数据库实验报告

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| E-R图 |
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| 关系模式 |
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| 所有数据（测试数据 = 基础数据 + 卡车1721数据 + 大客户数据） |
| USE express;  -- 初始化系统用户  INSERT INTO User\_ (user\_id, user\_name, user\_type, telephone\_number, payment)  VALUES (10086, 'system', 'S', NULL, NULL);  -- 初始化快递站点  INSERT INTO TransferStation (station\_id, nickname, location, type, creator, manager)  VALUES (1, '武汉转运中心', '中国|湖北|武汉|市级仓库', '一级仓库', 10086, 10086),  (2, '武东城区总站', '中国|湖北|武汉|东区仓库', '二级仓库', 10086, 10086),  (3, '武东1街分站', '中国|湖北|武汉|东1街仓库', '三级仓库', 10086, 10086),  (4, '武东2街分站', '中国|湖北|武汉|东2街仓库', '三级仓库', 10086, 10086),  (5, '深圳转运中心', '中国|广东|深圳|市级仓库', '一级仓库', 10086, 10086),  (6, '深东城区总站', '中国|广东|深圳|东区仓库', '二级仓库', 10086, 10086),  (7, '深西城区总站', '中国|广东|深圳|西区仓库', '二级仓库', 10086, 10086),  (8, '深东1街分站', '中国|广东|深圳|东1街仓库', '三级仓库', 10086, 10086),  (9, '深西1街分站', '中国|广东|深圳|西1街仓库', '三级仓库', 10086, 10086),  (10, '东京转运中心', '日本|东京|市级仓库', '一级仓库', 10086, 10086),  (11, '东京新宿站', '日本|东京|新宿|区级仓库', '二级仓库', 10086, 10086); |
| USE express;  -- 卡车1721被毁事件，暨"两个幸运儿给自己心仪的妹子寄情书事件"  INSERT INTO User\_ (user\_id, user\_name, user\_type, telephone\_number, payment)  VALUES (10000000001, '倒霉蛋1', 'C', '10000000001', 'once'), -- 一位幸运儿  (10000000002, '倒霉蛋2', 'C', '10000000002', 'once'), -- 另一位幸运儿  (10010000001, '妹子1', 'V', '10010000001', NULL), -- 心仪的妹子  (10010000002, '妹子2', 'V', '10010000002', NULL), -- 心仪的妹子  (10020000001, '快递员1', 'E', '10020000001', 'monthly'), -- 深东1街的快递小哥  (10020000002, '快递员2', 'E', '10020000002', 'monthly'), -- 1721的倒霉司机  (10020000003, '快递员3', 'E', '10020000003', 'monthly'), -- 深西1街的快递小哥  (10000000003, '幸存的发货人', 'C', '10000000003', 'once'), -- 最后一次成功交货的发货人  (10010000003, '幸存的收货人1', 'V', '10010000003', NULL), -- 最后一次成功交货的收获人1  (10010000004, '幸存的收货人2', 'V', '10010000003', NULL); -- 最后一次成功交货的收获人2  INSERT INTO Vehicle (vehicle\_id, type, brand, license\_number, worth)  VALUES (1, '小电车', '雅迪', 'xdc1', 1000), -- 深东1街的快递小哥的车车  (2, '小电车', '爱玛', 'xdc2', 1000), -- 深西1街的快递小哥的车车  (1721, '货车', '倒霉牌', 'hc1721', 50000); -- 罪魁祸首1721卡车  INSERT INTO TransferStation (station\_id, nickname, location, type, creator, manager)  VALUES (12, '倒霉蛋1的家', '中国|深圳市|东城区|深东1街|xxx', '用户主址', 10000000001, 10000000001), -- 发货地址1  (13, '妹子1的家', '中国|深圳市|西城区|深西1街|xxx', '用户地址', 10000000001, 10010000001), -- 收获地址1  (14, '倒霉蛋2的家', '中国|深圳市|东城区|深东1街|xxx', '用户主址', 10000000002, 10000000002), -- 发货地址2  (15, '妹子2的家', '中国|深圳市|西城区|深西1街|xxx', '用户地址', 10000000002, 10010000002), -- 收货地址2  (16, '幸存的发货人的家', '中国|深圳市|东城区|深东1街|xxx', '用户主址', 10000000003, 10000000003),  (17, '幸存的收货人1的家', '中国|深圳市|西城区|深西1街|xxx', '用户地址', 10000000003, 10010000003),  (18, '幸存的收货人2的家', '中国|深圳市|西城区|深西1街|xxx', '用户地址', 10000000003, 10010000004);  INSERT INTO Order\_ (order\_id, customer\_id, status, create\_time, expect\_deliver\_time\_frame, payment, pay\_type, is\_paid,  express\_type, service\_type, is\_deliver\_on\_time, weight, package\_type)  VALUES (1, 10000000001, '中断', CONCAT(LAST\_YEAR\_MONTH(1), '-2 8:00:00'), '晚上', 5.0, '预付', 'T', '当天', '即时送',  NULL, 1.1, '扁平信封'),  (2, 10000000002, '中断', CONCAT(LAST\_YEAR\_MONTH(1), '-2 9:00:00'), '晚上', 5.0, '预付', 'T', '当天', '即时送', NULL, 1.1,  '扁平信封'),  (3, 10000000003, '完成', CONCAT(LAST\_YEAR\_MONTH(2), '-30 8:00:00'), '晚上', 10.0, '到付', 'T', '当天', '京尊达', 'T', 1.1,  '小盒子'),  (4, 10000000003, '完成', CONCAT(LAST\_YEAR\_MONTH(2), '-30 8:00:00'), '晚上', 12.0, '到付', 'T', '当天', NULL, 'F', 2.2,  '大盒子');  INSERT  INTO Goods (package\_id, goods\_name, worth)  VALUES (1, '倒霉蛋1的情书', 1.1), -- 情书1  (2, '倒霉蛋2的情书', 1.2), -- 情书2  (3, '水晶球', 10.1),  (4, '小米充电器', 8.8),  (4, '华为充电器', 9.9);  INSERT INTO TransportFragment (fragment\_id, road\_map, fragment\_description, expected\_start\_time, actual\_start\_time,  expected\_ending\_time, actual\_ending\_time, status, order\_id, start\_point, ending\_point,  executor, vehicle\_id)  VALUES (1, '模拟线路1', '上门取件', CONCAT(LAST\_YEAR\_MONTH(1), '-2 8:15:00'), CONCAT(LAST\_YEAR\_MONTH(1), '-2 8:15:00'),  CONCAT(LAST\_YEAR\_MONTH(1), '-2 8:30:00'), CONCAT(LAST\_YEAR\_MONTH(1), '-2 8:30:00'), '完成', 1,  12, 8, 10020000001, 1),  (2, '模拟线路2', '从深东1街分站 直接送往 深西1街分站', CONCAT(LAST\_YEAR\_MONTH(1), '-2 11:00:00'),  CONCAT(LAST\_YEAR\_MONTH(1), '-2 11:00:00'), CONCAT(LAST\_YEAR\_MONTH(1), '-2 14:00:00'), NULL, '终止',  1, 8, 9, 10020000002, 1721),  (3, '模拟线路3', '深西1街分站 送往 妹子1家里', CONCAT(LAST\_YEAR\_MONTH(1), '-2 16:00:00'), NULL,  CONCAT(LAST\_YEAR\_MONTH(1), '-2 20:00:00'), NULL, '取消', 1, 9, 13,  10020000003, 2),  (4, '模拟线路4', '上门取件', CONCAT(LAST\_YEAR\_MONTH(1), '-2 9:00:00'), CONCAT(LAST\_YEAR\_MONTH(1), '-2 9:00:00'),  CONCAT(LAST\_YEAR\_MONTH(1), '-2 9:15:00'), CONCAT(LAST\_YEAR\_MONTH(1), '-2 9:15:00'), '完成', 2, 14,  8, 10020000001, 1),  (5, '模拟线路5', '从深东1街分站 直接送往 深西1街分站', CONCAT(LAST\_YEAR\_MONTH(1), '-2 11:00:00'),  CONCAT(LAST\_YEAR\_MONTH(1), '-2 11:00:00'), CONCAT(LAST\_YEAR\_MONTH(1), '-2 14:00:00'), NULL,  '终止', 2, 8, 9, 10020000002, 1721),  (6, '模拟线路6', '深西1街分站 送往 妹子2家里', CONCAT(LAST\_YEAR\_MONTH(1), '-2 16:00:00'), NULL,  CONCAT(LAST\_YEAR\_MONTH(1), '-2 20:30:00'), NULL, '取消', 2, 9, 15,  10020000003, 2),  (7, '模拟线路7', '上门取件', CONCAT(LAST\_YEAR\_MONTH(2), '-30 9:00:00'), CONCAT(LAST\_YEAR\_MONTH(2), '-30 9:00:00'),  CONCAT(LAST\_YEAR\_MONTH(2), '-30 9:30:00'), CONCAT(LAST\_YEAR\_MONTH(2), '-30 9:30:00'),  '完成', 3, 16, 8, 10020000001, 1),  (8, '模拟线路8', '从深东1街分站 直接送往 深西1街分站', CONCAT(LAST\_YEAR\_MONTH(2), '-30 10:00:00'),  CONCAT(LAST\_YEAR\_MONTH(2), '-30 10:00:00'), CONCAT(LAST\_YEAR\_MONTH(2), '-30 15:00:00'),  CONCAT(LAST\_YEAR\_MONTH(2), '-30 15:00:00'), '完成', 3, 8, 9, 10020000002, 1721),  (9, '模拟线路9', '从深西1街分站 送往 