BÀI TẬP TOÁN RỜI RẠC 2 – CHƯƠNG 6

<u>Câu hỏi 1</u> Cho mạng $G = \langle V, E \rangle$ gồm 6 đỉnh được biểu diễn dưới dạng ma trận trọng số như sau

	1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>
1	0	18	8	8	8	8
2	8	0	5	3	2	8
<mark>3</mark>	8	8	0	2	8	7
<mark>4</mark>	8	8	8	0	8	15
<mark>5</mark>	8	8	8	9	0	8
<mark>6</mark>	∞	∞	∞	∞	8	0

Sử dụng thuật toán đường tăng luồng tìm luồng cực đại trên mạng đồ thị G đã cho, chỉ rõ kết quả tại mỗi bước thực hiện theo thuật toán.

Giải Số đỉnh n = 6; đỉnh phát s = 1 và đỉnh thu t = 6. Lập bảng:

Khởi tạo:

		M	[ang	G						L	uồng	g f			
	1	2	3	4	<u>5</u>	<mark>6</mark>			1	2	3	4	<mark>5</mark>	<mark>6</mark>	
1	0	18	0	0	8	0		1	0	0	0	0	0	0	
2	0	0	5	3	2	0		2	0	0	0	0	0	0	
3	0	0	0	2	0	7		<mark>3</mark>	0	0	0	0	0	0	
<mark>4</mark>	0	0	0	0	0	15		<mark>4</mark>	0	0	0	0	0	0	
<u>5</u>	0	0	0	9	0	0		<mark>5</mark>	0	0	0	0	0	0	
<mark>6</mark>	0	0	0	0	0	0		<mark>6</mark>	0	0	0	0	0	0	
										Va	ul(f) =	= 0			

Bước 1:

		M	ang	G					L	uồn	g f					Đầ	thị	Gf		
	1	2	3	4	<mark>5</mark>	<mark>6</mark>		1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>		1	2	<mark>3</mark>	<mark>4</mark>	<u>5</u>	<mark>6</mark>
1	0	18	0	0	8	0	1	0	0	0	0	0	0	1	0	18	0	0	8	0
2	0	0	5	3	2	0	2	0	0	0	0	0	0	2	0	0	5	3	2	0
3	0	0	0	2	0	7	3	0	0	0	0	0	0	3	0	0	0	2	0	7
4	0	0	0	0	0	15	4	0	0	0	0	0	0	4	0	0	0	0	0	15
5	0	0	0	9	0	0	5	0	0	0	0	0	0	<u>5</u>	0	0	0	9	0	0
<mark>6</mark>	0	0	0	0	0	0	6	0	0	0	0	0	0	<mark>6</mark>	0	0	0	0	0	0
																				<u> </u>

Tìm đường tăng luồng			Tăn	g luớ	ing f	•	
Bfs(1) = $\{1(0); 2(1), 5(1); 3(2), 4(2); 6(3)\}$		1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>
Đường tăng luồng:	1	0	5	0	0	0	0
$6 \leftarrow 3 \leftarrow 2 \leftarrow 1$	2	0	0	5	0	0	0
Giá trị tăng luồng:	3	0	0	0	0	0	5
$\delta = 5$	4	0	0	0	0	0	0
	<u>5</u>	0	0	0	0	0	0
	<mark>6</mark>	0	0	0	0	0	0
	Val($\overline{(f)} = 0$	5				

Bước 2:

		M	ang	G					L	uồng	g f					Đã) thị	Gf		
	1	2	3	<mark>4</mark>	<u>5</u>	<mark>6</mark>		1	2	<mark>3</mark>	<mark>4</mark>	<u>5</u>	<mark>6</mark>		1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>
1	0	18	0	0	8	0	1	0	5	0	0	0	0	1	0	13	0	0	8	0
2	0	0	5	3	2	0	2	0	0	5	0	0	0	2	5-	0	0	3	2	0
3	0	0	0	2	0	7	3	0	0	0	0	0	5	3	0	5-	0	2	0	2
4	0	0	0	0	0	15	4	0	0	0	0	0	0	4	0	0	0	0	0	15
<u>5</u>	0	0	0	9	0	0	<u>5</u>	0	0	0	0	0	0	<u>5</u>	0	0	0	9	0	0
<mark>6</mark>	0	0	0	0	0	0	<mark>6</mark>	0	0	0	0	0	0	<mark>6</mark>	0	0	5-	0	0	0
													-							

