Primary Key is underlined, Foreign Key is in *italic*.
only one carnival running in a particular day.

RM CARNIVALS

UNF

CARNIVAL (Carnival_Date, Carnival_Location, Carnival_Director, Event_offered, {sponsor_name, sponsor_naming, sponsor_amount, sponsor_conPerson, sponsor_conPhone})

step 1: remove repeating groups

CARNIVAL (Carnival_Date, Carnival_Location, Carnival_Director, Event_offered, sponsor_name)

SPONSOR(Sponsor_name, sponsor_naming, sponsor_amount, sponsor_conPerson, sponsor_conPhone)

step2: create an associate entity to store multi-valve attribute Event_offered

EVENT (Carnival_Date, Event_offered)

1NF

CARNIVAL (Carnival_Date, Carnival_Location, Carnival_Director, S*ponsor_name*)

EVENT (Event_offered, *Carnival_Date*,)

SPONSOR (Sponsor_name, *Carnival_Date*, sponsor_naming, sponsor_amount, sponsor_conPerson, sponsor_conPhone)

No partial dependency, and no transitive dependency. Therefore, the 1NF is automatically in 2NF and 3NF

different competitors can fill in the same emergency contact and guardian

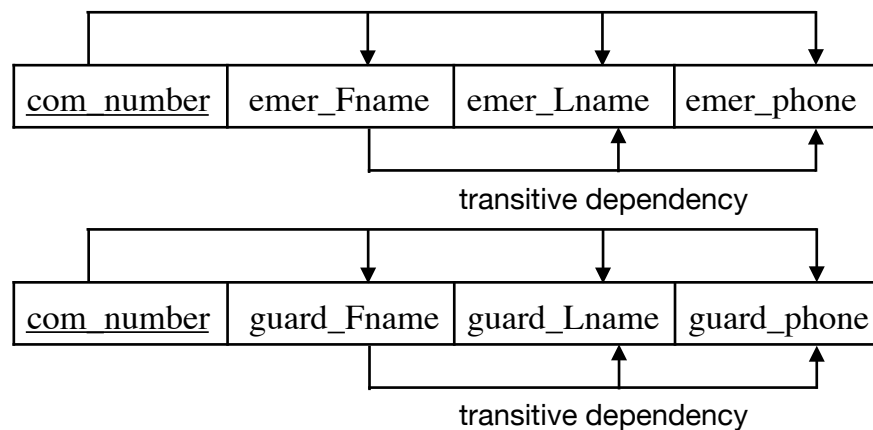## COMPETITOR REGISTRATION

UNF

COMPETITOR (com_number, com_Fname, com_Lname, com_ gender, com_DOB, com_email, com_ uniStu, com_phone, medical_aware, medical_area, emer_Fname, emer_Lname, emer_phone, emer_relation, guard_Fname, guard_Lname, guard_Phone)

step1: create an associate entity to store multi-valve attribute medical_area

1NF

COMPETITOR (com_number, com_Fname, com_Lname, com_ gender, com_DOB, com_email, com_ uniStu, com_phone, medical_aware, emer_Fname, emer_Lname, emer_phone, emer_relation, guard_Fname, guard_Lname, guard_Phone)

MEDICAL (com_number, medical_area)

| com_number | emer_Fname | emer_Lname | emer_phone |

transitive dependency

| com_number | guard_Fname | guard_Lname | guard_phone |

transitive dependency

No partial dependency, so 1NF is 2NF

3NF

COMPETITOR (com_number, com_Fname, com_Lname, com_ gender, com_DOB, com_email, com_ uniStu, com_phone, medical_aware, emer_relation, *emer_Fname, emer_Lname, guard_Fname, guard_Lname*)

MEDICAL (*com_number*, medical_area)

EMERGENCY (emer_Fname, emer_Lname, emer_phone)

GUARDIAN (guard_Fname, guard_Lname, guard_Phone)
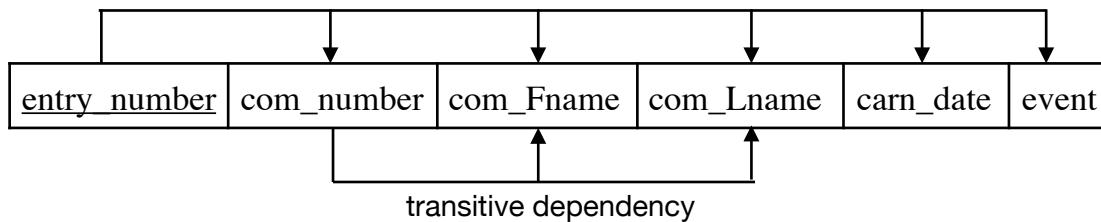
ENTRY REGISTRATION

assume entry number is unique across carnivals, one competitor can be assigned with several entry numbers across carnivals

UNF

ENTRANT (entry_number, com_number, com_Fname, com_Lname, carnival_date, event)

1NF

ENTRANT (<u>entry_number</u>, com_number, com_Fname, com_Lname, carnival_date, event)

<u>entry_number</u>	com_number	com_Fname	com_Lname	carn_date	event

transitive dependency

since there is no partial dependency, 1NF is automatically in 2NF. For 3NF, we should remove transitive dependency.

