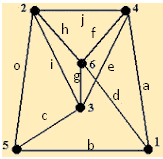
**Лабораторная работа №7**

**Основные понятия теории графов**

**Цель работы:** Составить матрицы инцидентности и смежности для графов.

**Задача 1**

**Постановка задачи**



**Решение**

Матрица инцидентности:

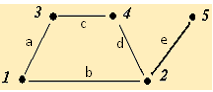
|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **a** | **b** | **c** | **d** | **e** | **f** | **g** | **h** | **i** | **j** | **o** |
| **1** | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **2** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 |
| **3** | 0 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| **4** | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| **5** | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| **6** | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 |

Матрица смежности:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** | **5** | **6** |
| **1** | 0 | 0 | 0 | 1 | 1 | 1 |
| **2** | 0 | 0 | 1 | 1 | 1 | 1 |
| **3** | 0 | 1 | 0 | 1 | 1 | 1 |
| **4** | 1 | 1 | 1 | 0 | 0 | 1 |
| **5** | 1 | 1 | 1 | 0 | 0 | 0 |
| **6** | 1 | 1 | 1 | 1 | 0 | 0 |

**Задача 2**

**Постановка задачи**



**Решение**

Матрица инцидентности:

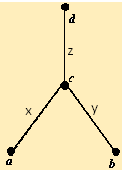
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **a** | **b** | **c** | **d** | **e** |
| **1** | 1 | 1 | 0 | 0 | 0 |
| **2** | 0 | 1 | 0 | 1 | 1 |
| **3** | 1 | 0 | 1 | 0 | 0 |
| **4** | 0 | 0 | 1 | 1 | 0 |
| **5** | 0 | 0 | 0 | 0 | 1 |

Матрица смежности:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** | **5** |
| **1** | 0 | 1 | 1 | 0 | 0 |
| **2** | 1 | 0 | 0 | 1 | 1 |
| **3** | 1 | 0 | 0 | 1 | 0 |
| **4** | 0 | 1 | 1 | 0 | 0 |
| **5** | 0 | 1 | 0 | 0 | 0 |

**Задача 3**

**Постановка задачи**



**Решение**

Матрица инцидентности:

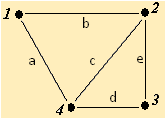
|  |  |  |  |
| --- | --- | --- | --- |
|  | **x** | **y** | **z** |
| **a** | 1 | 0 | 0 |
| **b** | 0 | 1 | 0 |
| **c** | 1 | 1 | 1 |
| **d** | 0 | 0 | 1 |

Матрица смежности:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **a** | **b** | **c** | **d** |
| **a** | 0 | 0 | 1 | 0 |
| **b** | 0 | 0 | 1 | 0 |
| **c** | 1 | 1 | 0 | 1 |
| **d** | 0 | 0 | 1 | 0 |

**Задача 4**

**Постановка задачи**



**Решение**

Матрица инцидентности:

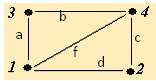
|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **a** | **b** | **c** | **d** | **e** |
| **1** | 1 | 1 | 0 | 0 | 0 |
| **2** | 0 | 1 | 1 | 0 | 1 |
| **3** | 0 | 0 | 0 | 1 | 1 |
| **4** | 1 | 0 | 1 | 1 | 0 |

Матрица смежности:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** |
| **1** | 0 | 1 | 0 | 1 |
| **2** | 1 | 0 | 1 | 1 |
| **3** | 0 | 1 | 0 | 1 |
| **4** | 1 | 1 | 1 | 0 |

**Задача 5**

**Постановка задачи**



**Решение**

Матрица инцидентности:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **a** | **b** | **c** | **d** | **f** |
| **1** | 1 | 0 | 0 | 1 | 1 |
| **2** | 0 | 0 | 1 | 1 | 0 |
| **3** | 1 | 1 | 0 | 0 | 0 |
| **4** | 0 | 1 | 1 | 0 | 1 |

Матрица смежности:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **1** | **2** | **3** | **4** |
| **1** | 0 | 1 | 1 | 1 |
| **2** | 1 | 0 | 0 | 1 |
| **3** | 1 | 0 | 0 | 1 |
| **4** | 1 | 1 | 1 | 0 |

**Вывод:** В ходе лабораторной работы были заполнены матрицы инцидентности и смежности для заданных графов.