Tìm đường tăng luồng			Tăn	g luð	ing f	i	
Bfs(1) = $\{1(0); 2(1), 5(1); 4(2); 6(4); 3(6)\}$		1	2	<mark>3</mark>	<mark>4</mark>	<u>5</u>	<mark>6</mark>
Đường tăng luồng:	1	0	8	0	0	0	0
$6 \leftarrow 4 \leftarrow 2 \leftarrow 1$	2	0	0	5	3	0	0
Giá trị tăng luồng:	3	0	0	0	0	0	5
$\delta = 3$	4	0	0	0	0	0	3
	5	0	0	0	0	0	0
	<mark>6</mark>	0	0	0	0	0	0
	Val	(f) =	8				

Bước 3:

		M	ang	G						L	uồnş	g f						Đã	thị	Gf		
	1	2	3	4	<mark>5</mark>	<mark>6</mark>			1	2	<mark>3</mark>	<mark>4</mark>	<u>5</u>	<mark>6</mark>			1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>
1	0	18	0	0	8	0]		0	8	0	0	0	0	1		0	10	0	0	8	0
2	0	0	5	3	2	0	2	2	0	0	5	3	0	0	2		8-	0	0	0	2	0
3	0	0	0	2	0	7	3	3	0	0	0	0	0	5	3		0	5-	0	2	0	2
4	0	0	0	0	0	15	<u> </u>	1	0	0	0	0	0	3	4		0	3-	0	0	0	12
<mark>5</mark>	0	0	0	9	0	0	4	5	0	0	0	0	0	0	<mark>5</mark>		0	0	0	9	0	0
<mark>6</mark>	0	0	0	0	0	0	6	5	0	0	0	0	0	0	<mark>6</mark>		0	0	5-	3-	0	0
																-						

Tìm đường tăng luồng			Tăn	g luớ	ing f	•	
Bfs(1) = $\{1(0); 2(1), 5(1); 4(5); 6(4); 3(6)\}$		1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>
Đường tăng luồng:	1	0	8	0	0	8	0
$6 \leftarrow 4 \leftarrow 5 \leftarrow 1$	2	0	0	5	3	0	0
Giá trị tăng luồng:	3	0	0	0	0	0	5
$\delta = 8$	4	0	0	0	0	0	11
	5	0	0	0	8	0	0
	<mark>6</mark>	0	0	0	0	0	0
	Val	(f) =	16				

Bước 4:

		M	ang	G					L	uồnş	g f					Đã	thị	Gf		
	1		3	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>		1	2	<mark>3</mark>	<mark>4</mark>	<u>5</u>	<mark>6</mark>		1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>
1	0	18	0	0	8	0	1	0	8	0	0	8	0	1	0	10	0	0	0	0
2	0	0	5	3	2	0	2	0	0	5	3	0	0	2	8-	0	0	0	2	0
3	0	0	0	2	0	7	3	0	0	0	0	0	5	3	0	5 -	0	2	0	2
4	0	0	0	0	0	15	<mark>4</mark>	0	0	0	0	0	11	4	0	<mark>3-</mark>	0	0	8-	<mark>4</mark>
5	0	0	0	9	0	0	<u>5</u>	0	0	0	8	0	0	<u>5</u>	8-	0	0	1	0	0
<mark>6</mark>	0	0	0	0	0	0	<mark>6</mark>	0	0	0	0	0	0	<mark>6</mark>	0	0	5-	11-	0	0
	•																			

Tìm đường tăng luồng			Tăn	g luớ	ing f	•	
Bfs(1) = $\{1(0); 2(1); 5(2); 4(5); 3(4); 6(4)\}$		1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>
Đường tăng luồng:	1	0	9	0	0	8	0
$6 \leftarrow 4 \leftarrow 5 \leftarrow 2 \leftarrow 1$	2	0	0	5	3	1	0
Giá trị tăng luồng:	3	0	0	0	0	0	5
$\delta = 1$	4	0	0	0	0	0	12
	5	0	0	0	9	0	0
	<mark>6</mark>	0	0	0	0	0	0
	Val	$\overline{(f)} =$	17				_

Bước 5:

		M	ang	G						L	uồng	g f					Đ) thị	Gf		
	1	2	3	4	<u>5</u>	<mark>6</mark>			1	2	3	4	<u>5</u>	<mark>6</mark>		1	2	3	4	<u>5</u>	<mark>6</mark>
1	0	18	0	0	8	0	1		0	9	0	0	8	0	1	0	9	0	0	0	0
2	0	0	5	3	2	0	2	2	0	0	5	3	1	0	2	<mark>9-</mark>	0	0	0	1	0
3	0	0	0	2	0	7	3	3	0	0	0	0	0	5	3	0	<u>5-</u>	0	2	0	2
4	0	0	0	0	0	15	<u> </u>	ļ [0	0	0	0	0	12	4	0	3-	0	0	9-	3
5	0	0	0	9	0	0	5	5	0	0	0	9	0	0	5	8-	1-	0	0	0	0
<mark>6</mark>	0	0	0	0	0	0	6	5	0	0	0	0	0	0	<mark>6</mark>	0	0	5 -	12-	0	0
		•	-	•	•					•	•	•	•				•			-	

