SQL

- SQL server is Microsoft's relational database management system.
- SQL primary function of the software system is storing and retrieving data.
- Microsoft SQL server is designed and developed by the Microsoft itself.
- It is Open-source language.

DATABASE

- A database is an organized collection of data, typically stored and accessed electronically from a computer system or electronic device.
- Types of DATABASES
    1. Hierarchical--→ Directory structure
    2. Flat file--→ CSV, EXCEL, Delimited
    3. Relational--→ SQL Server, Oracle, MySQL and more

DTATA TYPES

- An attribute that specifies the types of data an object can hold.

TYPES OF DATA TYPES

- Unicode characters string
- Numeric
- Approximate number
- String datatype

- Comment is an informational message in SQL server.

DATA

- All the things which are around us is considered as a data, either it can be in a soft form or in hard form.

DECLARE

- It helps us to assign a variable of a data tab.

SET

- It helps us to the variable for holding the values.

SELECT

- Select statement is used to print the value in SQL.

@TEMP

- It is said that this is a temporary variable.

NUMERIC DATATYPE

INTEGER

1. Tiny integer
2. Smal lint
3. Integer
4. Big int
5. Float
6. Decimal

TINY INTEGER

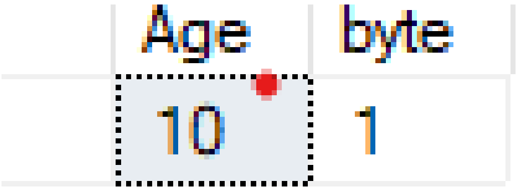
- It can store the values between ZERO (0) to 255.
- It will take ONE BYTE information to store this data type.

- @ = temp
- Empid = Variable name
- @empid =temporary variable name
- Alias = temp name

DATALENGTH

- Data length is a function in SQL Server. It helps us to understand the value. What bytes of space take a particular data in our memory.

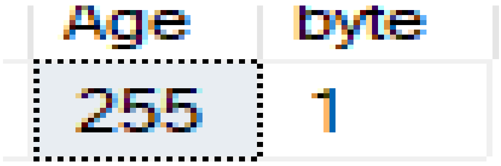
```
1.

declare @val tinyint
set @val = 10
select @val as Age ,datalength (@val) as byte
```



Age	byte
10	1

2.

```
declare @val tinyint
set @val=255
select @val as Age,DATALENGTH(@val) as byte
```

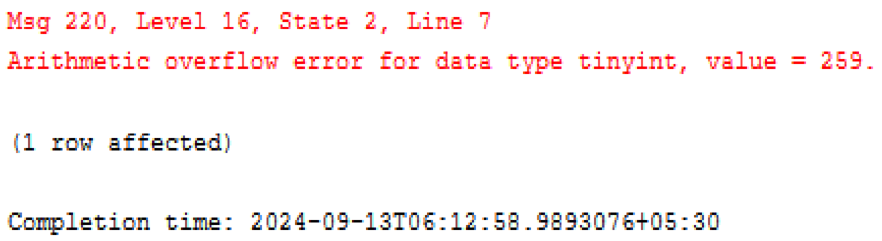


Age	byte
255	1

- In tinyint more than 255 is doesn’t work.

3.

```
declare @val tinyint
set @val=259
select @val as Age,DATALENGTH(@val) as byte
```



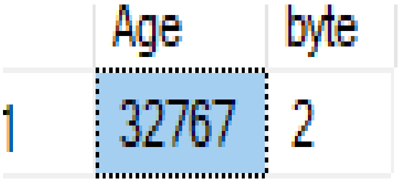
```
Msg 220, Level 16, State 2, Line 7
Arithmetic overflow error for data type tinyint, value = 259.

(1 row affected)

Completion time: 2024-09-13T06:12:58.9893076+05:30
```

SMALL INTEGER

- Range of the value is between zero -32768 to 32768.
- It will take 2 BYTES to store a particular information/ or one single record.

1.

```
declare @val smallint
set @val=32767
select @val as Age,DATALENGTH(@val) as byte
```



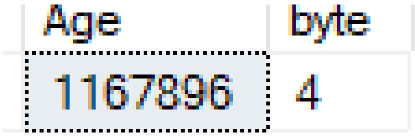
	Age	byte
1	32767	2

INTEGER

- Integer follow the range between -2,147,483,648 to 2,147,483,647.
- It takes 4 BYTES to store the single information.