3NF

ENTRANT (<u>entry_number</u>, carnival, event, *com_number*)

COMPETITOR (<u>com_number</u>, com_Fname, com_Lname)

TEAM REGISTRATION

UNF

TEAM (team_name, carnival, team_manager_entry)

1NF

TEAM (<u>team_manager_entry</u>, carnival, team_name)

no partial dependency and transitive dependency, so 1 NF is in 2NF and 3NF
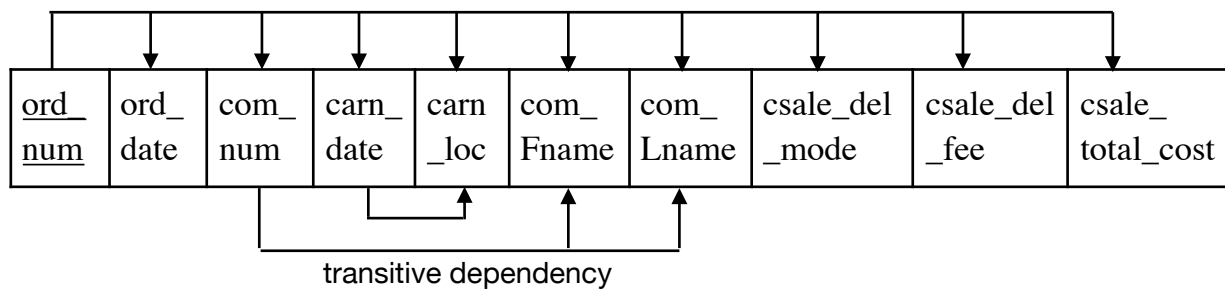
COMPETITOR MERCHANDISE

assume order number is unique across date and carnivals. Delivery fee is dependent on both delivery mode and number of items ordered

UNF

C_SALE (order_number, order_date, carnival_date, carnival_location, competitor _number, com_Fname, com_Lname, csale_delivery_mode, csale_delivery_fee, csale_total_cost, {item_code, item_des, item_cost, item_qty, item_linecost})
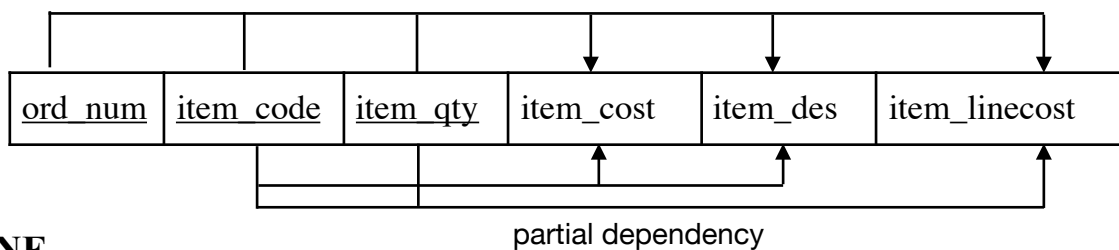
1NF

C_SALE (order_number, order_date, carnival_date, carnival_location, competitor _number, com_Fname, com_Lname, csale_delivery_mode, csale_delivery_fee, csale_total_cost)

ord_num	ord_date	com_num	carn_date	carn_loc	com_Fname	com_Lname	csale_del_mode	csale_del_fee	csale_total_cost

transitive dependency

C_ORDER (*order_num*, item_code, item_qty, item_cost, item_des, item_linecost)

ord_num	item_code	item_qty	item_cost	item_des	item_linecost

partial dependency

2NF

C_ORDER(order_num, *item_code*, item_qty)

C_LINE (*Item_code*, item_qty, item_linecost,)

C_ITEM (item_code, item_des, item_cost)

C_SALE (<u>order_number</u>, order_date, carnival_date, carnival_location, competitor _number, com_Fname, com_Lname, csale_delivery_mode, csale_delivery_fee, csale_total_cost)

