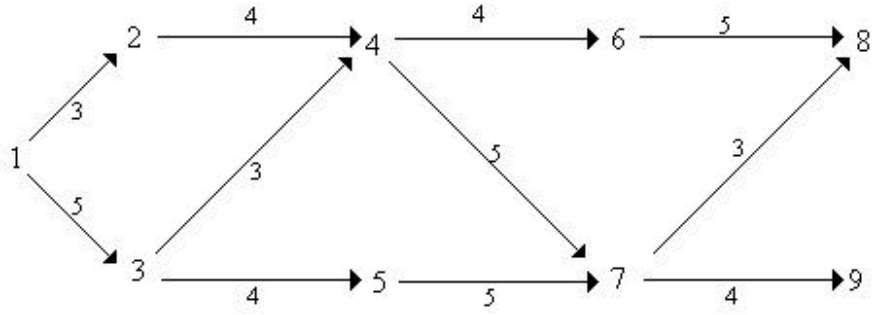
EXEMPLO - Busca em Profundidade

(SCHWARZ, Gaston Adair. **Grafos – Introdução e Processos de Busca**. Apostila, 1998)



- **INICIALIZAÇÃO**

S = {1}	T = {8,9}	A = {1}
F = ϕ	V = ϕ	g(1) = 0
P(1) = ϕ	R = 4	K=8

🗁 **1ª ITERAÇÃO**

Passo 2:	A = {1} – {1} = ϕ	(v = 1)
	F = ϕ ∪ {1} = {1}	
Passo 3:	Γ(1) = {2,3}	
Passo 4:	m = 2; P(2) = 1	; A = {2} ∪ ϕ = {2}
		g(2) = 0 + 3 = 3
	m = 3; P(3) = 1	; A = {3} ∪ {2} = {3,2}
		g(3) = 0 + 5 = 5

🗁 **2ª ITERAÇÃO**

Passo 2:	A = {3,2} – {3} = {2}	(v = 3)
	F = {1} ∪ {3} = {1,3}	
Passo 3:	Γ(3) = {4,5}	
Passo 4:	m = 4; P(4) = 3	; A = {4} ∪ {2} = {4,2}
		g(4) = 5 + 3 = 8
	m = 5; P(5) = 3	; A = {5} ∪ {4,2} = {5,4,2}
		g(5) = 5 + 4 = 9

🗁 3ª ITERAÇÃO

Passo 2: $A = \{5,4,2\} - \{5\} = \{4,2\}$ $(v = 5)$
$F = \{1,3\} \cup \{5\} = \{1,3,5\}$

Passo 3: $V = \phi \cup \{5\} = \{5\}$

Passo 2: $A = \{4,2\} - \{4\} = \{2\}$ $(v = 4)$
$F = \{1,3,5\} \cup \{4\} = \{1,3,5,4\}$

Passo 3: $\Gamma(4) = \{6,7\}$

Passo 4: $m = 6; P(6) = 4$; $A = \{6\} \cup \{2\} = \{6,2\}$
$g(6) = 8 + 4 = 12$
$m = 7; P(7) = 4$; $A = \{7\} \cup \{6,2\} = \{7,6,2\}$
$g(7) = 8 + 5 = 13$

🗁 4ª ITERAÇÃO

Passo 2: $A = \{7,6,2\} - \{7\} = \{6,2\}$ $(v = 7)$
$F = \{1,3,5,4\} \cup \{7\} = \{1,3,5,4,7\}$

Passo 3: $V = \{5\} \cup \{7\} = \{5,7\}$

Passo 2: $A = \{6,2\} - \{6\} = \{2\}$ $(v = 6)$
$F = \{1,3,5,4,7\} \cup \{6\} = \{1,3,5,4,7,6\}$

Passo 3: $V = \{5,7\} \cup \{6\} = \{5,7,6\}$

Passo 2: $A = \{2\} - \{2\} = \phi$ $(v = 2)$
$F = \{1,3,5,4,7,6\} \cup \{2\} = \{1,3,5,4,7,6,2\}$

