第6章练习题

**一. 单选题（共 37 分）**

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| 1. | 如图所示，v1到v0的最短路径为：（1 分）     |  |  |  |  | | --- | --- | --- | --- | | A. | v1,v2,v3,v0 | B. | v1,v2,v0 | | C. | v1,v3,v0 | D. | v1,v0 | |

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| 2. | 以v1为起始结点对下图进行【广度】优先遍历，正确的遍历序列是（ ）（1 分）     |  |  |  |  | | --- | --- | --- | --- | | A. | v1，v2，v3，v4，v5，v6，v7 | B. | v1，v2，v5，v4，v3，v7，v6 | | C. | v1，v2，v4，v7，v4，v5，v6 | D. | v1，v2，v5，v6，v7，v3，v4 | |

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| 3. | 以v1为起始结点对下图进行【深度】优先遍历，正确的遍历序列是（ ）（1 分）     |  |  |  |  | | --- | --- | --- | --- | | A. | v1，v2，v3，v4，v5，v6，v7 | B. | v1，v2，v5，v4，v3，v7，v6 | | C. | v1，v2，v4，v7，v4，v5，v6 | D. | v1，v2，v5，v6，v7，v3，v4 | |

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| 4. | 5 个结点的有向完全图含有弧的数目为（ ）。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 25 | B. | 30 | | C. | 15 | D. | 20 | |

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| 5. | 下列哪一种图的邻接矩阵是对称矩阵？（ ）（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 有向图 | B. | 无向图 | | C. | AOV网 | D. | AOE网 | |

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| 6. | 一个有 n 个结点的图，最少有（ ）个连通分量。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 0 | B. | 1 | | C. | n-1 | D. | n | |

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| 7. | 一个有 n 个结点的图， 最多有（ ）个连通分量。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 0 | B. | 1 | | C. | n-1 | D. | n | |

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| 8. | 在一个无向图中，所有顶点的度数之和等于所有边数的（ ）倍。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 1/2 | B. | 2 | | C. | 1 | D. | 4 | |

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| 9. | 在一个有向图中，所有顶点的入度之和等于所有出度之和的（ ）倍。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 1/2 | B. | 2 | | C. | 1 | D. | 4 | |

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| 10. | G是一个非连通无向图，共有28 条边，则该图至少有（ ）顶点。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 6 | B. | 7 | | C. | 8 | D. | 9 | |

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| 11. | 对于具有n个顶点的图，若采用邻接矩阵表示，则该矩阵的大小为（ ）。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | n | B. | n\*n | | C. | n-1 | D. | n(n-1) | |

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| 12. | 如果从无向图的任一顶点出发进行一次深度优先搜索即可访问所有顶点，则该图一定是（ ）。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 完全图 | B. | 连通图 | | C. | 有回路 | D. | 一棵树 | |

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| 13. | 带权有向图G用邻接矩阵A存储，则顶点i的入度等于A中（ ）。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 第i行非无穷的元素之和 | B. | 第i列非无穷且非0的元素个数之和 | | C. | 第i行非无穷且非0的元素个数 | D. | 第i行与第i列非无穷且非0的元素之和 | |

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| 14. | 无向图的邻接矩阵是一个（ ）。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 对称矩阵 | B. | 零矩阵 | | C. | 上三角矩阵 | D. | 对角矩阵 | |

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| 15. | 如图所示的有向图的拓扑排序的结果序列是（ ）。（1 分）     |  |  |  |  | | --- | --- | --- | --- | | A. | 125634 | B. | 123456 | | C. | 521643 | D. | 516234 | |

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| 16. | 一个具有n个顶点的有向图最多有（ ）条边。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | n\*(n-1)/2 | B. | n\*(n-1) | | C. | n\*(n+1)/2 | D. | n\*n | |

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| 17. | 以下说法正确的是（ ）。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 连通分量是无向图中的极小连通子图 | B. | 强连通分量是有向图中的极大强连通子图 | | C. | 在一个有向图的拓扑序列中若顶点a在顶点b之前，则图中必有一条弧<a,b> | D. | 对有向图G，如果以任一顶点出发进行一次深度优先或广度优先搜索能访问到每个顶点，则该图一定是完全图 | |