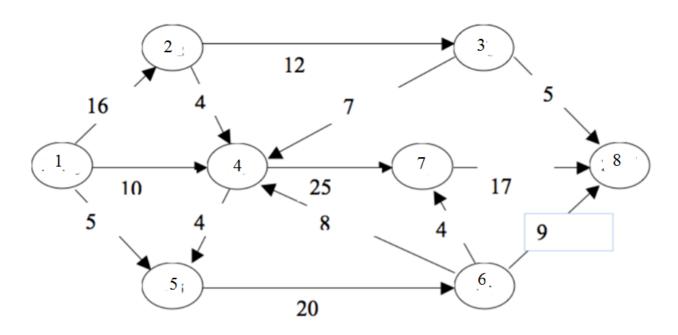
Tìm đường tăng luồng

Bfs(1) = $\{1(0); 2(1); 5(2)\}$

Không tìm được đường tăng luồng.

Kết luận: Val(f) = 17 Luồng cực đại f:

	1	2	3	4	<mark>5</mark>	<mark>6</mark>
1	0	9	0	0	8	0
2	0	0	5	3	1	0
<mark>3</mark>	0	0	0	0	0	5
<mark>4</mark>	0	0	0	0	0	12
2 3 4 5 6	0	0	0	9	0	0
<mark>6</mark>	0	0	0	0	0	0



Sử dụng thuật toán đường tăng luồng tìm luồng cực đại trên mạng đồ thị G đã cho, chỉ rõ kết quả tại mỗi bước thực hiện theo thuật toán.

 $\overline{\text{S\^o}}$ đỉnh n = 8; đỉnh phát s = 1 và đỉnh thu t = 8.

Lập bảng:

Khởi tạo:

			M	ang	G								L	uồng	g f			
	1	2	3	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>	<mark>7</mark>	8	_		1	2	3	<mark>4</mark>	<u>5</u>	<mark>6</mark>	<mark>7</mark>	8
1	0	16	0	10	5	0	0	0		1	0	0	0	0	0	0	0	0
2	0	0	12	4	0	0	0	0		2 3	0	0	0	0	0	0	0	0
3	0	0	0	7	0	0	0	5			0	0	0	0	0	0	0	0
<mark>4</mark>	0	0	0	0	4	0	25	0		<mark>4</mark>	0	0	0	0	0	0	0	0
<mark>5</mark>	0	0	0	0	0	20	0	0		<mark>5</mark>	0	0	0	0	0	0	0	0
<mark>6</mark>	0	0	0	8	0	0	4	9		<mark>6</mark> 7	0	0	0	0	0	0	0	0
<mark>7</mark>	0	0	0	0	0	0	0	17			0	0	0	0	0	0	0	0
<mark>8</mark>	0	0	0	0	0	0	0	0		8	0	0	0	0	0	0	0	0
									-				Va	ıl(f) =	= 0			_

Bước 1:

			M	ạng	G							Lu	ıồn	g f							Đầ) th	į G	f		
	1	2	<mark>3</mark>	4	<u>5</u>	6	<mark>7</mark>	8		1	2	3	4	<u>5</u>	<mark>6</mark>	<mark>7</mark>	8		1	2	<mark>3</mark>	4	<u>5</u>	<mark>6</mark>	<mark>7</mark>	8
1	0	16	0	10	5	0	0	0	1	0	0	0	0	0	0	0	0	1	0	16	0	10	5	0	0	0
2	0	0	12	4	0	0	0	0	2	0	0	0	0	0	0	0	0	2	0	0	12	4	0	0	0	0
3	0	0	0	7	0	0	0	5	3	0	0	0	0	0	0	0	0	3	0	0	0	7	0	0	0	5
4	0	0	0	0	4	0	25	0	4	0	0	0	0	0	0	0	0	4	0	0	0	0	4	0	25	0
5	0	0	0	0	0	20	0	0	<u>5</u>	0	0	0	0	0	0	0	0	5	0	0	0	0	0	20	0	0
<u>6</u>	0	0	0	8	0	0	4	9	<mark>6</mark>	0	0	0	0	0	0	0	0	6	0	0	0	8	0	0	4	9
7	0	0	0	0	0	0	0	17	<mark>7</mark>	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	17
8	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0

