***BÀI TẬP LÝ THUYẾT CHƯƠNG 5***

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***Nhóm*** *: 02*

**Bài làm***:*

**Bài 1**: **Đếm bậc các đỉnh**

Gọi : **d(x)out**là số bậc ra tại 1 đỉnh x

**d(x)in** là số bậc vào tại 1 đỉnh

**d(x)** là số bậc tại 1 điểm của đồ thị vô hướng

* *Ví dụ 5.1*: Xét đồ thi vô hướng ta có:
* d(A) = 3 ; d(B) = 4 ; d(C) = 4; d(D) = 4; d(E) = 2; d(F) = 5; d(G) = 2
* ∑ d = 24
* *Ví dụ 5.2*: Xét đồ thi vô hướng
* d(A) = 5 ; d(B) = 4 ; d(C) = 4; d(D) = 5; d(E) = 2; d(F) = 6
* ∑ d = 26
* *Ví dụ 5.3*: Xét đồ thi vô hướng
* d(A) = 5 ; d(B) = 6 ; d(C) = 4; d(D) = 4; d(E) = 4; d(F) = 3
* ∑ d = 26
* *Ví dụ 5.6*:Xét đồ thi có hướng
* d(A)out = 3 ; d(A)in = 0 => d(A) = 3
* d(B)out = 2 ; d(B)in = 2 => d(B) = 4
* d(C)out = 2 ; d(C)in = 2 => d(C) = 4
* d(D)out = 1 ; d(D)in = 2 => d(A) = 3
* d(E)out = 1 ; d(E)in = 3 => d(A) = 4
* d(F)out = 1 ; d(F)in = 1 => d(A) = 2
* ∑ d = 20

**Bài 2: Tìm ma trận kề của đồ thị :**

* *Ví dụ 5.1*: Xét đồ thi vô hướng

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **A** | **B** | **C** | **D** | **E** | **F** | **G** |
| **A** |  | 1 | 1 | 1 |  |  |  |
| **B** | 1 |  | 1 |  | 1 | 1 |  |
| **C** | 1 | 1 |  | 1 |  | 1 |  |
| **D** | 1 |  | 1 |  |  | 1 | 1 |
| **E** |  | 1 |  |  |  | 1 |  |
| **F** |  | 1 | 1 | 1 | 1 |  | 1 |
| **G** |  |  |  | 1 |  | 1 |  |

* *Ví dụ 5.*6: Xét đồ thị có hướng

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **A** | **B** | **C** | **D** | **E** | **F** |
| **A** |  | 1 | 1 | 1 |  |  |
| **B** |  |  | 1 |  | 1 |  |
| **C** |  |  |  | 1 |  | 1 |
| **D** |  |  |  |  | 1 |  |
| **E** |  |  |  |  |  | 1 |
| **F** |  | 1 |  |  |  |  |

* *Ví dụ 5.7*: Xét đồ thị có trọng số

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **A** | **B** | **C** | **D** | **E** | **F** |
| **A** |  | 110 | 90 | 100 |  |  |
| **B** | 110 |  | 50 |  | 55 | 80 |
| **C** | 90 | 50 |  | 40 | 80 |  |
| **D** | 100 |  | 40 |  | 60 |  |
| **E** |  | 55 | 80 | 60 |  | 70 |
| **F** |  | 80 |  |  | 70 |  |

