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1	2	3	4	Σ

Übungsblatt Nr. 2
(Abgabetermin 12.11.2021)

Aufgabe 1

1.

i

The state space is equal to the amount of possible board states considering 0 to 8 queens.

$$\Sigma_{i=0}^{8} \binom{64}{i} = 5130659561$$

ii

The first queen can be placed on any field (8x8), the next one on any field not in the row of the first queen (8*7) ...

$$\Pi_{n=5}^{8} \binom{8n}{1} = 6881280$$

2.

i

states = Pacman location and (not eaten) food
actions = North, East, West, South
goal test = is all food eaten?
path cost = 1 per action

ii

1 - 18 food,
pcaman can be on any of the 12 empty fields or a food-field with already eaten food.

$$\Sigma_{i=0}^{18} \left(\binom{18}{i} * \binom{12 + 18 - i}{1} \right) = 5505024$$

iii

$$\Sigma_{i=0}^{18}\left(\binom{18}{i} * \binom{12+18-i}{1} * 28 * 28\right) = 4315938816$$

Aufgabe 2

a)

i

Hamburg
Flensburg, Bremen, Rostock
Bremen, Rostock
Rostock, Emden, Hannover
Emden, Hannover, Berlin
Hannover, Berlin, Dortmund
Berlin, Dortmund, Kassel, Magdeburg
Dortmund, Kassel, Magdeburg, Dresden
Kassel, Magdeburg, Dresden, Köln
Magdeburg, Dresden, Köln, Frankfurt, Würzburg, Erfurt
Dresden, Köln, Frankfurt, Würzburg, Erfurt
Köln, Frankfurt, Würzburg, Erfurt
Frankfurt, Würzburg, Erfurt, Saarbrücken
Würzburg, Erfurt, Saarbrücken, Karlsruhe
Erfurt, Saarbrücken, Karlsruhe, Regensburg
Saarbrücken, Karlsruhe, Regensburg
Karlsruhe, Regensburg
Regensburg, Freiburg, Tübingen

Visited:
Hamburg
Flensburg, Bremen, Rostock
Emden, Hannover
Berlin
Dortmund
Kassel, Magdeburg
Dresden
Köln
Frankfurt, Würzburg, Erfurt
Saarbrücken
Karlsruhe
Regensburg
Freiburg, Tübingen

ii

Hamburg
Flensburg, Bremen, Rostock
Bremen, Rostock
Emden, Hannover, Rostock
Dortmund, Hannover, Rostock
Köln, Kassel, Hannover, Rostock
Saarbrücken, Frankfurt, Kassel, Hannover, Rostock
Karlsruhe, Frankfurt, Kassel, Hannover, Rostock
Freiburg, Tübingen

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iii

Hamburg
Bremen
Flensburg
Rostock
Hannover
Emden
Magdeburg
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Köln
Frankfurt
Dresden
Würzburg
Karlsruhe
Saarbrücken
Regensburg
Tübingen

b)

Disadvantage: time-consuming
Advantage: applicable if search space is large/infinite and solution depth is unknown to prevent failure