

```
In [3]: # Fill in student ID and name
#
student_id = "223737376"
student_first_last_name = "Nawal"
print(student_id, student_first_last_name)
```

223737376 Nawal

```
In [4]: """
        Firebase Realtime database demonstration.
        """

# Install libraries, if not yet.
! pip install firebase_admin pandas

import firebase_admin
from firebase_admin import credentials

databaseURL = "https://sit225n-default-rtdb.asia-southeast1.firebaseio.com/"
cred_obj = credentials.Certificate("sit225n-firebase-adminsdk-fbsvc-85b5c435df.jsn")

# Check if default app already exists
if not firebase_admin._apps:
    default_app = firebase_admin.initialize_app(cred_obj, {
        'databaseURL': databaseURL
    })
```

Defaulting to user installation because normal site-packages is not writeable
Requirement already satisfied: firebase_admin in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (7.1.0)
Requirement already satisfied: pandas in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (2.3.1)
Requirement already satisfied: cachecontrol>=0.14.3 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from firebase_admin) (0.14.3)
Requirement already satisfied: google-api-core<3.0.0dev,>=2.25.1 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from google-api-core[grpc]<3.0.0dev,>=2.25.1; platform_python_implementation != "PyPy"->firebase_admin) (2.25.1)
Requirement already satisfied: google-cloud-firestore>=2.21.0 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from firebase_admin) (2.21.0)
Requirement already satisfied: google-cloud-storage>=3.1.1 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from firebase_admin) (3.2.0)
Requirement already satisfied: pyjwt>=2.10.1 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from pyjwt[crypto]>=2.10.1->firebase_admin) (2.10.1)
Requirement already satisfied: httpx==0.28.1 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from httpx[http2]==0.28.1->firebase_admin) (0.28.1)
Requirement already satisfied: anyio in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from httpx==0.28.1->httpx[http2]==0.28.1->firebase_admin) (4.10.0)
Requirement already satisfied: certifi in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from httpx==0.28.1->httpx[http2]==0.28.1->firebase_admin) (2025.8.3)
Requirement already satisfied: httpcore==1.* in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from httpx==0.28.1->httpx[http2]==0.28.1->firebase_admin) (1.0.9)
Requirement already satisfied: idna in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from httpx==0.28.1->httpx[http2]==0.28.1->firebase_admin) (3.10)
Requirement already satisfied: h2<5,>=3 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from httpx[http2]==0.28.1->firebase_admin) (4.2.0)
Requirement already satisfied: googleapis-common-protos<2.0.0,>=1.56.2 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from google-api-core<3.0.0dev,>=2.25.1->google-api-core[grpc]<3.0.0dev,>=2.25.1; platform_python_implementation != "PyPy"->firebase_admin) (1.70.0)
Requirement already satisfied: protobuf!=3.20.0,!3.20.1,!4.21.0,!4.21.1,!4.21.2,!4.21.3,!4.21.4,!4.21.5,<7.0.0,>=3.19.5 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from google-api-core<3.0.0dev,>=2.25.1->google-api-core[grpc]<3.0.0dev,>=2.25.1; platform_python_implementation != "PyPy"->firebase_admin) (6.31.1)
Requirement already satisfied: proto-plus<2.0.0,>=1.22.3 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from google-api-core<3.0.0dev,>=2.25.1->google-api-core[grpc]<3.0.0dev,>=2.25.1; platform_python_implementation != "PyPy"->firebase_admin) (1.26.1)
Requirement already satisfied: google-auth<3.0.0,>=2.14.1 in c:\users\jalmi\appdata

\\local\\packages\\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\\localcache\\local-packages\\python313\\site-packages (from google-api-core<3.0.0dev,>=2.25.1->google-api-core[grpc]<3.0.0dev,>=2.25.1; platform_python_implementation != "PyPy"->firebase_admin) (2.40.3)

Requirement already satisfied: requests<3.0.0,>=2.18.0 in c:\\users\\jalmi\\appdata\\local\\packages\\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\\localcache\\local-packages\\python313\\site-packages (from google-api-core<3.0.0dev,>=2.25.1->google-api-core[grpc]<3.0.0dev,>=2.25.1; platform_python_implementation != "PyPy"->firebase_admin) (2.32.4)

Requirement already satisfied: grpcio<2.0.0,>=1.33.2 in c:\\users\\jalmi\\appdata\\local\\packages\\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\\localcache\\local-packages\\python313\\site-packages (from google-api-core[grpc]<3.0.0dev,>=2.25.1; platform_python_implementation != "PyPy"->firebase_admin) (1.74.0)

Requirement already satisfied: grpcio-status<2.0.0,>=1.33.2 in c:\\users\\jalmi\\appdata\\local\\packages\\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\\localcache\\local-packages\\python313\\site-packages (from google-api-core[grpc]<3.0.0dev,>=2.25.1; platform_python_implementation != "PyPy"->firebase_admin) (1.74.0)

