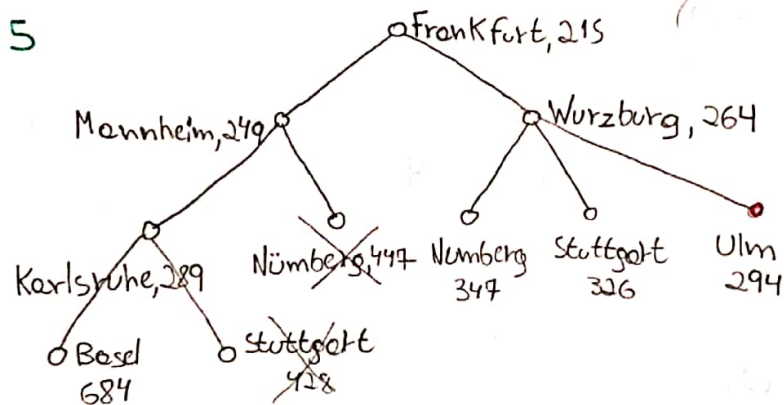
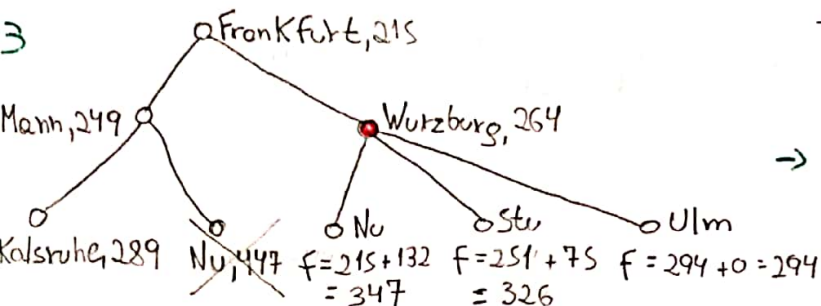
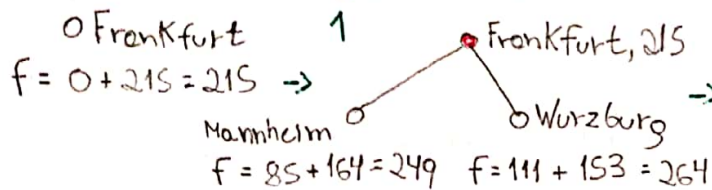


IA - Exercícios A* e AG

1) Usando A*: Ir de Frankfurt a Ulm

$$f(n) = g(n) + h(n)$$



i) opens [Stuttgart, Nurnberg, Basel]

ii) closed: [Frankfurt, Mannheim, Wurzburg, Karlsruhe, Ulm]

iii) Solução: [Frankfurt, Wurzburg, Ulm]

custo = 294 Km

2) AG: Problema da Mochila

a) $x_1 \rightarrow \frac{4}{5}$; $x_2 \rightarrow \frac{1}{1}$; $x_3 \rightarrow \frac{4}{4}$; $x_4 \rightarrow \frac{3}{2}$; $x_5 \rightarrow \frac{1}{3}$ ($\frac{t_i}{v_i}$)

