|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| Mineral | Mineral general information. This table is related cell\_parameters\_and\_morphology  cleavage photo  colour photo\_mineral radioactivity\_and\_electromagnetism  common\_impurities streak\_and\_tenacity  fracture transparency  twining  luminescent colour ID  lustre | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| mineral\_name | Unique ID | Text | PK | Unique, not NULL | pyrite |
| Mineral\_formula | Chemical formula symbol | text |  |  | FeS |
| Crystal\_system | System name | text |  |  | trigonal |
| Streak\_color\_ID | From colour\_ID table | Integer | FK |  | 1 |
| Maximum\_hardness | number | real |  |  | 6.5 |
| minimum\_hardness | number | real |  |  | 4 |
| maximum\_specific\_gravity | number | real |  |  | 7.7 |
| minimum\_specific\_gravity real | number | real |  |  | 14 |
| tenacity | English description | Text |  |  | brittle |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| cell\_parameters\_and\_morphology | Cell parameters and morphology  Relate to mineral | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| morphology | Description of mineral | text |  |  | Typically cubic or pyritohedral. |
| Mineral name | Name  From mineral table | text | FK | Not NULL | pyrite |
| a | Cell length | real |  |  | 2.8 |
| b | Cell length | real |  |  | 1.88 |
| c | Cell length | real |  |  | 5.768 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| lustre\_ID | lustre\_ID relate to lustre | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| lustre\_ID | Unique ID | Auto Integer | PK | Unique, not NULL | 1 |
| lustre | Mineral’s lustre | Text |  | Not NULL, unique | metallic |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| lustre | Mineral lustre, relate to mineral and lustre\_ID | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| mineral\_name | Mineral name from mineral table | text | FK | not NULL | pyrite |
| Lustre\_ID | Umber from lustre\_ID table | integer | FK | Not NULL | 1 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| Colour\_ID | colour\_ID relate to mineral and colour | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| Colour\_ID | Unique ID | Auto Integer | PK | Unique, not NULL | 1 |
| colour | Mineral colour | text |  | Not NULL, unique | yellow |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| Colour | Mineral colour, relate to mineral and colour\_ID | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| Mineral\_name | Mineral name from mineral table | text | FK | not NULL | pyrite |
| Colour\_ID | ID from colour\_ID table | integer | FK | Not NULL | 1 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| common\_impurities | Mineral common impurities, relate to mineral | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| Mineral\_name | Mineral name from mineral table | text | FK | not NULL | pyrite |
| impurities | impurities | text |  |  | Cr |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| luminescent | Mineral luminescent type and colour | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| Mineral\_name | Mineral name from mineral table | text | FK | not NULL | pyrite |
| Colour\_ID | ID from colour\_ID table | integer | FK |  | 1 |
| luminescent\_description | Luminescent type | Date |  |  | Fluorescent under UV |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| fracture\_ID | fracture\_ID relate to fracture | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| fracture\_ID | Unique ID | Auto Integer | PK | Unique, not NULL | 1 |
| fracture | Mineral fracture | text |  | Not NULL, unique | conchoidal |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| fracture | Mineral fracture, relate to mineral and fracture\_ID | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| Mineral\_name | Mineral name from mineral table | text | FK | not NULL | pyrite |
| fracture\_ID | ID from fracture\_ID table | integer | FK | Not NULL | 1 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| cleavage\_ID | cleavage\_ID relate to mineral cleavage | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| cleavage\_ID | Unique ID | Auto Integer | PK | Unique, not NULL | 1 |
| cleavage | Mineral cleavage | text |  | Not NULL, unique | poor |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| cleavage | Mineral cleavage, relate to mineral and fracture\_ID | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| Mineral\_name | Mineral name from mineral table | text | FK | not NULL | pyrite |
| cleavage\_ID | ID from cleavage\_ID table | integer | FK | Not NULL | 1 |
| miller\_indices | number | integer |  |  | 001 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| radioactivity\_and\_electromagnetism | Radioactivity and electromagnetism of minerals, relate to mineral. | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| Mineral\_name | Mineral name from mineral table | text | FK | not NULL | pyrite |
| Radioactivity | Radioactivity of minerals | Text |  |  | yes |
| electromagnetism | Electromagnetism of minerals | Text |  |  | yes |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| transparency | Transparency of minerals, relate to minerals | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| Mineral\_name | Mineral name from mineral table | text | FK | not NULL | pyrite |
| transparency | Transparency of minerals | text |  | Not NULL | opaque |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| twining\_ID | twining\_ID relate to mineral twining | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| twining\_ID | Unique ID | Auto Integer | PK | Unique, not NULL | 1 |
| twining | Mineral twining | text |  | Not NULL, unique | interpenetrating |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| twining | Mineral twining, relate to mineral and twining\_ID | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| Mineral\_name | Mineral name from mineral table | text | FK | not NULL | pyrite |
| twining\_ID | ID from twining\_ID table | Integer | FK | not NULL | 1 |
| Twining\_name | name | text |  |  | Iron Cross Law |
| miller\_indices | number | integer |  |  | 110 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| photo | Mineral photos, relate to user\_ID, and location\_ID | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| photo\_ID | Unique ID | Auto Integer | PK | Unique, not NULL | 1 |
| user\_ID | Name from user table | text | FK | not NULL | Tovano |
| photo | image | blob |  | Not null |  |
| location\_ID | ID from location table | integer | FK |  | 1 |
| dimension | Dimension of mineral | text |  |  | 3cm x 2cm x 1cm |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| photo\_mineral | Interconnect photos and minerals relate to twining\_ID and photo\_ID and mineral | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| Mineral\_name | Mineral name from mineral table | text | FK |  | quartz |
| photo\_ID | ID from photo table | integer | FK | not NULL | 1 |
| Twining\_name | name | text |  |  | Japan twin law |
| Other\_name | Mineral var | text |  |  | amethyst |
| twining\_ID | ID from twining\_ID table | Integer | FK |  | 1 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| user | User name relate to photo\_ID | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| user\_ID | Unique ID | text | PK | Unique, not NULL | Tovano |
| photo\_ID | ID from photo table | integer | FK | unique | 1 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Entity Name | Entity Description | | | | |
| location | location relate to photo table | | | | |
| Field Name | Description | Datatype | Key Field | Constraints | Example |
| Location\_ID | Unique ID | Auto Integer | PK | Unique, not NULL | 1 |
| location | Location name | text |  | not NULL unique | karaka |
| country | Country name | text |  | Not null | New Zealand |