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| 18. | 一个具有8个顶点的有向图中，所有顶点的入度之和与所有顶点的出度之和的差等于（ ）。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 16 | B. | 4 | | C. | 0 | D. | 2 | |

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| 19. | 对于一个有向图，若一个顶点的入度为k1，出度为k2，则对应邻接表中该顶点单链表中的结点数为（ ）。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | k1+k2 | B. | k1-k2 | | C. | k1 | D. | k2 | |

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| 20. | 下面（）方法可以判断一个有向图是否有回路。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 广度优先遍历 | B. | 深度优先遍历 | | C. | 拓扑排序 | D. | 求关键路径 | |

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| 21. | 如图所示的有向图，可以得到不同的拓扑排序的个数是（）。（1 分）     |  |  |  |  | | --- | --- | --- | --- | | A. | 4 | B. | 3 | | C. | 2 | D. | 1 | |

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| 22. | 具有n个顶点的有向图最多有（）条边。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | n | B. | n-1 | | C. | n(n-1) | D. | n(n+1) | |

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| 23. | n个顶点的无向连通图用邻接矩阵表示时，该矩阵至少有（）个非零元素。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | n | B. | 2(n-1) | | C. | n/2 | D. | n(n-1)/2 | |

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| 24. | 下面（）适合构造一个稠密图的最小生成树。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | Prim算法 | B. | Kruskal算法 | | C. | Dijkstral算法 | D. | Floyd算法 | |

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| 25. | 下面（）适合构造一个稀疏图的最小生成树。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | Prim算法 | B. | Kruskal算法 | | C. | Dijkstral算法 | D. | Floyd算法 | |

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| 26. | 用邻接矩阵表示图进行广度优先遍历时，通常借助（）来实现算法。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 栈 | B. | 队列 | | C. | 树 | D. | 图 | |

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| 27. | 用邻接表表示图进行深度优先遍历时，通常借助（）来实现算法。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 栈 | B. | 队列 | | C. | 树 | D. | 图 | |

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| 28. | 图的深度优先遍历类似于树的（）。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 先序遍历 | B. | 中序遍历 | | C. | 后序遍历 | D. | 层序遍历 | |

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| 29. | 图的广度优先遍历类似于树的（）。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 先序遍历 | B. | 中序遍历 | | C. | 后序遍历 | D. | 层序遍历 | |

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| 30. | 已知图的邻接矩阵如图所示，则从v0出发按照深度优先遍历的结果是（）。（1 分）     |  |  |  |  | | --- | --- | --- | --- | | A. | 0243156 | B. | 0136542 | | C. | 0134256 | D. | 0361542 | |

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| 31. | 对于n个顶点，e条边且使用邻接表存储的有向图进行广度优先遍历，其算法的时间复杂度为（）。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | O（n） | B. | O（e） | | C. | O（n+e） | D. | O（n\*e） | |

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| 32. | 如图所示的有向网图，若采用迪杰斯特拉算法求解源点a到其他各个顶点的最短路径，则得到的第一条最短路径的目标是b，第二条最短路径的目标是c，则后序得到其余个最短路径的目标顶点一次是（）。（1 分）     |  |  |  |  | | --- | --- | --- | --- | | A. | d,e,f | B. | e,d,f | | C. | f,d,e | D. | f，e，d | |

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| 33. | 如图所示为的矩阵为一个图的邻接矩阵，则该图的各个顶点的度数分别是是（）。（1 分）     |  |  |  |  | | --- | --- | --- | --- | | A. | 1，2，1，2 | B. | 2，2，1，1 | | C. | 3，4，2，3 | D. | 4，4，2，2 | |

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| 34. | 若对如图所示的无向图进行遍历，下列选项中，不是广度优先遍历的序列的是（）。（1 分）     |  |  |  |  | | --- | --- | --- | --- | | A. | H,C,A,B,D,E,G,F | B. | E,A,F,G,B,H,C,D | | C. | D,B,C,A,H,E,F,G | D. | A,B,C,D,H,E,F,G | |

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| 35. | 如图所示的有向图进行拓扑排序，得到的拓扑排序可能是（）。（1 分）     |  |  |  |  | | --- | --- | --- | --- | | A. | 3,1,2,4,5,6 | B. | 3,1,2,4,6,5 | | C. | 3,1,4,2,5,6 | D. | 3,1,4,2,6,5 | |