Tìm đường tăng luồng]	ſănş	g lu	ồng	f		
Bfs(1) = $\{1(0); 2(1), 4(1), 5(1); 3(2), 7(4); 6(5); 8(3)\}$		1	2	<mark>3</mark>	<mark>4</mark>	<u>5</u>	6	<mark>7</mark>	8
Đường tăng luồng:	1	0	5	0	0	0	0	0	0
$8 \leftarrow 3 \leftarrow 2 \leftarrow 1$	2	0	0	5	0	0	0	0	0
Giá trị tăng luồng:	3	0	0	0	0	0	0	0	5
$\delta = 5$	<mark>4</mark>	0	0	0	0	0	0	0	0
	5	0	0	0	0	0	0	0	0
	<mark>6</mark>	0	0	0	0	0	0	0	0
	<mark>7</mark>	0	0	0	0	0	0	0	0
	8	0	0	0	0	0	0	0	0
	Val	(f) =	= 5	•					

Bước 2:

			M	lạng	g G							Lı	ıồn	g f							Ð) th	į G	f		
	1	2	<mark>3</mark>	4	5	<mark>6</mark>	<mark>7</mark>	8		1	2	3	4	<u>5</u>	<mark>6</mark>	<mark>7</mark>	8		1	2	3	4	5	<u>6</u>	<mark>7</mark>	8
1	0	16	0	10	5	0	0	0	1	0	5	0	0	0	0	0	0	1	0	11	0	10	5	0	0	0
2	0	0	12	4	0	0	0	0	2	0	0	5	0	0	0	0	0	2	5-	0	<mark>7</mark>	4	0	0	0	0
3	0	0	0	7	0	0	0	5	<mark>3</mark>	0	0	0	0	0	0	0	5	3	0	5-	0	7	0	0	0	0
4	0	0	0	0	4	0	25	0	4	0	0	0	0	0	0	0	0	4	0	0	0	0	4	0	25	0
5	0	0	0	0	0	20	0	0	<mark>5</mark>	0	0	0	0	0	0	0	0	5	0	0	0	0	0	20	0	0
<mark>6</mark>	0	0	0	8	0	0	4	9	<mark>6</mark>	0	0	0	0	0	0	0	0	<u>6</u>	0	0	0	8	0	0	4	9
7	0	0	0	0	0	0	0	17	<mark>7</mark>	0	0	0	0	0	0	0	0	7	0	0	0	0	0	0	0	17
8	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	8	0	0	5-	0	0	0	0	0

Tìm đường tăng luồng			7	Γăn	g lu	ồng	f		
Bfs(1) = $\{1(0); 2(1), 4(1), 5(1); 3(2), 7(4); 6(5); 8(7)\}$		1	2	3	4	<u>5</u>	6	<mark>7</mark>	8
Đường tăng luồng:	1	0	5	0	10	0	0	0	0
$8 \leftarrow 7 \leftarrow 4 \leftarrow 1$	2	0	0	5	0	0	0	0	0
Giá trị tăng luồng:	3	0	0	0	0	0	0	0	5
$\delta = 10$	4	0	0	0	0	0	0	10	0
	<u>5</u>	0	0	0	0	0	0	0	0
	<mark>6</mark>	0	0	0	0	0	0	0	0
	7	0	0	0	0	0	0	0	10
	8	0	0	0	0	0	0	0	0
	Val	(f) =	= 15	5					<u>_</u>

Bước 3:

				M	ạng	g G							L	uồn	g f							Đã) thi	G	f		
		1	2	<mark>3</mark>	4	<u>5</u>	<mark>6</mark>	<mark>7</mark>	8		1	2	<mark>3</mark>	<mark>4</mark>	<u>5</u>	<mark>6</mark>	<mark>7</mark>	8		1	2	<mark>3</mark>	4	<u>5</u>	<u>6</u>	<mark>7</mark>	8
1	. [0	16	0	10	5	0	0	0	1	0	5	0	10	0	0	0	0	1	0	11	0	0	5	0	0	0
2	<u> </u>	0	0	12	4	0	0	0	0	2	0	0	5	0	0	0	0	0	2	5-	0	<mark>7</mark>	4	0	0	0	0
3	, [0	0	0	7	0	0	0	5	3	0	0	0	0	0	0	0	5	3	0	<u>5-</u>	0	7	0	0	0	0
<u> </u>	<u> </u>	0	0	0	0	4	0	25	0	4	0	0	0	0	0	0	10	0	4	10-	0	0	0	4	0	15	0
5	, [0	0	0	0	0	20	0	0	<mark>5</mark>	0	0	0	0	0	0	0	0	5	0	0	0	0	0	20	0	0
6	,	0	0	0	8	0	0	4	9	<mark>6</mark>	0	0	0	0	0	0	0	0	<u>6</u>	0	0	0	8	0	0	4	9
7	' [0	0	0	0	0	0	0	17	<mark>7</mark>	0	0	0	0	0	0	0	10	7	0	0	0	10-	0	0	0	<mark>7</mark>
8	<u> </u>	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	8	0	0	5-	0	0	0	10-	0