3NF

C_SALE (<u>order_number</u>, order_date, *carnival_date*, *competitor _number*, csale_delivery_mode, csale_delivery_fee, csale_total_cost)

CARNIVAL (<u>carnival_date</u>, carnival_location)

COMPETITOR (<u>competitor _number</u>, com_Fname, com_Lname)

C_ORDER(<u>order_num</u>, *item_code*, <u>item_qty</u>)

C_LINE (*Item_code*, <u>item_qty</u>, item_linecost,)

C_ITEM (<u>item_code,</u> item_des, item_cost)
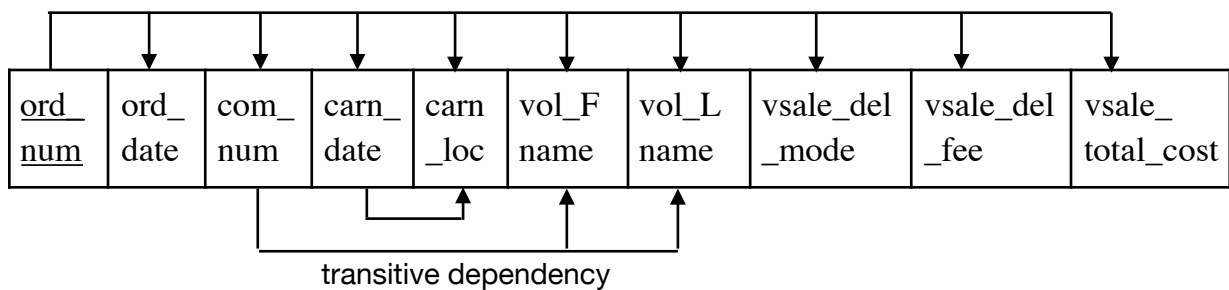
VOLUNTEER MERCHANDISE

assume order number is unique across date and carnivals

UNF

V_SALE (order_number, order_date, carnival_date, carnival_location, volunteer_number, vol_Fname, vol_Lname, vsale_delivery_mode, vsale_delivery_fee, vsale_total_cost, {item_code, item_des, item_cost, item_qty, item_linecost})
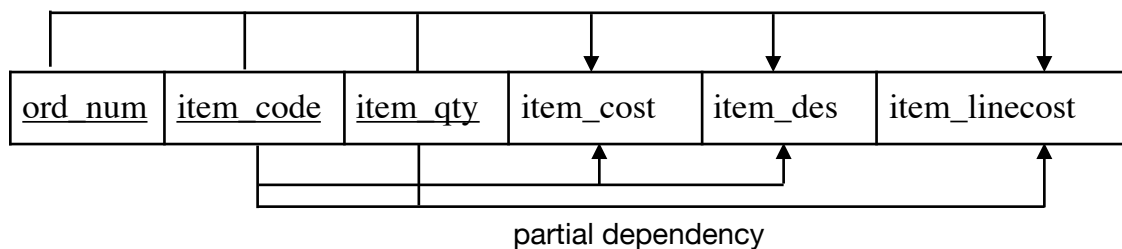
1NF

V_SALE (order_number, order_date, carnival_date, carnival_location, volunteer_number, vol_Fname, vol_Lname, vsale_delivery_mode, vsale_delivery_fee, vsale_total_cost)

ord_num	ord_date	com_num	carn_date	carn_loc	vol_F name	vol_L name	vsale_del_mode	vsale_del_fee	vsale_total_cost

transitive dependency

V_ORDER (*order_number*, item_code, item_qty, item_cost, item_des, item_linecost)

ord_num	item_code	item_qty	item_cost	item_des	item_linecost

partial dependency

2NF6

V_ORDER(order_num, *item_code*, item_qty)

V_LINE (*Item_code*, item_qty, item_linecost,)

V_ITEM (item_code, item_des, item_cost)

V_SALE (<u>order_number</u>, order_date, carnival_date, carnival_location, competitor _number, vol_Fname, vol_Lname, vsale_delivery_mode, vsale_delivery_fee, vsale_total_cost)

3NF

V_SALE (<u>order_number</u>, order_date, *carnival_date*, *competitor _number*, csale_delivery_mode, csale_delivery_fee, csale_total_cost)

CARNIVAL (<u>carnival_date</u>, carnival_location)

VOLUNTEER(<u>volunteer _number</u>, vol_Fname, vol_Lname)

V_ORDER(<u>order_num</u>, *<u>item_code</u>*, <u>item_qty</u>)

V_LINE (*<u>Item_code</u>*, <u>item_qty</u>, item_linecost,)

V_ITEM (<u>item_code,</u> item_des, item_cost)