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| 36. | 如图所示的带权图，从D开始采用可能是Kruskal算法但不是Prim算法求解其最小生成树，则第二次选中的边是（）。（1 分）     |  |  |  |  | | --- | --- | --- | --- | | A. | （A,C） | B. | （A,D） | | C. | （B,C） | D. | （C,D） | |

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| 37. | 有8个顶点的无向图最多有（ ）条边。（1 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 14 | B. | 28 | | C. | 56 | D. | 12 | |

**二. 多选题（共 6 分）**

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| 1. | 图的存储结构主要有（ ）。（2 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | 十字链表 | B. | 三元组 | | C. | 邻接矩阵 | D. | 邻接表 | |

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| 2. | 无向图G=(V,E)，其中：V={a,b,c,d,e,f}，E={(a,b),(a,e),(a,c),(b,e),(c,f),(f,d),(e,d)}，对该图进行深度优先遍历，可能得到的顶点序列是（ ）。（2 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | abedfc | B. | abcefd | | C. | acfdeb | D. | aebdfc | |

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| 3. | 已知有向图G=(V,E)，其中V={v1,v2,v3,v4,v5,v6,v7},E={<v1,v2>,<v1,v3>,<v1,v4>,<v2,v5>,<v3,v5>,<v3,v6>,<v4,v4>,<v5,v7>,<v6,v7>},G的拓扑序列正确的是（ ）。（2 分）   |  |  |  |  | | --- | --- | --- | --- | | A. | v1v3v4v6v2v5v7 | B. | v1v3v2v6v4v5v7 | | C. | v1v2v5v3v4v6v7 | D. | v1v4v2v3v6v5v7 | |

**三. 判断题（共 12 分）**

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| 1. | 在AOE网中一定只有一条关键路径。（1 分） |

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| 2. | 若一个有向图的邻接矩阵中对角线以下元素均为零，则该图的拓扑序列必定存在。（1 分） |

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| 3. | 邻接矩阵存储图，所占用的存储空间大小只与图中顶点个数有关，而与图的边数无关。（1 分） |

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| 4. | 一个有向图的邻接表和逆邻接表中的结点个数一定相等。（1 分） |

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| 5. | 图 G 的生成树是该图的一个极小连通子图。（1 分） |

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| 6. | 在一个有向图的拓扑序列中，若顶点 a 在顶点 b 之前，则图中必有一条弧。（1 分） |

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| 7. | 一个图的广度优先遍历序列是唯一的。（1 分） |

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| 8. | 图的广度优先遍历序列和深度优先遍历序列不是唯一的。（1 分） |

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| 9. | 邻接表只能用于存储有向图，而邻接矩阵则可存储有向图和无向图（1 分） |

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| 10. | 存储图的邻接矩阵中，邻接矩阵的大小不但与图的顶点个数有关，而且与图的边数也有关。（1 分） |

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| 11. | 图的生成树是唯一的。（1 分） |

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| 12. | 一个具有n个顶点的有向图最多有n(n-1)条边。（1 分） |

**四. 填空题（共 60 分）**

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| 1. | 写出如图所示的有向无环图一个正确的拓扑序列。 （1 分）  注意：使用连续的小写字母序列 |

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| 2. | 如图所示的带权无向图的最小生成树的权为【1】.（1 分） |

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| 3. | 9 个顶点的强连通图至少有（ ）条边（1 分） |

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| 4. | 如图所示的无向连通网，从顶点 a 开始用 Prim 算法构造最小生成树，请按构造过程顺序写出加入最小生成树的边。 （5 分）  注意：将输入法调整到英文状态，只写边的邻接顶点的字母，如 bd（或db） |

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| 5. | 如图所示的无向连通网，用 Kruskal 算法构造最小生成树，请按构造过程顺序写出加入最小生成树的边。 （5 分）  注意：将输入法调整到英文状态，只写边的邻接顶点的字母，如 bd（或db） |