Requirement already satisfied: cachetools<6.0,>=2.0.0 in c:\\users\\jalmi\\appdata\\local\\packages\\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\\localcache\\local-packages\\python313\\site-packages (from google-auth<3.0.0,>=2.14.1->google-api-core<3.0.0dev,>=2.25.1->google-api-core[grpc]<3.0.0dev,>=2.25.1; platform_python_implementation != "PyPy"->firebase_admin) (5.5.2)

Requirement already satisfied: pyasn1-modules>=0.2.1 in c:\\users\\jalmi\\appdata\\local\\packages\\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\\localcache\\local-packages\\python313\\site-packages (from google-auth<3.0.0,>=2.14.1->google-api-core<3.0.0dev,>=2.25.1->google-api-core[grpc]<3.0.0dev,>=2.25.1; platform_python_implementation != "PyPy"->firebase_admin) (0.4.2)

Requirement already satisfied: rsa<5,>=3.1.4 in c:\\users\\jalmi\\appdata\\local\\packages\\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\\localcache\\local-packages\\python313\\site-packages (from google-auth<3.0.0,>=2.14.1->google-api-core<3.0.0dev,>=2.25.1->google-api-core[grpc]<3.0.0dev,>=2.25.1; platform_python_implementation != "PyPy"->firebase_admin) (4.9.1)

Requirement already satisfied: hyperframe<7,>=6.1 in c:\\users\\jalmi\\appdata\\local\\packages\\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\\localcache\\local-packages\\python313\\site-packages (from h2<5,>=3->httpx[http2]==0.28.1->firebase_admin) (6.1.0)

Requirement already satisfied: hpack<5,>=4.1 in c:\\users\\jalmi\\appdata\\local\\packages\\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\\localcache\\local-packages\\python313\\site-packages (from h2<5,>=3->httpx[http2]==0.28.1->firebase_admin) (4.1.0)

Requirement already satisfied: h11>=0.16 in c:\\users\\jalmi\\appdata\\local\\packages\\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\\localcache\\local-packages\\python313\\site-packages (from httpcore==1.*->httpx==0.28.1->httpx[http2]==0.28.1->firebase_admin) (0.16.0)

Requirement already satisfied: charset_normalizer<4,>=2 in c:\\users\\jalmi\\appdata\\local\\packages\\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\\localcache\\local-packages\\python313\\site-packages (from requests<3.0.0,>=2.18.0->google-api-core<3.0.0dev,>=2.25.1->google-api-core[grpc]<3.0.0dev,>=2.25.1; platform_python_implementation != "PyPy"->firebase_admin) (3.4.3)

Requirement already satisfied: urllib3<3,>=1.21.1 in c:\\users\\jalmi\\appdata\\local\\packages\\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\\localcache\\local-packages\\python313\\site-packages (from requests<3.0.0,>=2.18.0->google-api-core<3.0.0dev,>=2.25.1->google-api-core[grpc]<3.0.0dev,>=2.25.1; platform_python_implementation != "PyPy"->firebase_admin) (2.5.0)

Requirement already satisfied: pyasn1>=0.1.3 in c:\\users\\jalmi\\appdata\\local\\packages\\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\\localcache\\local-packages\\python313\\site-packages (from rsa<5,>=3.1.4->google-auth<3.0.0,>=2.14.1->google-api-core<3.0.0dev,>=2.25.1->google-api-core[grpc]<3.0.0dev,>=2.25.1; platform_python_implementation != "PyPy"->firebase_admin) (0.6.1)

Requirement already satisfied: numpy>=1.26.0 in c:\\users\\jalmi\\appdata\\local\\packages\\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\\localcache\\local-packages\\pyt

hon313\site-packages (from pandas) (2.3.2)
 Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from pandas) (2.9.0.post0)
 Requirement already satisfied: pytz>=2020.1 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from pandas) (2025.2)
 Requirement already satisfied: tzdata>=2022.7 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from pandas) (2025.2)
 Requirement already satisfied: msgpack<2.0.0,>=0.5.2 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from cachecontrol>=0.14.3->firebase_admin) (1.1.1)
 Requirement already satisfied: google-cloud-core<3.0.0,>=1.4.1 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from google-cloud-firestore>=2.21.0->firebase_admin) (2.4.3)
 Requirement already satisfied: google-resumable-media<3.0.0,>=2.7.2 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from google-cloud-storage>=3.1.1->firebase_admin) (2.7.2)
 Requirement already satisfied: google-crc32c<2.0.0,>=1.1.3 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from google-cloud-storage>=3.1.1->firebase_admin) (1.7.1)
 Requirement already satisfied: cryptography>=3.4.0 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from pyjwt[crypto]>=2.10.1->firebase_admin) (45.0.6)
 Requirement already satisfied: cffi>=1.14 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from cryptography>=3.4.0->pyjwt[crypto]>=2.10.1->firebase_admin) (1.17.1)
 Requirement already satisfied: pycparser in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from cffi>=1.14->cryptography>=3.4.0->pyjwt[crypto]>=2.10.1->firebase_admin) (2.22)
 Requirement already satisfied: six>=1.5 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from python-dateutil>=2.8.2->pandas) (1.17.0)
 Requirement already satisfied: sniffio>=1.1 in c:\users\jalmi\appdata\local\packages\pythonsoftwarefoundation.python.3.13_qbz5n2kfra8p0\localcache\local-packages\python313\site-packages (from anyio->httpx==0.28.1->httpx[http2]==0.28.1->firebase_admin) (1.3.1)

```
In [5]: from firebase_admin import db

# A reference point is always needed to be set
# before any operation is carried out on a database.
#
ref = db.reference("/")

# JSON format data (key/value pair)
data = { # Outer {} contains inner data structure
    "Book1":
        {
            "Title": "The Fellowship of the Ring",
            "Author": "J.R.R. Tolkien",
            "Genre": "Epic fantasy",
            "Price": 100
        },

