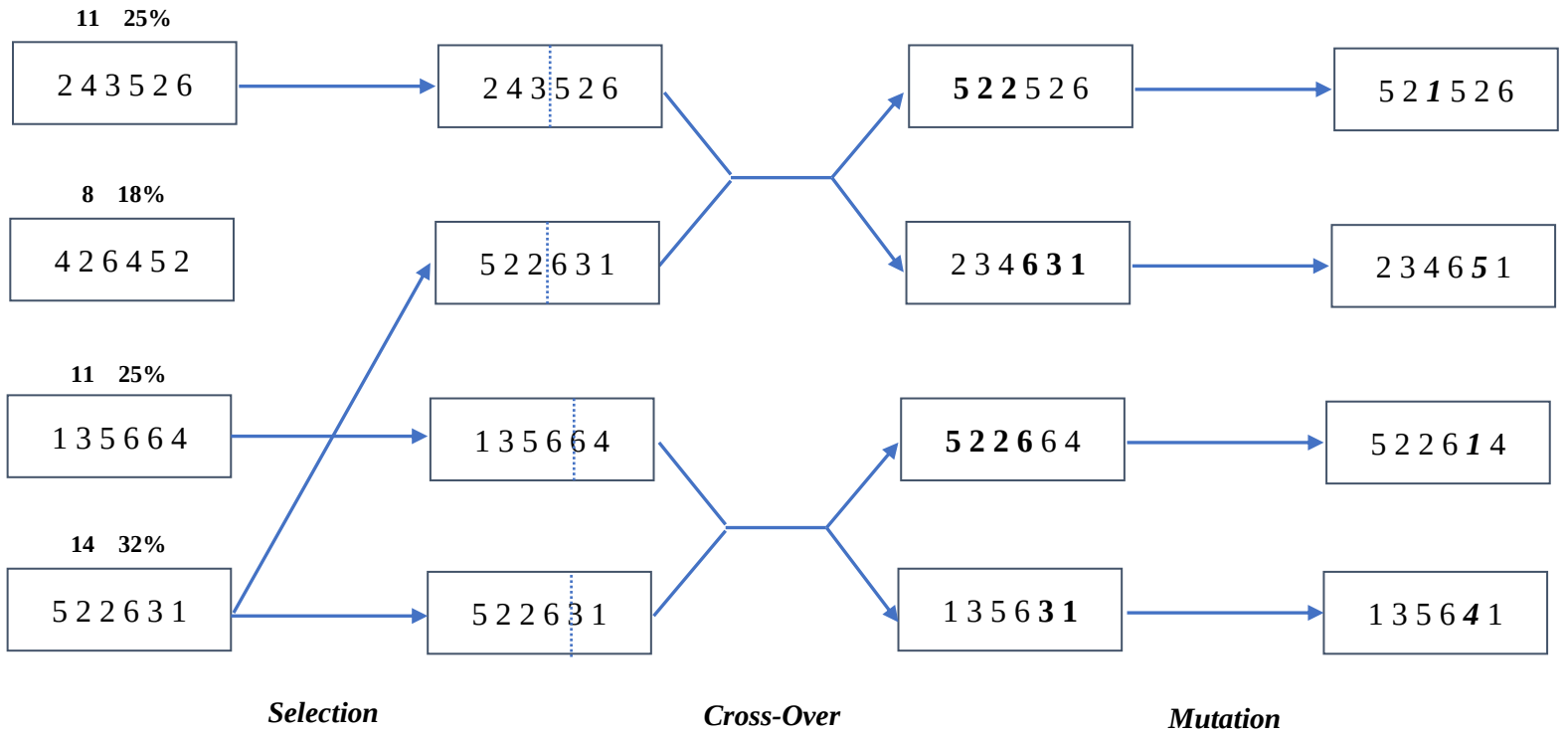
D : 522631 (0,25)

- Adaptation function : number of queens that do not attack each other (Min = 0, Max = 15) Max = 15 = $(6^2 - 6)/2$ (0,25)
- The initial population is composed of 6 chromosomes :
  - First chromosome A : 243526, number of attacks = 4, F(A) = 11 = 15-4 (0,25)
  - Second chromosome B : 426452, number of attacks = 7, F(B) = 8 (0,25)
  - Third chromosome C : 135664, number of attacks = 4, F(C) = 11 (0,25)
  - Fourth chromosome D : 522631, number of attacks = 1, F(D) = 14 (0,25)
- Probability of chromosome selection (proportional to the adaptation):
  - A : 11/(11+8+11+14) = 25% (0,25)
  - B : 8/(11+8+11+14) = 18% (0,25)
  - C : 11/(11+8+11+14) = 25% (0,25)
  - D : 14/(11+8+11+14) = 32% (0,25)

