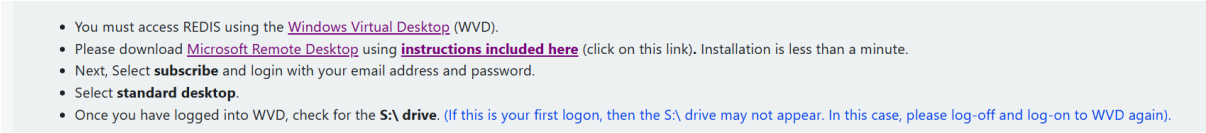
Redis is an open-source key-value NoSQL database that stores its database entirely in the memory, using computer storage to ensure data persistence. As it works primarily from memory (in-memory database), it is extremely fast. It has a client-server architecture with one server capable of serving multiple clients. Redis supports a rich set of data types such as list, set and hashes. Redis can be used for applications that require support for messaging-queues (Publish/Subscribe) and for any short-lived data such as web application sessions, web page hit counts, etc. The number of Redis databases is fixed, and set in the configuration file. By default, you have 16 databases. Each database is identified by a number (not a name) – enter command INFO.

1. Configuration

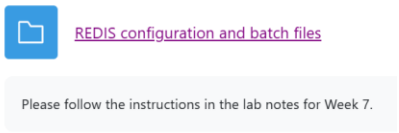
- Login through Exeter Virtual Device (WVD). Refer to **Week 7 ELE** for further information.

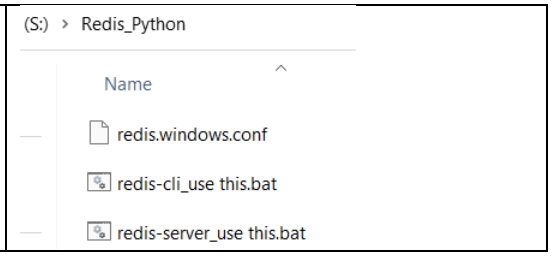


- Locate S:\ Drive
- Create two folders directly under **S:\ Drive**.

Redis *Redis_Python*	

- Copy the following three files (**available under Week 7 ELE**) to the folder "Redis_Python"



redis.windows.conf *redis-cli_use this.bat* *redis-server_use this.bat*	

- Start Redis server first by clicking ***redis-server_use this.bat***
- Then start Redis client by clicking ***redis-cli_use this.bat***
- To test server-client connectivity, issue the command "PING" through the **Redis-client**. You will receive the response "PONG" if connectivity has been established. You are now ready to start!
- Test commands:

Redis 127.0.0.1:6379> INFO
Redis 127.0.0.1:6379> SELECT 1 (database 0-16)
Redis 127.0.0.1:6379> DBSIZE (returns the number of keys in the selected database)

2. Data Types

Redis key commands are used for managing keys. The commands are indicated in brown font.

Redis prompt> COMMAND KEY_NAME

Note: For help with Redis commands use HELP followed by the COMMAND name

- **Redis prompt>** HELP COMMAND

String

A Redis string is a sequence of bytes. Key is *name*. Value is a String *"BEMM459 REDIS Tutorial"*.
Redis 127.0.0.1:6379> SET name "BEMM459 REDIS Tutorial"
Redis 127.0.0.1:6379> **GET** name

Note: To return all keys from the selected database using *pattern* (including ? and *)

- **Redis prompt>** **KEYS** *pattern*

Hashes – used to represent objects

A Redis hash is a collection of key-value pairs. It sets the specified fields to their respective values in the ***hash stored at key***.

- The command overwrites any specified fields already present in the *hash*.
- If a key does not exist, a new key holding a hash is created.
- Syntax: HMSET key field value [field value ..]

In the example below, the key storing the hash is *student:1*. Hash data type is used to store the student object, which contains basic information about the student (fields: name, course, module1).
Redis 127.0.0.1:6379> HMSET student:1 name "Hello World" course "MSc Business Analytics" module1 "BEMM459"

Use HGET to return the value associated with one field in the hash stored at key *student:1*.
Redis 127.0.0.1:6379> HGET student:1 name
Redis 127.0.0.1:6379> HGET student:1 course
Redis 127.0.0.1:6379> HGET student:1 module1

Use HGETALL To return all fields and values of the hash stored at key *student:1*.
Redis 127.0.0.1:6379> HGETALL student:1