1.

```
declare @val int
set @val=1167896
select @val as Age,DATALENGTH(@val) as byte
```

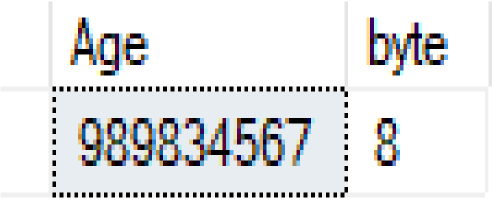


Age	byte
1167896	4

BIG INT

- Big int range is between – 9,223,372,036,854,775,808 to 9,223,372,036,854,775,807.
- It takes 8 BYTES to store one value.

```
declare @val bigint
set @val=989834567
select @val as Age,DATALENGTH(@val) as byte
```

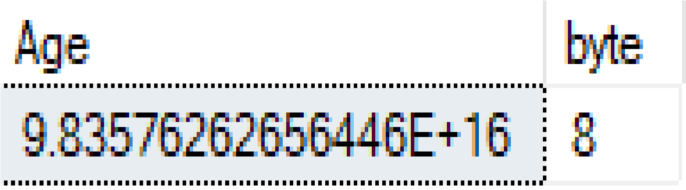


Age	byte
989834567	8

FLOAT

- We can store numeric value and decimal value in float data types.
- It will take 8 BYTES to store a single record.
- The float data in SQL Server can store the value up to the 15 number of lengths.

```sql
declare @val float
set @val=98357626265644646
select @val as Age,DATALENGTH(@val) as byte
```



Age	byte
9.83576262656446E+16	8

DECIMAL

- Decimal can hold the values between the range is :-

PRECISION	STORAGE BYTES
1. 1-9	5
2. 10-19	9
3. 20-28	13
4. 29-38	17

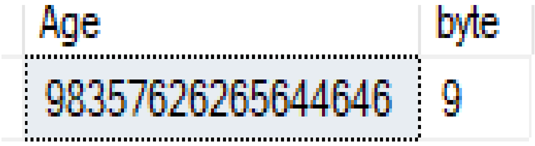
- The highest value, what we can store in a decimal up to 38 number of lengths towards the left and right, including the point.
- PRECISION means the no of value towards the left and towards the right.

EG- 10.23

- SCALE VALUE is all the values which comes towards the right of a decimal point.

1.

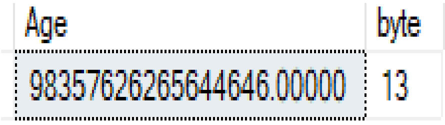
```
declare @val decimal (38,0)
set @val=98357626265644646
select @val as Age,DATALENGTH(@val) as byte
```



Age	byte
98357626265644646	9

2.

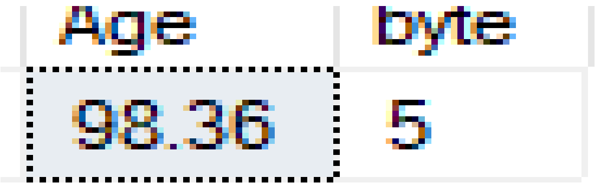
```
declare @val decimal (38,5)
set @val=98357626265644646
select @val as Age,DATALENGTH(@val) as byte
```



Age	byte
98357626265644646.00000	13

3.

```
declare @val decimal (38,2)
set @val=98.357626265644646
select @val as Age,DATALENGTH(@val) as byte
```



Age	byte
98.36	5

STRING

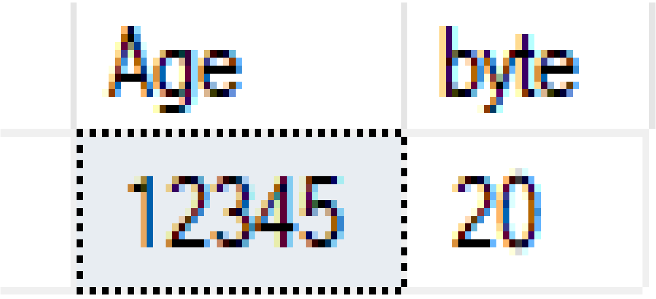
- In SQL Server, there are two types of string: -
    1. CHR(Character)
    2. VARCHAR

CHARACTER

- The character holds the information, which is numeric, which is spatial and alphabets.
- It is an information which is stored within a single code, no double codes.
- It is fixed length of datatype.
- It Will take one byte of space to store one character information.
- The max length of character is 8000.
- Extra waste of space is known as static memory allocation.