```

```

    "Book2":
    {
        "Title": "The Two Towers",
        "Author": "J.R.R. Tolkien",
        "Genre": "Epic fantasy",
        "Price": 100
    },
    "Book3":
    {
        "Title": "The Return of the King",
        "Author": "J.R.R. Tolkien",
        "Genre": "Epic fantasy",
        "Price": 100
    },
    "Book4":
    {
        "Title": "Brida",
        "Author": "Paulo Coelho",
        "Genre": "Fiction",
        "Price": 100
    }
}

# JSON format data is set (overwritten) to the reference
# point set at /, which is the root node.
#
ref.set(data)

```

In [18]: `ref = db.reference("/") # set ref point`

```

# query all data under the ref
books = ref.get()
print(books)
print(type(books))

# print each item separately
for key, value in books.items():
    print(f"{key}: {value}")

# Query /Book1
ref = db.reference("/Book1")
books = ref.get()
print(books)

```

```
{'Book1': {'Author': 'J.R.R. Tolkien', 'Genre': 'Epic fantasy', 'Price': 100, 'Title': 'The Fellowship of the Ring'}, 'Book2': {'Author': 'J.R.R. Tolkien', 'Genre': 'Epic fantasy', 'Price': 100, 'Title': 'The Two Towers'}, 'Book3': {'Author': 'J.R.R. Tolkien', 'Genre': 'Epic fantasy', 'Price': 100, 'Title': 'The Return of the King'}, 'Book4': {'Author': 'Paulo Coelho', 'Genre': 'Fiction', 'Price': 100, 'Title': 'Brida'}}
<class 'dict'>
Book1: {'Author': 'J.R.R. Tolkien', 'Genre': 'Epic fantasy', 'Price': 100, 'Title': 'The Fellowship of the Ring'}
Book2: {'Author': 'J.R.R. Tolkien', 'Genre': 'Epic fantasy', 'Price': 100, 'Title': 'The Two Towers'}
Book3: {'Author': 'J.R.R. Tolkien', 'Genre': 'Epic fantasy', 'Price': 100, 'Title': 'The Return of the King'}
Book4: {'Author': 'Paulo Coelho', 'Genre': 'Fiction', 'Price': 100, 'Title': 'Brida'}
{'Author': 'J.R.R. Tolkien', 'Genre': 'Epic fantasy', 'Price': 100, 'Title': 'The Fellowship of the Ring'}
```

```
In [19]: # Write using push() function
# Note that a set() is called on top of push()
#
ref = db.reference("/")
ref.set({
    "Books":
        {
            "Best_Sellers": -1
        }
})

ref = db.reference("/Books/Best_Sellers")

for key, value in data.items():
    ref.push().set(value)
```

```
In [20]: # Update data
# Requirement: The price of the books by
# J. R. R. Tolkien is reduced to 80 units to
# offer a discount.

ref = db.reference("/Books/Best_Sellers/")
best_sellers = ref.get()
print(best_sellers)

for key, value in best_sellers.items():
    if value["Author"] == "J.R.R. Tolkien":
        ref.child(key).update({"Price": 80})
```

```
{'-OYBU4G9oR0LVUPkt30q': {'Author': 'J.R.R. Tolkien', 'Genre': 'Epic fantasy', 'Price': 100, 'Title': 'The Fellowship of the Ring'}, '-OYBU4K5QQ11l15lr3-L': {'Author': 'J.R.R. Tolkien', 'Genre': 'Epic fantasy', 'Price': 100, 'Title': 'The Two Towers'}, '-OYBU4NpeyRP3kowe0Xe': {'Author': 'J.R.R. Tolkien', 'Genre': 'Epic fantasy', 'Price': 100, 'Title': 'The Return of the King'}, '-OYBU4RZJ-qZBBQIxnU': {'Author': 'Paulo Coelho', 'Genre': 'Fiction', 'Price': 100, 'Title': 'Brida'}}
```

```
In [21]: # Let's delete all best seller books
# with J.R.R. Tolkien as the author.

ref = db.reference("/Books/Best_Sellers")
best_sellers = ref.get() # refresh the data
```

```
for key, value in best_sellers.items():  
    if value["Author"] == "J.R.R. Tolkien":  
        ref.child(key).set({})
```

```
In [22]: # Delete all best_seller data.  
ref = db.reference("/Books/Best_Sellers/")  
ref.set({})
```

```
In [ ]: ref = db.reference("/Books/Best_Sellers")  
ref.set({})
```