Tìm đường tăng luồng			-	Γăn	g lu	ồng	g f		
Bfs(1) = $\{1(0); 2(1), 5(1); 3(2), 4(2); 6(5); 7(4); 8(6)\}$		1	2	3	<mark>4</mark>	<u>5</u>	<mark>6</mark>	<mark>7</mark>	8
Đường tăng luồng:	1	0	5	0	10	5	0	0	0
$8 \leftarrow 6 \leftarrow 5 \leftarrow 1$	2	0	0	5	0	0	0	0	0
Giá trị tăng luồng:	3	0	0	0	0	0	0	0	5
$\delta = 5$	4	0	0	0	0	0	0	10	0
	5	0	0	0	0	0	5	0	0
	<u>6</u>	0	0	0	0	0	0	0	5
	<mark>7</mark>	0	0	0	0	0	0	0	10
	8	0	0	0	0	0	0	0	0
	Val	(f)	= 20)					

Bước 4:

			M	[ạng	g G							L	uồn	g f							Đã) thị	G	f		
	1	2	3	4	<u>5</u>	<mark>6</mark>	<mark>7</mark>	8		1	2	3	4	<u>5</u>	<mark>6</mark>	<mark>7</mark>	8		1	2	3	<mark>4</mark>	<u>5</u>	<mark>6</mark>	<mark>7</mark>	8
1	0	16	0	10	5	0	0	0	1	0	5	0	10	5	0	0	0	1	0	11	0	0	0	0	0	0
2	0	0	12	4	0	0	0	0	2	0	0	5	0	0	0	0	0	2	5-	0	7	4	0	0	0	0
3	0	0	0	7	0	0	0	5	3	0	0	0	0	0	0	0	5	3	0	<mark>5</mark> -	0	7	0	0	0	0
4	0	0	0	0	4	0	25	0	4	0	0	0	0	0	0	10	0	4	10 -	0	0	0	4	0	15	0
5	0	0	0	0	0	20	0	0	5	0	0	0	0	0	5	0	0	5	5-	0	0	0	0	15	0	0
<mark>6</mark>	0	0	0	8	0	0	4	9	<mark>6</mark>	0	0	0	0	0	0	0	5	<mark>6</mark>	0	0	0	8	<mark>5</mark> -	0	4	<mark>4</mark>
7	0	0	0	0	0	0	0	17	7	0	0	0	0	0	0	0	10	7	0	0	0	10-	0	0	0	<mark>7</mark>
8	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	8	0	0	<mark>5</mark> -	0	0	<mark>5</mark> -	10 -	0

Tìm đường tăng luồng			-	Γăn	g lu	ồng	f		
Bfs(1) = $\{1(0); 2(1); 3(2), 4(2); 5(4); 7(4); 6(5); 8(7)\}$		1	2	3	4	<u>5</u>	6	<mark>7</mark>	8
Đường tăng luồng:	1	0	9	0	10	5	0	0	0
$8 \leftarrow 7 \leftarrow 4 \leftarrow 2 \leftarrow 1$	2	0	0	5	4	0	0	0	0
Giá trị tăng luồng:	3	0	0	0	0	0	0	0	5
$\delta = 4$	4	0	0	0	0	0	0	14	0
	<u>5</u>	0	0	0	0	0	5	0	0
	<mark>6</mark>	0	0	0	0	0	0	0	5
	<mark>7</mark>	0	0	0	0	0	0	0	14
	8	0	0	0	0	0	0	0	0
	Val	(f) =	= 24	1	•		•		

Bước 5:

			I	Мą	ang	G							L	uồn	g f							Đã	th:	į G	f		
	1	2	3		<mark>4</mark>	<u>5</u>	<mark>6</mark>	<mark>7</mark>	8		1	2	3	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>	<mark>7</mark>	8		1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>	<mark>7</mark>	8
1	0	16	6 0		10	5	0	0	0	1	0	9	0	10	5	0	0	0	1	0	7	0	0	0	0	0	0
2	0	0	12	2	4	0	0	0	0	2	0	0	5	4	0	0	0	0	2	<mark>9</mark> -	0	7	0	0	0	0	0
3	0	0	0		7	0	0	0	5	3	0	0	0	0	0	0	0	5	3	0	<mark>5</mark> -	0	7	0	0	0	0
4	0	0	0		0	4	0	25	0	4	0	0	0	0	0	0	14	0	4	<u>10</u> -	<mark>4</mark> -	0	0	4	0	1 1	0
<u>5</u>	0	0	0		0	0	20	0	0	<u>5</u>	0	0	0	0	0	5	0	0	5	<u>5</u> -	0	0	0	0	15	0	0
6	0	0	0		8	0	0	4	9	<mark>6</mark>	0	0	0	0	0	0	0	5	<mark>6</mark>	0	0	0	8	<mark>5</mark> -	0	4	<mark>4</mark>
7	0	0	0		0	0	0	0	17	7	0	0	0	0	0	0	0	14	7	0	0	0	<mark>14</mark> -	0	0	0	3
8	0	0	0		0	0	0	0	0	8	0	0	0	0	0	0	0	0	8	0	0	<mark>5</mark> -	0	0	<mark>5-</mark>	14-	0

Tìm đường tăng luồng]	ſăn	g lu	ồng	f		
Bfs(1) = $\{1(0); 2(1); 3(2); 4(3); 5(4), 7(4); 6(5); 8(7)\}$		1	2	<mark>3</mark>	<mark>4</mark>	<u>5</u>	<mark>6</mark>	<mark>7</mark>	8
Đường tăng luồng:	1	0	12	0	10	5	0	0	0
$8 \leftarrow 7 \leftarrow 4 \leftarrow 3 \leftarrow 2 \leftarrow 1$	2	0	0	8	4	0	0	0	0
Giá trị tăng luồng:	3	0	0	0	3	0	0	0	5
$\delta = 3$	4	0	0	0	0	0	0	17	0
	<u>5</u>	0	0	0	0	0	5	0	0
	<mark>6</mark>	0	0	0	0	0	0	0	5
	7	0	0	0	0	0	0	0	17
	8	0	0	0	0	0	0	0	0
	Val	$\overline{(f)}$	= 27						

Bước 6:

			M	ạng	; G							L	uồn	g f							Đá) th	G	f		
	1	2	3	4	5	<mark>6</mark>	<mark>7</mark>	8		1	2	3	4	<u>5</u>	<u>6</u>	<mark>7</mark>	8		1	2	<mark>3</mark>	4	5	<mark>6</mark>	<mark>7</mark>	8
1	0	16	0	10	5	0	0	0	1	0	12	0	10	5	0	0	0	1	0	4	0	0	0	0	0	0
2	0	0	12	4	0	0	0	0	2	0	0	8	4	0	0	0	0	2	12 -	0	4	0	0	0	0	0
3	0	0	0	7	0	0	0	5	3	0	0	0	3	0	0	0	5	3	0	<mark>8-</mark>	0	4	0	0	0	0
4	0	0	0	0	4	0	25	0	<mark>4</mark>	0	0	0	0	0	0	17	0	4	10 -	<mark>4</mark> -	<mark>3</mark> -	0	4	0	8	0
5	0	0	0	0	0	20	0	0	<mark>5</mark>	0	0	0	0	0	5	0	0	5	5-	0	0	0	0	15	0	0
<mark>6</mark>	0	0	0	8	0	0	4	9	<mark>6</mark>	0	0	0	0	0	0	0	5	<mark>6</mark>	0	0	0	8	<mark>5</mark> -	0	4	<mark>4</mark>
<mark>7</mark>	0	0	0	0	0	0	0	17	<mark>7</mark>	0	0	0	0	0	0	0	17	7	0	0	0	<mark>17</mark> -	0	0	0	0
8	0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	8	0	0	5-	0	0	5 -	<mark>17</mark> -	0

Tìm đường tăng luồng			7	Γănş	g luč	ồng	f		
Bfs(1) = $\{1(0); 2(1); 3(2); 4(3); 5(4), 7(4); 6(5); 8(6)\}$		1	2	3	4	<u>5</u>	6	<mark>7</mark>	8
Đường tăng luồng:	1	0	16	0	10	5	0	0	0
$8 \leftarrow 6 \leftarrow 5 \leftarrow 4 \leftarrow 3 \leftarrow 2 \leftarrow 1$	2	0	0	12	4	0	0	0	0
Giá trị tăng luồng:	3	0	0	0	7	0	0	0	5
$\delta = 4$	4	0	0	0	0	4	0	17	0
	5	0	0	0	0	0	9	0	0
	<u>6</u>	0	0	0	0	0	0	0	9
	<mark>7</mark>	0	0	0	0	0	0	0	17
	8	0	0	0	0	0	0	0	0
	Va	l(f)	= 31						

