

1 E.A.5.2

1.1 n -Queens

Il problema n -Queens si potrebbe codificare come problema CSP nel seguente modo. Siano (X, D, C) t.c.

- $X = \{Q_1, \dots, Q_n\}$
- $D = \{D_1, \dots, D_n \mid D_i = \{1, \dots, n\}\}$
- vincoli:
 - $\text{alldiff}(Q_1, \dots, Q_n)$
 - $C_\Delta = \left\{ \begin{array}{l} \langle \{Q_i, Q_j\}, \Delta \rangle \mid \\ i \neq j \wedge \\ \Delta = \{(x, y) \mid |i - j| \neq |x - y|\} \end{array} \right\}$

1.2 5-Queens

$$\delta = \{1, \dots, n\} \times \{1, \dots, n\} \setminus \{(1, 1), (2, 2), (3, 3), (4, 4), (5, 5)\}$$

- $X = \{Q_1, Q_2, Q_3, Q_4, Q_5\}$
- $D = \{D_1, D_2, D_3, D_4, D_5 \mid D_i = \{1, 2, 3, 4, 5\}\}$
- vincoli:
 - $\text{alldiff}(Q_1, Q_2, Q_3, Q_4, Q_5)$

1.3 MiniZinc code

```
include "alldifferent.mzn";

int: n = 8; /* l'editor va in crash a n = 21 */
array[1..n] of var 1..n: queens;
constraint alldifferent(queens);
constraint forall(i in 1..n, j in (i + 1)..n)(
    abs(queens[j] - queens[i]) != j - i
);
```