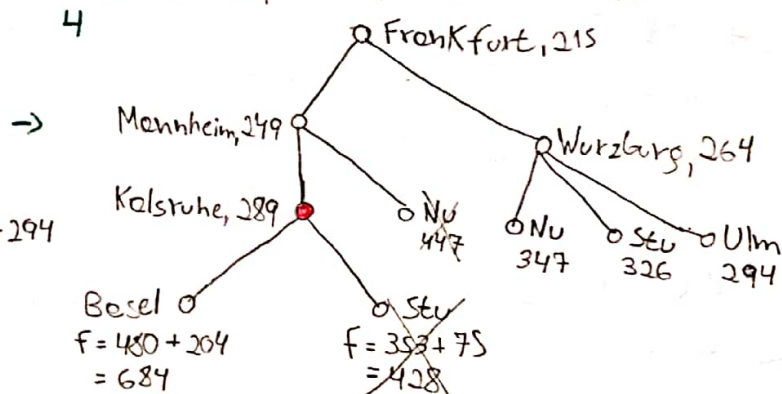
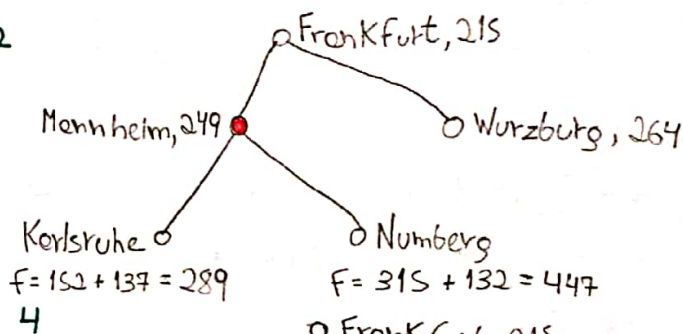
$\hookrightarrow 2^\circ$ $\hookrightarrow 3^\circ$ $\hookrightarrow 4^\circ$ $\hookrightarrow 5^\circ$ $\hookrightarrow 1^\circ$

\rightarrow ordem de escolha baseada em maior benefício

Indivíduo mais apto: 1 1 0 0 1, $t = 6 \leq 7$, $v = 9$
 (p/c = 7)
 $\downarrow \downarrow \downarrow$
 $x_1 x_2 x_5$

Arthur Font

12036152



t	Open	Closed
0	F	—
1	Ma, W	F
2	W, K, Nu	F, Ma
3	K, U, S, Nu	F, Ma, W
4	U, S, Nu, B	F, Ma, W, K
5	S, Nu, B	F, Ma, W, K, U

b) Avalie a aptidão de cada indivíduo:

• $a_1 \rightarrow 01110$

$$H(a_1) \rightarrow -\sum((1 \cdot 1) + (4 \cdot 1) + (3 \cdot 1)) + 7 \\ \rightarrow -8 + 7 \rightarrow -1, \text{ logo } H(a_1) = 1$$

$$F(a_1) = [1-1] \sum v_j x_j = 0$$

• $a_2 \rightarrow 00110$

$$H(a_2) \rightarrow -\sum((4 \cdot 1) + (3 \cdot 1)) + 7 \rightarrow -7 + 7 \rightarrow 0, \text{ logo } H(a_2) = 0$$

$$F(a_2) = [1-0] \cdot (4 \cdot 1 + 2 \cdot 1) = 1 \cdot 6 = 6$$

• $a_3 \rightarrow 01100$

$$H(a_3) \rightarrow -\sum((1 \cdot 1) + (4 \cdot 1)) + 7 \rightarrow -5 + 7 \rightarrow 2, \text{ logo } H(a_3) = 0$$

$$F(a_3) = [1-0] \cdot (1 \cdot 1 + 4 \cdot 1) = 1 \cdot 5 = 5$$

c) Dois indivíduos mais aptos:

1: 00110 \times 00100 (crossover após o 2º gene)
2: 01100 \times 01110

• Crossover:

Prole 1) 00100

$$H(p_1) \rightarrow -(4 \cdot 1) + 7 \rightarrow -4 + 7 \rightarrow 3, \text{ logo } H(p_1) = 0$$

$$F(p_1) = [1-0] \cdot (4 \cdot 1) = 1 \cdot 4 = 4$$

Prole 2) 01110

$$H(p_2) \rightarrow -\sum((1 \cdot 1) + (4 \cdot 1) + (3 \cdot 1)) + 7 \rightarrow -8 + 7 \rightarrow -1, \text{ logo } H(p_2) = 1$$

$$F(p_2) = 0$$

• Dois filhos gerados e o mais apto da geração anterior em ordem decrescente

1) 00110

$$F(a_i) = 6$$

2) 00100

$$F(a_i) = 4$$

3) 01110

$$F(a_i) = 0$$

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