Lists

Redis Lists are lists of strings, sorted by insertion order. You can add elements to a Redis List on the head (LPUSH) or on the tail (RPUSH).
Redis 127.0.0.1:6379> LPUSH BEMM459 SQLite (the list is "SQLite")
Redis 127.0.0.1:6379> LPUSH BEMM459 Redis (the list is "Redis", "SQLite")
Redis 127.0.0.1:6379> LPUSH BEMM459 MongoDB (the list is "MongoDB", "Redis", "SQLite")
Redis 127.0.0.1:6379> RPUSH BEMM459 Neo4J (the list is "MongoDB", "Redis", "SQLite", "Neo4J")
Redis 127.0.0.1:6379> RPUSH BEMM459 Cassandra (the list is "MongoDB", "Redis", "SQLite", "Neo4J", "Cassandra")
Redis 127.0.0.1:6379> **LRANGE** BEMM459 **0 4**

Sets

Redis Sets are an unordered collection of string. A set has "unique" property (no duplicate values allowed).
Redis 127.0.0.1:6379> SADD MSc_BA:BEMM459_Assessment "Assignment @ 60%"
Redis 127.0.0.1:6379> SADD MSc_BA:BEMM459_Assessment "Final Exam @ 40%"
Redis 127.0.0.1:6379> SADD MSc_BA:BEMM459_Assessment "Final Exam @ 40%" (repeating)
Redis 127.0.0.1:6379> **SMEMBERS** MSc_BA:BEMM459_Assessment

Sorted Sets

Redis Sorted Sets are non-repeating collections of Strings. However, every member of a Sorted Set is associated with a score, that is used in order the strings from the smallest to the greatest score. While members are unique, the scores may be repeated.
Redis 127.0.0.1:6379> ZADD MSc_BA:Students 0 "Student A"
Redis 127.0.0.1:6379> ZADD MSc_BA:Students 0 "Student B"
Redis 127.0.0.1:6379> ZADD MSc_BA:Students 5 "Student X"
Redis 127.0.0.1:6379> ZADD MSc_BA:Students 1 "Student Y"

Redis 127.0.0.1:6379> ZADD MSc_BA:Students 1 “Student Y” (repeating)
Redis 127.0.0.1:6379> ZADD MSc_BA:Students 2 “Student Z”
Redis 127.0.0.1:6379> **ZRANGEBYSCORE** MSc_BA:Students **0 100**

3. Other Commands

GETRANGE
Redis GETRANGE command is used to get the substring of the string value stored at the key, determined by the offsets start and end (both are inclusive). Negative offsets provide an offset starting from the end of the string (-1 means the last character).
Redis 127.0.0.1:6379> SET name "Hello World"
Redis 127.0.0.1:6379> **GETRANGE** name **0 4**
Redis 127.0.0.1:6379> **GETRANGE** name **5 -2**

KEYS
Redis KEYS command is used to search keys with a matching pattern.

Redis 127.0.0.1:6379> SET name “Hello”
Redis 127.0.0.1:6379> SET name1 “Hello1”
Redis 127.0.0.1:6379> **KEYS** name* (wild card)

- Note: To get a list of all the keys available in Redis, use only * (KEYS *)
- Note: RANDOMKEY command is used to get a random key from the database.

APPEND
Append value to a key.

Redis 127.0.0.1:6379> SET name “Hello”
Redis 127.0.0.1:6379> APPEND name “World” (returns the length of the string after the append operation)
Redis 127.0.0.1:6379> **GET** name

EXISTS
Redis EXISTS command is used to check whether the key exists in Redis or not. Returns 1, if the key exists. Returns 0, if the key does not exist.

Redis 127.0.0.1:6379> EXISTS Key_name

RENAME
Redis RENAME command is used to change the name of a key. It returns an error if the old key and the new key names are equal, or when the key does not exist. If the new key already exists, then it overwrites the existing key.

Redis 127.0.0.1:6379> RENAME Key_name Key_name_new

DEL
The command deletes a key, if it exists.
Redis 127.0.0.1:6379> DEL Key_name

(use command **FLUSHDB** to delete all keys from the current database)

GETSET
Sets the specified string value in Redis key and returns its old value.

Redis 127.0.0.1:6379> GETSET BEMM459:Marks **50** (if the key does not exisit then (nil) is returned)
Redis 127.0.0.1:6379> GETSET BEMM459:Marks **70** (sets the new value 70 and returns the old value 50)

SETNX
Sets the specified string value only if key does not exist. **SET** if **N**ot e**X**ists.

Redis 127.0.0.1:6379> SETNX BEMM459:FinalMarks **50**
Redis 127.0.0.1:6379> SETNX BEMM459: FinalMarks **70**
Redis 127.0.0.1:6379> **GET** BEMM459: FinalMarks (returns 50)

- Note: use MSETNX to set multiple keys to multiple values, only if none of the keys exist.