Passo 3: $\Gamma(2) = \{4\}$

Passo 3: $m = 4; P(4) = 2$; $A = \{4\} \cup \phi = \{4\}$
$g(4) = 3 + 4 = 7$

🗁 5ª ITERAÇÃO

Passo 2: $A = \{4\} - \{4\} = \phi$ $(v = 4)$
$F = \{1,3,5,4,7,6,2\} \cup \{4\} = \{1,3,5,4,7,6,2,4\}$

Passo 3: $\Gamma(4) = \{6,7\}$

Passo 4: $m = 6; P(6) = 4$; $A = \{6\} \cup \phi = \{6\}$
$g(6) = 7 + 4 = 11$
$V = \{5,7,6\} - \{6\} = \{5,7\}$
$m = 7; P(7) = 4$; $A = \{7\} \cup \{6\} = \{7,6\}$
$g(7) = 7 + 5 = 12$
$V = \{5,7\} - \{7\} = \{5\}$

🗁 6ª ITERAÇÃO

Passo 2: $A = \{7,6\} - \{7\} = \{6\}$ $(v = 7)$

$F = \{1,3,5,4,7,6,2\} \cup \{7\} = \{1,3,5,4,7,6,2\}$

Passo 3: $V = \{5\} \cup \{7\} = \{5,7\}$

Passo 2: $A = \{6\} - \{6\} = \phi$ $(v = 6)$

$F = \{1,3,5,4,7,6,2\} \cup \{6\} = \{1,3,5,4,7,6,2\}$

Passo 3: $V = \{5,7\} \cup \{6\} = \{5,7,6\}$

Passo 1: $A = V = \{5,7,6\}$; $K = 8 + 4 = 12$; $V=\phi$

Passo 2: $A = \{5,7,6\} - \{5\} = \{7,6\}$ $(v = 5)$

$F = \{1,3,5,4,7,6,2\} \cup \{5\} = \{1,3,5,4,7,6,2\}$

Passo 3: $\Gamma(5) = \{7\}$

🗁 7ª ITERAÇÃO

Passo 2: $A = \{7,6\} - \{7\} = \{6\}$ $(v = 7)$

$F = \{1,2,3,4,5,6\} \cup \{7\} = \{1,2,3,4,5,6,7\}$

Passo 2: $\Gamma(7) = \{8,9\}$

Passo 3: $m = 8$; $P(8) = 7$; $A = \{8\} \cup \{6\} = \{8,6\}$

$g(8) = 12 + 3 = 15$

$m = 9$; $P(9) = 7$; $A = \{9\} \cup \{8,6\} = \{9,8,6\}$

$g(9) = 12 + 4 = 16$

🗁 8ª ITERAÇÃO

Passo 2: $A = \{9,8,6\} - \{9\} = \{8,6\}$ $(v = 9)$

$F = \{1,3,5,4,7,6,2\} \cup \{9\} = \{1,3,5,4,7,6,2,9\}$

Passo 3: $V = \phi \cup \{9\} = \{9\}$

Passo 2: $A = \{8,6\} - \{8\} = 6$ $(v = 8)$

$F = \{1,3,5,4,7,6,2,9\} \cup \{8\} = \{1,3,5,4,7,6,2,9,8\}$

Passo 3: $V = \{9\} \cup \{8\} = \{9,8\}$

Passo 2: $A = \{6\} - \{6\} = \phi$ $(v = 6)$

$F = \{1,3,5,4,7,6,2,9,8\} \cup \{6\} = \{1,3,5,4,7,6,2,9,8\}$

Passo 2: $\Gamma(6) = \{8\}$

🗁 9ª ITERAÇÃO

Passo 1: $A = V = \{9,8\}$; $k = 12 + 4 = 16$; $V = \phi$

Passo 2: $\{9,8\} - \{9\} = \{8\}$ $(v = 9)$

$F = \{1,3,5,4,7,6,2,9,8\} \cup \{9\} = \{1,3,5,4,7,6,2,9,8\}$

Passo 3: $g(9) \leq K$ e $9 \in T$ $\rightarrow$ Pare com sucesso.

SOLUÇÃO ÓTIMA:

Custo: $g(9) = 16$

Caminho: 1 – 2 – 4 – 7 – 9

$P(9) = 7$; $P(7) = 4$; $P(4) = 2$; $P(2) = 1$