Analysis of Design Process and Use Cases

During my database proposal, I choose a topic about minerals. My initial idea is about helping collectors to identify their mineral and its locality. So, based on this, I choose a lot of entities that indicate the properties of minerals. For example, minerals’ physical and chemical properties, their optical data, photos and the localities.

Because I limited my database as a tool to gain information only on the properties of minerals, so things like mineral store, mineral museums, and time and locations of mineral conventions will not be in the scope of my project. Basically, the database is only design for academic uses.

**Use-cases**

Gallery

* User View the mineral gallery
* Select the photo of a mineral base on its localities
* see the description of the specimen
* Description will include the name of the uploaders and the mineral locality details

As a user, I want to able to view a mineral gallery so I know what they look like.

As a user, I want to able to view a mineral’s photos base on its localities so I know where it is from.

As a user, I want to able to see a description of the photo about the mineral so I can understand the of the specimen.

As a user, I want to able to see who upload the photo, so I can view his profile to see more of his work.

Users

* Able to create account
* Able to upload photos of minerals and this description
* Able to add new locality and its detail
* Able to see his profile with his upload history

As a user, I want to create an account so I can upload photo.

As a user, I want to able to input the locality and the detail of the photo so other users will know the specimen’s locality.

As a user, I want to able to add new locality into the database so other user can know about this location.

As a user, I want to have a profile so I can see the history of my uploaded photos, and localities.

Mineral information

* Able to search the details of minerals by its name
* A mineral’s information will be divided into different sections base on different properties

As a user, I want be able to search the detail of the mineral by its name so I can see the mineral information.

As a user, I want to able to see different information are separate into different section, so it is easier for me to gain the information.

Locality information

* Photo of the locations
* All the minerals that were found in this location
* The characteristic of minerals found in this location

As a user, I want to able see photos of the locations so where I go there, I can locate it.

As a user, I want to see all the minerals that can be find there so I know what I expect.

As a user, I want to know what characteristic of the mineral that produce in this locality so it help me to identify my specimen.

The process of building my system will start with the database. First, I will need to list all the entities. There, I separate the database into 7 entities.

* **General information about the mineral**

**Mineral name (Primary key string)**

Formula

Hardness

Specific gravity

Crystal system

Type locality (Location of the minerals when they first being discover.)

* **Physical properties**

**Mineral name (Foreigner key string)**

Luster (String)

Transparency (String)

Color (String)

Streak (String)

Hardness (Float)

Tenacity (String)

Cleavage (String)

Fracture (String)

Specific gravity (float)

Radioactivity (String)

Luminescent (String)

Electromagnetism (String)

* **Chemical properties**

**Mineral name (Foreigner key string)**

Formula (String)

Common Impurities (String)

Solubility (string)

Blowpipe tests (String)

Acid reaction (String)

* **Crystallography**

**Mineral name (Foreigner key String)**

Crystal system (String)

Cell Parameters (float)

Morphology (Block)

Twinning (String)

Crystal forms (String)

* **User (Two tables)**

**User name (String Primary key)**

**User upload picture ID (Integer foreigner key)**

* **Photo (Two table**

**Photo ID (Integer Primary key)**

**Location ID (Integer foreigner key)**

**User name (String Foreigner key)**

**Mineral name (String foreigner key)**

Description (string)

* **Location (Two tables)**

**Locality ID (integer Primary key)**

I have also identified the attributes and its type, and including the primary and foreigner keys in each entity. I have removed the optical data entity and also some of the attributes from crystallography. This is largely because these measurements can not or having being done on most mineral.

I have also added a entity called the “general information of mineral”, the reason for this is to avoid to duplicate identical primary key, in this case is the mineral name.

