MySQL Data Types

- Numeric
- String
- Date and Time
- Other
  - Spatial
  - JSON

Numeric

- Exact Value
  - Integer: INTEGER (INT), SMALLINT, TINYINT, MEDIUMINT, BIGINT
  - Fixed-point: DECIMAL (NUMERIC)
- Approximate Value
  - Floating-point: FLOAT, DOUBLE
- Bit:
  - BIT

Numeric

- Exact Value
  - Integer
    - TINYINT (1 byte of storage): e.g., 127
    - SMALLINT: e.g., 32767
    - MEDIUMINT: e.g., 8388607
    - INTEGER (INT): e.g., 2147483647
    - BIGINT: e.g., 2^{63}-1

Numeric

- Exact Value
  - Fixed-point: DECIMAL (NUMERIC)
    - DECIMAL(5, 2): any number from -999.99 to 999.99
    - DECIMAL(9, 1): e.g., 12345678.9
    - Maximum number of digits: 65

Numeric

- Approximate Value (Floating-Point)
  - FLOAT(p), 0 <= p <= 24
    - e.g., 1/3 in decimal form 0.333333….
  - DOUBLE: equivalent to FLOAT(p), 25 <= p <= 53
    - e.g., '1e+52', '-1e+52'

Numeric

- BIT
  - BIT(6): e.g.. b'000101'
  - BIT(3): e.g.. b'011'

String

- CHAR, VARCHAR
- NCHAR, NVARCHAR
- BINARY, VARBINARY
- BLOB, TEXT
- ENUM
- SET

String

- CHAR: max size 255
- VARCHAR: max size 65535

Value	CHAR(4)	Storage Required	VARCHAR(4)	Storage Required
''	' '	4 bytes	''	1 byte
'ab'	'ab '	4 bytes	'ab'	3 bytes
'abcd'	'abcd'	4 bytes	'abcd'	5 bytes
'abcdefgh'	'abcd'	4 bytes	'abcd'	5 bytes

String

- BINARY, VARBINARY: Stores binary (byte) strings
  - e.g 01001000011001010110110001101100011011110 (equivalent of ASCII text 'Hello')

String

- TEXT (size): similar to VARCHAR, but size is required
  - TINYTEXT
  - TEXT
  - MEDIUMTEXT
  - LONGTEXT
- BLOB (size): similar to VARBINARY, but size is required
  - TINYBLOB
  - BLOB
  - MEDIUMBLOB
  - LONGBLOB

String

- BLOB: use to store binary data like images, sounds, videos, word processor documents, spreadsheets

String

ENUM: allows one value from pre-defined list

```
CREATE TABLE `film` (
  `film_id` smallint(5) unsigned NOT NULL AUTO_INCREMENT,
  `title` varchar(128) NOT NULL,
     …
  `rating` enum('G','PG','PG-13','R','NC-17') DEFAULT 'G',
  `special_features` set('Trailers','Commentaries','Deleted
     Scenes','Behind the Scenes') DEFAULT NULL,
     …
```

String

ENUM

```
CREATE TABLE shirts (
	name VARCHAR(40),
	size ENUM('x-small', 'small', 'medium', 'large', 'x-large')
);


INSERT INTO shirts (name, size)
VALUES ('dress shirt','large'), ('t-shirt','medium'), ('polo
	shirt','small');
```

String

SET: allows zero or more values from pre-defined list

```
CREATE TABLE `film` (
  `film_id` smallint(5) unsigned NOT NULL AUTO_INCREMENT,
  `title` varchar(128) NOT NULL,
     …
  `rating` enum('G','PG','PG-13','R','NC-17') DEFAULT 'G',
  `special_features` set('Trailers','Commentaries','Deleted
     Scenes','Behind the Scenes') DEFAULT NULL,
     …
```

String

SET

```
CREATE TABLE myset (col SET('a', 'b', 'c', 'd'));

INSERT INTO myset (col) VALUES ('a,d'), ('d,a'),
('a,d,a'), ('a,d,d'), ('d,a,d');
```

All rows show up as 'a, d'

Date and time

- DATE
- DATETIME
- TIMESTAMP
- TIME
- YEAR

Date and time

- DATE: e.g., '2020-02-17'
  - Range: '1000-01-01' to '9999-12-31'
- DATETIME: e.g., '2020-02-17 18:30:35.000000'
  - Range: '1000-01-01 00:00:00' to '9999-12-31 23:59:59'
- TIMESTAMP: e.g., '2020-02-17 18:30:35.000000'
  - Range: '1970-01-01 00:00:01' UTC to '2038-01-19 03:14:07' UTC.
  - Stored in database as UTC (universal time)
  - Stored as the number of seconds since the Unix epoch ('1970-01-01 00:00:00' UTC)

Date and time

- TIME: e.g., '18:30:35.000000'
- YEAR(4): e.g., 2020
- YEAR(2): e.g., 69 (treated as 2069), 79 (treated as 1979)
  - Year values in the range 00-69 become 2000-2069.
  - Year values in the range 70-99 become 1970-1999.

MySQL Data Type Reference

- MySQL 8.0 Reference Manual Chapter 11

- w3schools.com MySQL Data Types (Version 8.0)