**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 (cruise\_id, datetime, port\_code, departure\_arrival)

**Full Dependencies:**

cruise\_id → cruise\_name, cruise\_cost\_per\_person

port\_code → port\_name, port\_latitude, port\_longitude, country\_code

country\_code → country\_name

cruise\_id, datetime → port\_code, departure\_arrival

**Final 3NF Relations**

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 (cruise\_id, datetime, port\_code, departure\_arrival)