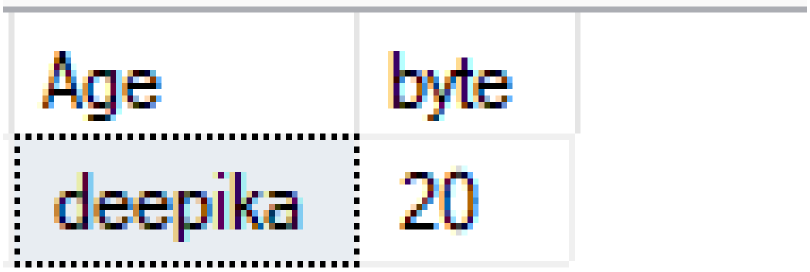
1.

```
declare @val char (20)
set @val='12345'
select @val as Age,DATALENGTH(@val) as byte
```



Age	byte
12345	20

```
2.
declare @val char (20)
set @val='deepika'
select @val as Age,DATALENGTH(@val) as byte
```



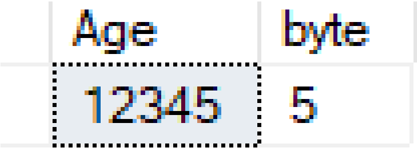
Age	byte
deepika	20

VARCHAR

- The varchar is advance of a character it’s known as a, it’s dynamic memory.
- Varchar max length is: - 1 to 8000.
- It is Variable length data type.
- It has Dynamic memory allocation.
- It takes 1 BYTE per character to store a information.

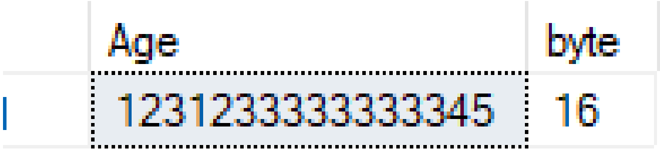
1.

```
declare @val varchar (20)
set @val='12345'
select @val as Age,DATALENGTH(@val) as byte
```



Age	byte
12345	5

```
1.
declare @val varchar (max)
set @val='1231233333333345'
select @val as Age,DATALENGTH(@val) as byte
```



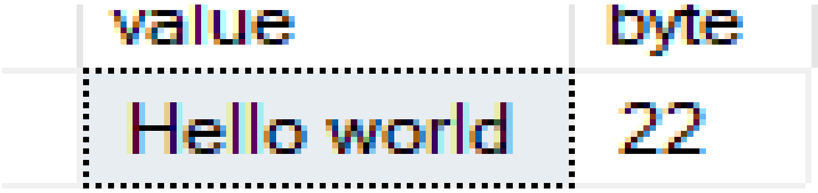
Age	byte
1231233333333345	16

NVARCHAR

- N CHAR ---→alph’s
- Nvarchar has dynamic memory allocation.
- It has max length of character is 0 to 4000.
- It has variable length data type.
- It takes 2 BYTES to store per character.
- It gives number of character *2.

1.

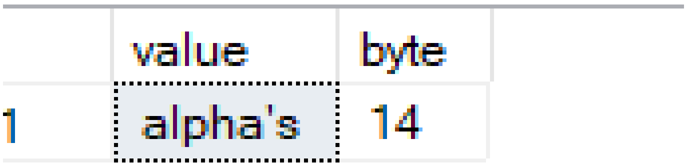
```
declare @val nvarchar(100)
set @val ='Hello world'
select @val as value,DATALENGTH(@val) as byte
```



value	byte
Hello world	22

2.

```
declare @val nvarchar(11)
set @val ='alpha''s'
select @val as value,DATALENGTH(@val) as byte
```



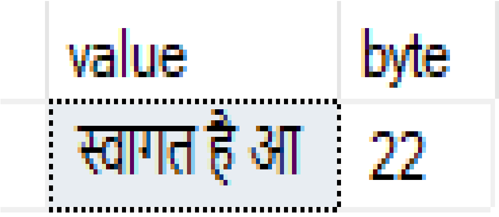
	value	byte
1	alpha's	14

UNICODE LANGUAGE

- In SQL Server, Other than English is Unicode language.
- Storing the Unicode information in SQL Server, then the data type for that would be (n) character.
- The length of n character is (1 – 4000).
- It is fixed length data type.
- It has static memory allocation.
- It takes 2 BYTES per character (One for the data and one for the Unicode information.)