幸存的收货人1的家', CONCAT(LAST\_YEAR\_MONTH(2), '-30 18:00:00'),  CONCAT(LAST\_YEAR\_MONTH(2), '-30 18:00:00'), CONCAT(LAST\_YEAR\_MONTH(2), '-30 19:00:00'),  CONCAT(LAST\_YEAR\_MONTH(2), '-30 19:00:00'), '完成', 3, 9, 17, 10020000003, 2),  (10, '模拟线路10', '上门取件', CONCAT(LAST\_YEAR\_MONTH(2), '-30 9:00:00'), CONCAT(LAST\_YEAR\_MONTH(2), '-30 9:00:00'),  CONCAT(LAST\_YEAR\_MONTH(2), '-30 9:30:00'), CONCAT(LAST\_YEAR\_MONTH(2), '-30 9:30:00'),  '完成', 4, 16, 8, 10020000001, 1),  (11, '模拟线路11', '从深东1街分站 直接送往 深西1街分站', CONCAT(LAST\_YEAR\_MONTH(2), '-30 10:00:00'),  CONCAT(LAST\_YEAR\_MONTH(2), '-30 10:00:00'), CONCAT(LAST\_YEAR\_MONTH(2), '-30 15:00:00'),  CONCAT(LAST\_YEAR\_MONTH(2), '-30 15:00:00'), '完成', 4, 8, 9, 10020000002, 1721),  (12, '模拟线路12', '从深西1街分站 送往 幸存的收货人2的家', CONCAT(LAST\_YEAR\_MONTH(2), '-30 18:00:00'),  CONCAT(LAST\_YEAR\_MONTH(2), '-30 18:00:00'), CONCAT(LAST\_YEAR\_MONTH(2), '-30 20:00:00'),  CONCAT(LAST\_YEAR\_MONTH(2), '-30 20:10:00'), '完成', 4, 9, 18, 10020000003, 2); |
| USE express;  -- 跨国大客户，最高开销  INSERT INTO User\_ (user\_id, user\_name, user\_type, telephone\_number, payment)  VALUES (20000000001, '钱老爹', 'C', '20000000001', 'monthly'),  (20010000001, '快递员A', 'E', '20010000001', 'monthly'),  (20010000002, '快递员B', 'E', '20010000002', 'monthly'),  (20010000003, '快递员C', 'E', '20010000003', 'monthly'),  (20010000004, '快递员D', 'E', '20010000004', 'monthly'),  (20010000005, '快递员E', 'E', '20010000005', 'monthly'),  (20020000001, '钱老娘', 'V', '20020000001', NULL);  INSERT INTO TransferStation (station\_id, nickname, location, type, creator, manager)  VALUES (100, '武汉机场', '中国|湖北|武汉｜机场', '中转站', 10086, 10086),  (101, '东京机场', '日本|东京|机场', '中转站', 10086, 10086),  (200, '老爹家', '中国|武汉市|东城区|武东1街|yyy', '用户主址', 20000000001, 20000000001),  (201, '老娘家', '日本|东京|新宿区|yyy', '用户地址', 20000000001, 20020000001);  INSERT INTO Vehicle (vehicle\_id, type, brand, license\_number, worth)  VALUES (10001, '小电车', '小刀', 'xdc10001', 1500.0),  (10002, '面包车', '五菱', 'mbc10002', 50000.0),  (10003, '飞机', '波音', '飞机10003', 50000000000.0),  (10004, '面包车', '本田', 'mbc10004', 100000.0),  (10005, '小电车', '特斯拉', 'xdc10005', 10000.0);  INSERT INTO Order\_ (order\_id, customer\_id, status, create\_time, expect\_deliver\_time\_frame, payment, pay\_type, is\_paid,  express\_type, service\_type, is\_deliver\_on\_time, weight, package\_type)  VALUES (100, 20000000001, '完成', CONCAT(LAST\_YEAR\_MONTH(1), '-15 8:00:00'), '上午', 666.66, '记账', 'F', '明天',  '即时送|京尊达|冷运|国际', 'T', 11.1, '小盒子');  INSERT INTO Goods (package\_id, goods\_name, worth)  VALUES (100, '冰雕戒指', 66666.66);  INSERT INTO TransportFragment (fragment\_id, road\_map, fragment\_description, expected\_start\_time, actual\_start\_time,  expected\_ending\_time, actual\_ending\_time, status, order\_id, start\_point, ending\_point,  executor, vehicle\_id)  VALUES (101, NULL, '直达机场', CONCAT(LAST\_YEAR\_MONTH(1), '-15 