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| 6. | 如图所示，请按 Dijkstra 算法计算从顶点 a 到其余各顶点的最短路径，并将计算过程按要求填写到以下空格。 （10 分）  1. 按算法顺序填写加入的找到最短路径的顶点、路径长度和上一点的序号，格式：【新加入的顶点数据|路径长度|上一顶点数据】   a|0|a，【1】，【2】，【3】，【4】，【5】   2. 写出指定最短路径及长度，格式【顶点序列|长度】，例如：abcdef|38 a->b：【6】 a->c：【7】 a->d：【8】 a->e：【9】 a->f：【10】 |

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| 7. | 如图所示，请使用 Floyd 算法计算该图的所有顶点之间的最短路径。 （12 分）  【格式】：路径序列（全部小写）,长度（不写括号） 【例如】：a->g: abcdefg,18  a->b: 【1】 a->c: 【2】 a->d: 【3】 b->a: 【4】 b->c: 【5】 b->d: 【6】 c->a: 【7】 c->b: 【8】 c->d: 【9】 d->a: 【10】 d->b: 【11】 d->c: 【12】  【注意】：填写时并输入法锁定在英文半角状态，路径全部用小写字母连续书写。 |

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| 8. | 如图所示的AOE网，请按步骤计算关键路径 （6 分）  Ve[k]=【1】(按顶点序号顺序填写，用逗号分隔各数据，例如：1,2,3,4,5,6） Vl[k]=【2】(按顶点序号顺序填写，用逗号分隔各数据，例如：1,2,3,4,5,6） e[i]=【3】（按活动序号顺序填写，用逗号分隔各数据，例如：1,2,3,4,5,6,7,8,9） l[i]=【4】（按活动序号顺序填写，用逗号分隔各数据，例如：1,2,3,4,5,6,7,8,9）  其中关键活动为：【5】（按顺序填写活动的序号，用逗号分隔和数据，例如：1,2,3） 关键路径为：【6】（按顺序连续填写顶点的序号，多条路径用逗号分隔，例如：123,456）  提示：在输入数据时将输入法设置在英文状态，确保输入数据和逗号是半角的。 |

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| 9. | 图的存储结构主要有两种，分别是【1】和【2】。（2 分） |

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| 10. | 如图所示AOE网，其关键路径是【1】。 （1 分）  （注：按顺序依次定出顶点，顶点之间不要有多余的符号） |

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| 11. | 如图所示AOE网，其关键路径是【1】。 （3 分）  （注：按顺序依次定出顶点，顶点之间不要有多余的符号） |

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| 12. | 如图所示的无向连通网，从顶点 a 开始用 Prim 算法构造最小生成树，第三次找到的最短边是【1】（2 分） |

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| 13. | AOV网中，结点表示【1】，边表示【2】。 （5 分） AOE网中，结点表示【3】，边表示【4】，边上的权值表示【5】。 |

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| 14. | 有向图G用邻接矩阵A[n][n]存储，矩阵第i行的所有元素之和等于顶点i的【1】。 （2 分） 有向图G用邻接矩阵A[n][n]存储，矩阵第i列的所有元素之和等于顶点i的【2】。 |

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| 15. | 如图所示有向图，则图中点ac之间的最短路径为【1】.（1 分） |

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| 16. | 8个顶点的无向连通图最少有【1】条边。（1 分） |

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| 17. | 一个无向图有n个顶点，e条边，则所有顶点的度数之和为【1】。（1 分） |

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| 18. | n个顶点e条边的图，若采用邻接矩阵存储，则空间复杂度为【1】。（1 分） |

**练习题答案**

**一. 单选题（共 37 分）**

1.B 2.A 3.D 4.D 5.B 6.B 7.D 8.B 9.C 10.D 11.B 12.B 13.B 14.A 15.D  
16.B 17.A 18.C 19.D 20.C 21.B 22.C 23.B 24.A 25.B 26.B 27.A 28.A 29.D 30.C  
31.C 32.C 33.C 34.D 35.D 36.C 37.B

**二. 多选题（共 6 分）**

1.CD 2.ACD 3.AD

**三. 判断题（共 12 分）**

1.× 2.√ 3.√ 4.√ 5.× 6.× 7.× 8.√ 9.× 10.× 11.× 12.√

**四. 填空题（共 60 分）**

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| 1. | |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 【1】 | abcfed | afebcd | abfced | abfecd | afbced | afbecd | |

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| 2. | |  |  | | --- | --- | | 【1】 | 17 | |