Bước 7:

				M	ang	; G							Lı	ıồn	g f							Đầ	thi	Gı	î		
	-	1	2	3	4	<mark>5</mark>	<mark>6</mark>	<mark>7</mark>	8		1	2	3	4	<mark>5</mark>	<mark>6</mark>	<mark>7</mark>	8		1	2	3	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>	<mark>7</mark>	8
1	(0	16	0	10	5	0	0	0	1	0	16	0	10	5	0	0	0	1	0	0	0	0	0	0	0	0
2	(0	0	12	4	0	0	0	0	2	0	0	12	4	0	0	0	0	2	16-	0	0	0	0	0	0	0
3	(0	0	0	7	0	0	0	5	3	0	0	0	7	0	0	0	5	3	0	12-	0	0	0	0	0	0
4	(0	0	0	0	4	0	25	0	<mark>4</mark>	0	0	0	0	4	0	17	0	4	10-	4-	<mark>7-</mark>	0	0	0	8	0
5	(0	0	0	0	0	20	0	0	<u>5</u>	0	0	0	0	0	9	0	0	5	5-	0	0	4-	0	11	0	0
6	(0	0	0	8	0	0	4	9	<mark>6</mark>	0	0	0	0	0	0	0	9	<mark>6</mark>	0	0	0	8	9-	0	4	0
7	(0	0	0	0	0	0	0	17	<mark>7</mark>	0	0	0	0	0	0	0	17	7	0	0	0	17 -	0	0	0	0
8	(0	0	0	0	0	0	0	0	8	0	0	0	0	0	0	0	0	8	0	0	<mark>5</mark> -	0	0	<mark>9-</mark>	17-	0

Tìm đường tăng luồng				Γănş	g luć	òng	f		
Bfs(1) = $\{1(0)\}$		1	2	3	4	<u>5</u>	<u>6</u>	<mark>7</mark>	8
Không tìm được đường tăng luồng	1	0	16	0	10	5	0	0	0
	2	0	0	12	4	0	0	0	0
	<mark>3</mark>	0	0	0	7	0	0	0	5
	4	0	0	0	0	4	0	17	0
	<mark>5</mark>	0	0	0	0	0	9	0	0
	<mark>6</mark>	0	0	0	0	0	0	0	9
	<mark>7</mark>	0	0	0	0	0	0	0	17
	8	0	0	0	0	0	0	0	0
	Val	(f)	= 31						

Kết luận: Val(f) = 31 Luồng cực đại f:

	1	2	3	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>	<mark>7</mark>	8
1	0	16	0	10	5	0	0	0
2	0	0	12	4	0	0	0	0
2 3 4 5 6 7	0	0	0	7	0	0	0	5
4	0	0	0	0	4	0	17	0
<u>5</u>	0	0	0	0	0	9	0	0
<mark>6</mark>	0	0	0	0	0	0	0	9
	0	0	0	0	0	0	0	17
8	0	0	0	0	0	0	0	0

Ví dụ số:

Khởi tạo:

		M	lạng	G							L	uồng	g f			
	1	<mark>2</mark>	3	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>				1	2	<mark>3</mark>	<mark>4</mark>	<u>5</u>	<mark>6</mark>	
<mark>1</mark>	0	5	5	0	0	0			1	0	0	0	0	0	0	
2	0	0	0	6	3	0			2	0	0	0	0	0	0	
<mark>3</mark>									<mark>3</mark>	0	0	0	0	0	0	
<mark>4</mark>	0	0	0	0	0	6			<mark>4</mark>	0	0	0	0	0	0	
<mark>5</mark>	0	0	0	0	0	6			<mark>5</mark>	0	0	0	0	0	0	
<mark>6</mark>	0	0	0	0	0	0			<mark>6</mark>	0	0	0	0	0	0	
											Va	l(f) =	= 0			

Bước 1:

		M	ạng	G_{f}			Tìm đường tăng luồng			L	uồng	g f		
	1	2	3	4	<mark>5</mark>	<mark>6</mark>	Bfs(1) = $\{1(0); 2(1), 3(1); 4(2),$		1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>
1	0	5	5	0	0	0	5(2); 6(4)}	1	0	5	0	0	0	0
2	0	0	0	6	3	0	Đường tăng luồng:	2	0	0	0	5	0	0
3	0	0	0	3	1	0	$6 \leftarrow 4 \leftarrow 2 \leftarrow 1$	3	0	0	0	0	0	0
4	0	0	0	0	0	6	Giá trị tăng luồng:	4	0	0	0	0	0	5
<u>5</u>	0	0	0	0	0	6	$\delta = 5$	<u>5</u>	0	0	0	0	0	0
<mark>6</mark>	0	0	0	0	0	0		<mark>6</mark>	0	0	0	0	0	0
								Val	(f) =	5				

Bước 2:

		M	ạng	Gf			Tìm đường tăng luồng				L	uồnş	g f		
	1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>	Bfs(1) = $\{1(0); 3(1); 4(3); 5(3);$			1	2	<mark>3</mark>	4	<mark>5</mark>	<mark>6</mark>
1	0	0	5	0	0	0	2(4), 6(4)}		1	0	5	1	0	0	0
2	5-	0	0	1	3	0	Đường tăng luồng:	,	2	0	0	0	5	0	0
3	0	0	0	3	1	0	$6 \leftarrow 4 \leftarrow 3 \leftarrow 1$		<mark>3</mark>	0	0	0	1	0	0
4	0	5-	0	0	0	1	Giá trị tăng luồng:	2	<mark>4</mark>	0	0	0	0	0	6
<u>5</u>	0	0	0	0	0	6	$\delta = 1$		<mark>5</mark>	0	0	0	0	0	0
<mark>6</mark>	0	0	0	5-	0	0			<mark>6</mark>	0	0	0	0	0	0
								V	al(f) =	6				

Bước 3:

		M	ạng	Gf			Tìm đường tăng luồng			L	uồng	g f		
	1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>	Bfs(1) = $\{1(0); 3(1); 4(3); 5(3);$		1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>
1	0	0	4	0	0	0	2(4); 6(5)}	1	0	5	2	0	0	0
2	5-	0	0	1	3	0	Đường tăng luồng:	2	0	0	0	5	0	0
3	1-	0	0	2	1	0	$6 \leftarrow 5 \leftarrow 3 \leftarrow 1$	3	0	0	0	1	1	0
<mark>4</mark>	0	5-	1-	0	0	0	Giá trị tăng luồng:	<mark>4</mark>	0	0	0	0	0	6
<mark>5</mark>	0	0	0	0	0	6	$\delta = 1$	<mark>5</mark>	0	0	0	0	0	1
<mark>6</mark>	0	0	0	6-	0	0		<mark>6</mark>	0	0	0	0	0	0
								Val	(f) =	7				

Bước 4:

		M	ạng	Gf			Tìm đường tăng luồng			L	uồng	g f		
	1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>	Bfs(1) = $\{1(0); 3(1); 4(3); 2(4);$		1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>
1	0	0	3	0	0	0	5(2); 6(5)}	1	0	5	4	0	0	0
2	5-	0	0	1	3	0	Đường tăng luồng:	2	0	0	0	3	2	0
3	2-	0	0	2	0	0	$6 \leftarrow 5 \leftarrow 2 \leftarrow 4 \leftarrow 3 \leftarrow 1$	3	0	0	0	3	1	0
<mark>4</mark>	0	5-	1-	0	0	0	Giá trị tăng luồng:	<mark>4</mark>	0	0	0	0	0	6
<mark>5</mark>	0	0	1-	0	0	5	$\delta = 2$	<u>5</u>	0	0	0	0	0	3
<mark>6</mark>	0	0	0	6-	1-	0		<mark>6</mark>	0	0	0	0	0	0
								Val	(f) = f	9				

Bước 5:

		M	ạng	Gf			Tìm đường tăng luồng
	1	2	<mark>3</mark>	<mark>4</mark>	<mark>5</mark>	<mark>6</mark>	Bfs(1) = $\{1(0); 3(1)\}$
1	0	0	1	0	0	0	Không tìm được đường tăng
2	5-	0	0	3	1	0	luồng.
3	4-	0	0	0	0	0	
4	0	3-	3-	0	0	0	
<u>5</u>	0	2-	1-	0	0	3	
<mark>6</mark>	0	0	0	6-	3-	0	

Kết luận: Val(f) = 9

	1	2	3	<mark>4</mark>	<u>5</u>	<mark>6</mark>
1	0	5	4	0	0	0
2	0	0	0	3	2	0
1 2 3 4 5 6	0	0	0	3	1	0
4	0	0	0	0	0	6
<u>5</u>	0	0	0	0	0	3
<mark>6</mark>	0	0	0	0	0	0