* *Ví dụ 5.11*: Xét đồ thị vô hướng

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** | **14** |
| **1** |  | 1 | 1 | 1 |  |  |  |  |  |  |  |  |  |  |
| **2** | 1 |  |  |  |  |  | 1 |  |  |  |  |  |  |  |
| **3** | 1 |  |  |  |  | 1 |  |  |  |  |  |  |  |  |
| **4** | 1 |  |  |  | 1 |  |  |  |  |  |  |  |  |  |
| **5** |  |  |  | 1 |  |  |  |  |  | 1 | 1 |  |  |  |
| **6** |  |  | 1 |  |  |  |  |  |  |  |  |  |  |  |
| **7** |  | 1 |  |  |  |  |  | 1 | 1 |  |  |  |  |  |
| **8** |  |  |  |  |  |  | 1 |  |  |  |  |  | 1 | 1 |
| **9** |  |  |  |  |  |  | 1 |  |  |  |  |  |  |  |
| **10** |  |  |  |  | 1 |  |  |  |  |  |  | 1 |  |  |
| **11** |  |  |  |  | 1 |  |  |  |  |  |  |  |  |  |
| **12** |  |  |  |  |  |  |  |  |  | 1 |  |  |  |  |
| **13** |  |  |  |  |  |  |  | 1 |  |  |  |  |  |  |
| **14** |  |  |  |  |  |  |  | 1 |  |  |  |  |  |  |

**Bài 3**: **Tìm damh sách kề của đồ thị**

* *Ví dụ 5.1*: Xét đồ thị vô hướng

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[0]*** |  | **A** |  |  | B |  |  | C |  |  | D |  |  | **NULL** |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[1]*** |  | **B** |  |  | A |  |  | C |  |  | E |  |  | F |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[2]*** |  | **C** |  |  | A |  |  | B |  |  | D |  |  | F |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[3]*** |  | **D** |  |  | A |  |  | C |  |  | F |  |  | G |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[4]*** |  | **E** |  |  | B |  |  | F |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[5]*** |  | **F** |  |  | B |  |  | C |  |  | D |  |  | E |  |  | G |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[6]*** |  | **G** |  |  | D |  |  | F |  |  | **NULL** |

* *Ví dụ 5.7*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[0]*** |  | **A** |  |  | B |  |  | C |  |  | D |  |  | **NULL** |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[1]*** |  | **B** |  |  | A |  |  | C |  |  | E |  |  | F |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[2]*** |  | **C** |  |  | A |  |  | B |  |  | D |  |  | E |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[3]*** |  | **D** |  |  | A |  |  | C |  |  | E |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[4]*** |  | **E** |  |  | B |  |  | D |  |  | C |  |  | F |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[5]*** |  | **F** |  |  | B |  |  | E |  |  | **NULL** |

* *Ví dụ 5.8*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[0]*** |  | **A** |  |  | B |  |  | C |  |  | D |  |  | **NULL** |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[1]*** |  | **B** |  |  | A |  |  | C |  |  | E |  |  | F |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[2]*** |  | **C** |  |  | A |  |  | B |  |  | D |  |  | F |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[3]*** |  | **D** |  |  | A |  |  | C |  |  | F |  |  | G |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[4]*** |  | **E** |  |  | B |  |  | F |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[5]*** |  | **F** |  |  | B |  |  | C |  |  | D |  |  | E |  |  | G |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[6]*** |  | **G** |  |  | D |  |  | F |  |  | **NULL** |

* *Ví dụ 5.11*:

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[0]*** |  | **1** |  |  | 2 |  |  | 3 |  |  | 4 |  |  | **NULL** |  |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[1]*** |  | **2** |  |  | 1 |  |  | 7 |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[2]*** |  | **3** |  |  | 1 |  |  | 6 |  |  | **NULL** |
| ***First[3]*** |  | **4** |  |  | 1 |  |  | 5 |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[4]*** |  | **5** |  |  | 4 |  |  | 10 |  |  | 11 |  |  | **NULL** |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[5]*** |  | **6** |  |  | 3 |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[6]*** |  | **7** |  |  | 2 |  |  | 8 |  |  | 9 |  |  | **NULL** |  |

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[7]*** |  | **8** |  |  | 7 |  |  | 13 |  |  | 14 |  |  | **NULL** |  |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[8]*** |  | **9** |  |  | 7 |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[9]*** |  | **10** |  |  | 15 |  |  | 12 |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[10]*** |  | **11** |  |  | 5 |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[11]*** |  | **12** |  |  | 10 |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[12]*** |  | **13** |  |  | 8 |  |  | **NULL** |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| ***First[13]*** |  | **14** |  |  | 8 |  |  | **NULL** |