Genetic Algorithm

Exercise: 6-Queens

- Evolution process diagram : (0,5 pt)

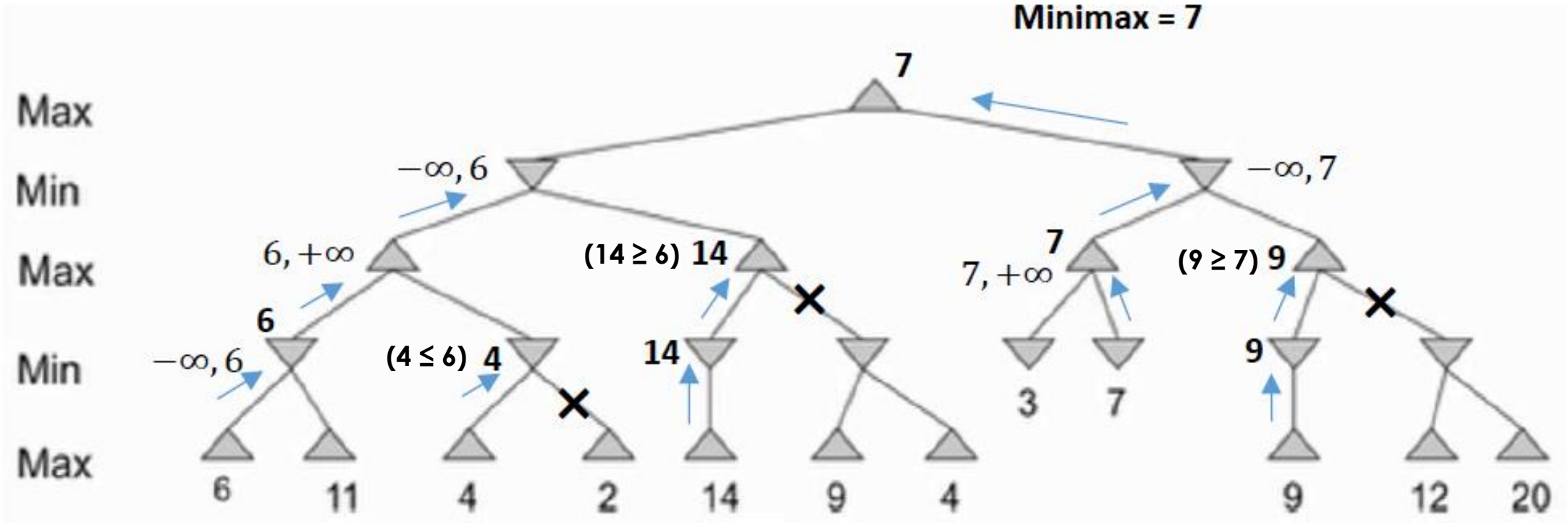


Test 2 /03 pts

$\alpha - \beta$ pruning

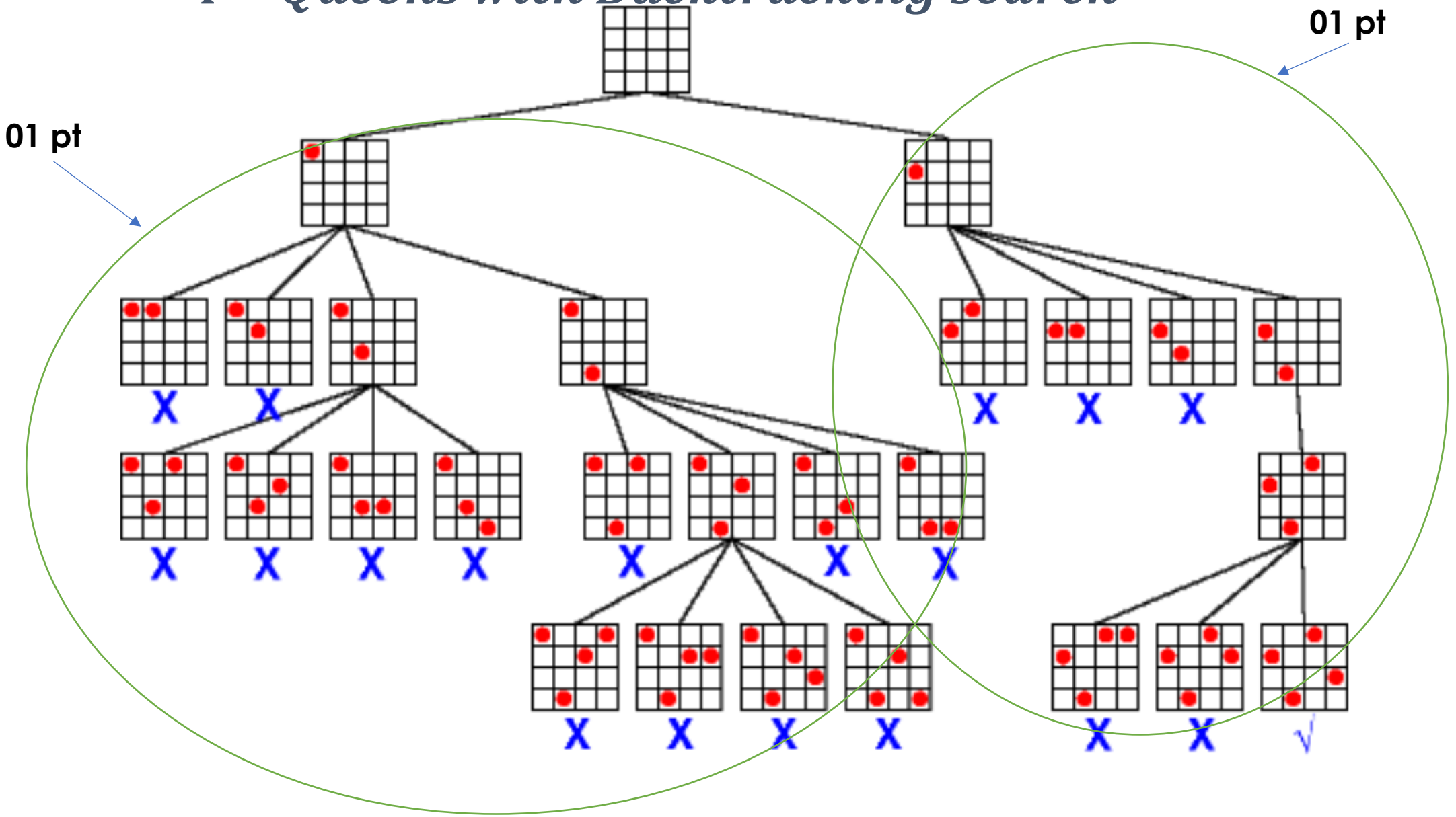
- Right returned value (0,5 pt), Right pruned branches (1,5 pt) + Interval states (0,5) + pruning conditions (0,5 pt) + False pruned branches (-0,25 each)

2) $6, +\infty$
3) $7, +\infty$



Test 3 /02 pts

$4 - Queens\ with\ Backtracking\ search$



Test 2 /02 pts

CSP Principles

Exercise: Match each term on the left with the corresponding answer/definition on the right (Right matching = +025, False matching = -0,25)

1	Solution to a CSP	A	A complete and consistent assignment
2	Complete Assignment	B	Specifies an allowable combination of variable values
3	Constraint Graph	C	Associates values with some or all variables
4	Arc Consistency	D	Every variable is associated with a value
5	Forward Checking	E	The values assigned to variables do not violate any constraints
6	Assignment	F	Set of allowed values for some variable
7	Domain	G	Nodes correspond to variables, links connect variables that participate in a constraint
8	Constraint	H	All values in a variable's domain satisfy its binary constraints
9	Consistent Assignment	I	When variable X is assigned, delete any value of constraint-graph neighbor variables inconsistent with the assigned value of X.

1 → A
2 → D
3 → G
4 → H
5 → I
6 → C
7 → F
8 → B
9 → E

TD - Final grade calculation

TD/20 =
Test 1 (3pts) + Test 2 (3pts)/2
+ Test 3/2
+ Test 4/2
+ Presentation/5
+ Attendance/5
+ Participation/3