  1.

```
declare @val nchar(11)
set @val = N'स्वागत है आपका'
select @val as value,DATALENGTH(@val) as byte
```



value	byte
स्वागत है आ	22

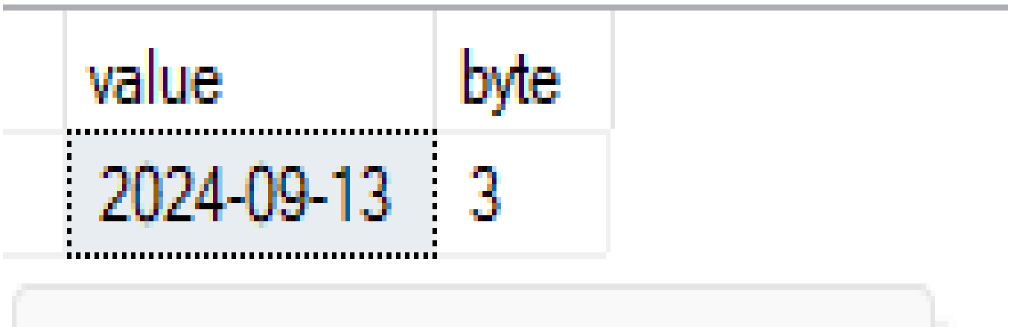
DATE AND TIME AND DATE DATATYPE

DATE

- A date having format: YYYY-MM-DD or MM – DD- YYYY.

1.

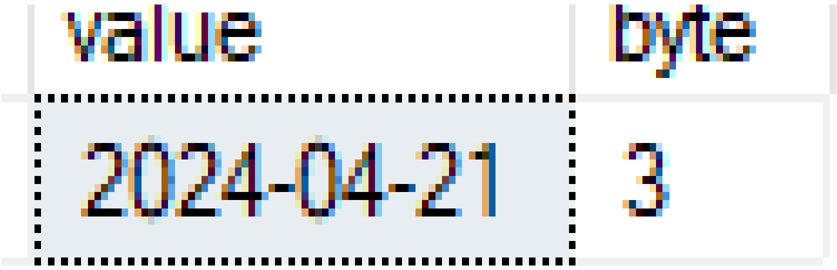
```
declare @val date
set @val = '2024-09-13'
select @val as value,DATALENGTH(@val) as byte
```



value	byte
2024-09-13	3

2.

```
declare @val date
set @val = '04-21-2024'
select @val as value,DATALENGTH(@val) as byte
```



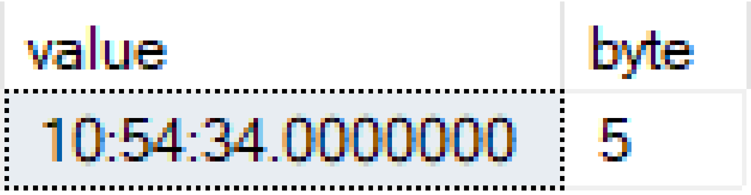
value	byte
2024-04-21	3

TIME

- A time format: -hh : mm : ss.
- In output → Extra 7 values is the millisecond information.

1.

```
declare @val time
set @val = '10:54:34'
select @val as value,DATALENGTH(@val) as byte
```

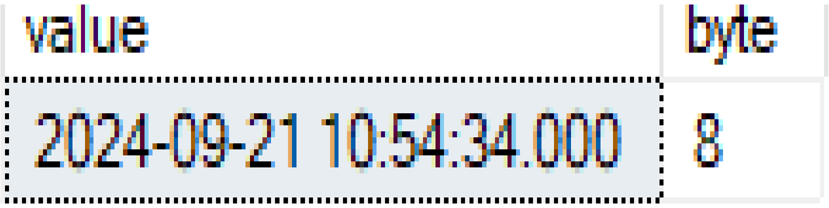


value	byte
10:54:34.0000000	5

DATE AND TIME

- A date and time combination having format: YYYY-MM-DD hh:mm: ss.
- It takes 8 BYTES to store the timestamp.

```
declare @val datetime
set @val = '2024-09-21 10:54:34'
select @val as value,DATALENGTH(@val) as byte
```



value	byte
2024-09-21 10:54:34.000	8