MSET
Sets given keys to their respective values, replacing existing values with new values (like SET).
Redis 127.0.0.1:6379> MSET key1 *val1* Key 2 *val2*

- Note: use MSETNX if you don't want to overwrite existing values.

MGET
Gets the value of all specified keys.

Redis 127.0.0.1:6379> MGET key1 key2

SETEX and TTL
Redis SETEX command is used to set some string value with a specified timeout in Redis key (in seconds). Redis TTL command is used to get the remaining time of the key expiry in seconds.
Syntax: SETEX KEY_NAME **TIMEOUT** VALUE
Syntax: TTL KEY_NAME

Redis 127.0.0.1:6379> SETEX UOE:StudentGuild:user34 **60** pen
Redis 127.0.0.1:6379> TTL UOE:StudentGuild:user34

- The command returns -2 if the key does not exist. The command returns -1 if the key exists but has no associated expire.

Redis 127.0.0.1:6379> **GET** UOE:StudentGuild:user34 (returns **(nil)** after timeout)

- Note: PSETEX command is used to set the value of a key, with the expiration of time in milliseconds (use PTTL).
- Note: use INFO command to check keys that are set to expire in db0, db1 etc.

EXPIRE
Redis Expire command is used to set the expiry of a key. After the expiry time, the key will not be available in Redis.
Redis 127.0.0.1:6379> SET name "Hello World"
Redis 127.0.0.1:6379> EXPIRE name 45
Redis 127.0.0.1:6379> TTL name
Note: use PEXPIRE command to set the expiry in milliseconds (use PTTL).

EXPIREAT
Redis Expireat command is used to set the expiry of key in Unix timestamp format. After the expiry time, the key will not be available in Redis.
Syntax: EXPIREAT KEY_NAME **TIME_IN_UNIX_TIMESTAMP**
Convertor: https://www.epochconverter.com/

Redis 127.0.0.1:6379> SET name "Hello World"
Redis 127.0.0.1:6379> EXPIREAT name 1740562915
Redis 127.0.0.1:6379> TTL name

- Note: use PEXPIREAT command to set the expiry in milliseconds - TIME_IN_MILLISECONDS_IN_UNIX_TIMESTAMP (use PTTL).

PERSIST
Redis PERSIST command is used to remove the expiration from the key. The return value is either 1 or 0.
Syntax: PERSIST KEY_NAME

Redis 127.0.0.1:6379> SET name "Hello World"
Redis 127.0.0.1:6379> EXPIRE name **120**
Redis 127.0.0.1:6379> TTL name
Redis 127.0.0.1:6379> PERSIST name
Redis 127.0.0.1:6379> TTL name (-1 indicates that the key does not have associated timeout)

INCR
Redis INCR command is used to increment the integer value of a key by one. If the key does not exist, it is set to 0 before performing the operation. An error is returned, if the key contains a value of the wrong type or contains a string that cannot be represented as an integer

Redis 127.0.0.1:6379> SET BEMM459:Total_Students **10**
Redis 127.0.0.1:6379> INCR BEMM459:Total_Students

INCRBY

Redis INCRBY command is used to increment the integer value of a key by a specified value. If the key does not exist, it is set to 0 before performing the operation. An error is returned, if the key contains a value of the wrong type or contains a string that cannot be represented as an integer.

Redis 127.0.0.1:6379> INCRBY BEMM459:Total_Students **5**

DECR

Redis DECR command is used to decrease the value of a key by one.
Redis 127.0.0.1:6379> DECR BEMM459:Total_Students

DECRBY

Redis DECRBY command is used to decrease the value of a key by a specified value.
Redis 127.0.0.1:6379> DECR BEMM459:Total_Students **5**

MOVE

Redis MOVE command is used to move a key from the currently selected database to the specified destination database. Return 1 if the key is moved. Returns 0 if the key is not moved.
Syntax: MOVE KEY_NAME DESTINATION_DATABASE

Redis 127.0.0.1:6379> SET mykey “helloworld”
Redis 127.0.0.1:6379> MOVE mykey 0 (or other db like 1,4, 12)

- Note: Use INFO command before and after to check move.

SAVE

Redis BGSAVE command is invoked to manually save data. The “BG” in BGSAVE indicates that the save occurs in the background.

Redis 127.0.0.1:6379> BGSAVE

EXIT

Redis QUIT command is invoked to quit the database.

Redis 127.0.0.1:6379> QUIT

References:

- *https://redis.io/commands*
- *https://www.tutorialspoint.com/*

/End

(Updated Feb 2025)