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| 3. | |  |  | | --- | --- | | 【1】 | 9 | |

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| 4. | |  |  |  | | --- | --- | --- | | 【1】 | ac | ca |  |  |  |  | | --- | --- | --- | | 【2】 | ab | ba |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | 【3】 | be | bf | fb | eb |  |  |  |  | | --- | --- | --- | | 【4】 | fe | ef |  |  |  |  | | --- | --- | --- | | 【5】 | df | fd | |

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| 5. | |  |  |  | | --- | --- | --- | | 【1】 | fe | ef |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | | 【2】 | ca | ac | fb | bf | be | eb |  |  |  |  | | --- | --- | --- | | 【3】 | df | fd |  |  |  |  | | --- | --- | --- | | 【4】 | ab | ba |  |  |  |  |  |  | | --- | --- | --- | --- | --- | | 【5】 | cd | dc | bd | db | |

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| 6. | |  |  | | --- | --- | | 【1】 | e|7|a |  |  |  | | --- | --- | | 【2】 | f|9|a |  |  |  | | --- | --- | | 【3】 | b|11|f |  |  |  | | --- | --- | | 【4】 | d|20|f |  |  |  | | --- | --- | | 【5】 | c|21|b |  |  |  | | --- | --- | | 【6】 | afb|11 |  |  |  | | --- | --- | | 【7】 | afbc|21 |  |  |  | | --- | --- | | 【8】 | afd|20 |  |  |  | | --- | --- | | 【9】 | ae|7 |  |  |  | | --- | --- | | 【10】 | af|9 | |

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| 7. | |  |  | | --- | --- | | 【1】 | ab,1 |  |  |  | | --- | --- | | 【2】 | abc,3 |  |  |  | | --- | --- | | 【3】 | abcd,9 |  |  |  | | --- | --- | | 【4】 | bcda,11 |  |  |  | | --- | --- | | 【5】 | bc,2 |  |  |  | | --- | --- | | 【6】 | bcd,8 |  |  |  | | --- | --- | | 【7】 | cda,9 |  |  |  | | --- | --- | | 【8】 | cdab,10 |  |  |  | | --- | --- | | 【9】 | cd,6 |  |  |  | | --- | --- | | 【10】 | da,3 |  |  |  | | --- | --- | | 【11】 | dab,4 |  |  |  | | --- | --- | | 【12】 | dabc,6 | |

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| 8. | |  |  | | --- | --- | | 【1】 | 0,3,2,6,8,9 |  |  |  | | --- | --- | | 【2】 | 0,4,2,6,8,9 |  |  |  | | --- | --- | | 【3】 | 0,0,3,3,2,2,6,8,6 |  |  |  | | --- | --- | | 【4】 | 1,0,4,5,2,6,6,8,7 |  |  |  | | --- | --- | | 【5】 | 2,5,7,8 |  |  |  | | --- | --- | | 【6】 | 13456 | |

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| 9. | |  |  | | --- | --- | | 【1】 | 邻接矩阵 |  |  |  | | --- | --- | | 【2】 | 邻接表 | |

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| 10. | |  |  |  | | --- | --- | --- | | 【1】 | V1V3V5V6 | v1v3v5v6 | |

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| 11. | |  |  |  | | --- | --- | --- | | 【1】 | V1V3V5V6 | v1v3v5v6 | |

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| 12. | |  |  |  | | --- | --- | --- | | 【1】 | be | eb | |

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| 13. | |  |  | | --- | --- | | 【1】 | 活动 |  |  |  |  | | --- | --- | --- | | 【2】 | 活动之间的优先关系 | 活动之间的制约关系 |  |  |  | | --- | --- | | 【3】 | 事件 |  |  |  | | --- | --- | | 【4】 | 活动 |  |  |  | | --- | --- | | 【5】 | 活动持续时间 | |

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| 14. | |  |  | | --- | --- | | 【1】 | 出度 |  |  |  | | --- | --- | | 【2】 | 入度 | |

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| 15. | |  |  | | --- | --- | | 【1】 | abc | |

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| 16. | |  |  | | --- | --- | | 【1】 | 7 | |

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| 17. | |  |  | | --- | --- | | 【1】 | 2e | |

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| 18. | |  |  | | --- | --- | | 【1】 | O(n\*n) | |