9:00:00'), CONCAT(LAST\_YEAR\_MONTH(1), '-15 9:00:00'),  CONCAT(LAST\_YEAR\_MONTH(1), '-15 10:00:00'), CONCAT(LAST\_YEAR\_MONTH(1), '-15 10:00:00'),  '完成', 100, 200, 100, 20010000002, 10002),  (102, NULL, 'flying', CONCAT(LAST\_YEAR\_MONTH(1), '-15 11:00:00'), CONCAT(LAST\_YEAR\_MONTH(1), '-15 11:00:00'),  CONCAT(LAST\_YEAR\_MONTH(1), '-16 9:30:00'), CONCAT(LAST\_YEAR\_MONTH(1), '-16 9:30:00'),  '完成', 100, 100, 101, 20010000003, 10003),  (103, NULL, '立刻配送', CONCAT(LAST\_YEAR\_MONTH(1), '-16 10:00:00'), CONCAT(LAST\_YEAR\_MONTH(1), '-16 9:45:00'),  CONCAT(LAST\_YEAR\_MONTH(1), '-16 10:30:00'), CONCAT(LAST\_YEAR\_MONTH(1), '-16 10:30:00'),  '完成', 100, 101, 201, 20010000004, 10004); |

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| 查询编写的代码以及运行查询的结果 |
| USE express;  -- 查询1721卡车被摧毁时对应的运输片段 SELECT T.order\_id FROM TransportFragment T WHERE vehicle\_id = 1721  AND T.status = '终止';  -- 找到车祸发生时卡车上有包裹的所有顾客 SELECT customer\_id FROM Order\_ WHERE order\_id IN (SELECT T.order\_id  FROM TransportFragment T  WHERE vehicle\_id = 1721  AND T.status = '终止' );  -- 找到车祸发生时卡车上有包裹的所有收件人 SELECT U.\* FROM TransportFragment TF  JOIN TransferStation TS ON TF.ending\_point = TS.station\_id  JOIN User\_ U ON TS.manager = U.user\_id WHERE U.user\_type = 'V'  AND TF.order\_id IN (SELECT T.order\_id  FROM TransportFragment T  WHERE vehicle\_id = 1721  AND T.status = '终止' );  -- 找到车祸前那辆卡车最后一次成功交货 (交货记录：完成两个运输结点的转流) SELECT \* FROM TransportFragment T3 WHERE T3.actual\_ending\_time = (SELECT *MAX*(T2.actual\_ending\_time)  FROM TransportFragment T2  WHERE T2.actual\_ending\_time <= (SELECT *MIN*(T1.expected\_ending\_time)  FROM TransportFragment T1  WHERE vehicle\_id = 1721  AND T1.status = '终止'  )  AND vehicle\_id = 1721  AND T2.status = '完成')  AND T3.status = '完成'  AND T3.vehicle\_id = 1721; |
| USE express;  -- 找到在过去一年中运送包裹最多的客户 SELECT O.customer\_id, *COUNT*(1) AS '订单数量' FROM Order\_ O WHERE O.create\_time BETWEEN *DATE\_SUB*(*NOW*(), INTERVAL 1 YEAR) AND *NOW*() GROUP BY O.customer\_id ORDER BY *COUNT*(1) DESC LIMIT 0,1;  -- 找到在过去一年中花费最多的客户 SELECT O.customer\_id, *SUM*(O.payment) AS '花费总额' FROM Order\_ O WHERE O.create\_time BETWEEN *DATE\_SUB*(*NOW*(), INTERVAL 1 YEAR) AND *NOW*() GROUP BY O.customer\_id ORDER BY *SUM*(O.payment) DESC LIMIT 0,1;  -- 顾客最多的街道 SELECT *LEFT*(TS.location, *INSTR*(TS.location, '街')) AS '顾客最多的街道' FROM TransferStation TS WHERE TS.type = '用户主址' GROUP BY *LEFT*(TS.location, *INSTR*(TS.location, '街')) ORDER BY *COUNT*(1) DESC LIMIT 0,1;  -- 查找未在承诺时间内交付的包裹 SELECT \* FROM Order\_ WHERE is\_deliver\_on\_time = 'F'; |
| USE express;  -- 查询上个月的账单  -- 简单的账单=客户+地址+欠款 SELECT \* FROM Bill\_1;  -- 按服务类型列出费用的账单 SELECT \* FROM Bill\_2;   -- 列出每批货物及其费用的明细账单 SELECT \* FROM Bill\_3; |

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| 你对自己工作的贡献以及你对他人工作的贡献 |
| 该综合性实验全由本人完成。 |