Student ID: 33878897
Student Name: Muhammad Mubashir Shah

UNF (Unnormalized Form)

CRUISE (cruise_id, cruise_name, cruise_cost_per_person,(port_code, port_name, port_latitude, port_longitude, country_code, country_name, departure_arrival, datetime))

1NF (First Normal Form)

CRUISE (cruise_id, datetime. cruise_name, cruise_cost_per_person, port_code, port_name, port_latitude, port_longitude, country_code, country_name, departure_arrival)

Candidate Keys (CKs):
- cruise_id, datetime
- port_code, datetime

Partial Dependencies:
cruise_id → cruise_name, cruise_cost_per_person
port_code → port_name, port_latitude, port_longitude, country_code, country_name

2NF (Second Normal Form)

CRUISE (cruise_id, cruise_name, cruise_cost_per_person)

PORT (port_code, port_name, port_latitude, port_longitude, country_code, country_name)

CRUISE_PORT_VISIT (cruise_id, datetime, port_code, departure_arrival)

Transitive Dependencies:
country_code → country_name (in PORT).

3NF (Third Normal Form)
CRUISE (cruise_id, cruise_name, cruise_cost_per_person)

PORT (port_code, port_name, port_latitude, port_longitude, country_code)

COUNTRY (country_code, country_name)

CRUISE_PORT_VISIT (<u>cruise_id</u>, <u>datetime</u>, port_code, departure_arrival)

Full Dependencies:
<u>cruise_id</u> → cruise_name, cruise_cost_per_person
<u>port_code</u> → port_name, port_latitude, port_longitude, country_code
<u>country_code</u> → country_name
<u>cruise_id</u>, <u>datetime</u> → port_code, departure_arrival

Final 3NF Relations
CRUISE (<u>cruise_id</u>, cruise_name, cruise_cost_per_person)

PORT (<u>port_code</u>, port_name, port_latitude, port_longitude, country_code)

COUNTRY (<u>country_code</u>, country_name)

CRUISE_PORT_VISIT (<u>cruise_id</u>, <u>datetime</u>, port_code, departure_arrival)