# SQL – Functions – CAST

- CAST is used to convert an expression of one data type to another
- Syntax
  - CAST ( expression AS data_type [ ( length ) ] )

```
-- change a value to text
CAST(count(actorID) AS varchar(50))
-- change a number to text
CAST(5 AS varchar(50))
```



- Arguments
  - expression
    - Any valid expression.
  - data_type
    - Is the target data type (INT, VARCHAR, BIT etc)
  - length
    - Is an optional integer that specifies the length of the target data type. The default value is 30.

In SQL if you want to combine numbers and text, you must CAST the number as text first!

# SQL Functions

DATE, STRING. . .

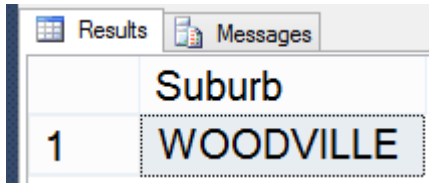
# SQL – Functions – STRING

- Functions are calculations performed by the DBMS
- Common functions include:

| Function | Example | Output |
|---|---|---|
| UPPER(col) | UPPER(Name) | Sam → SAM |
| LOWER(col) | LOWER(Name) | Sam → sam |
| RTRIM(col) | RTRIM(Name) | [Sam ] → [Sam] |
| LTRIM(col) | LTRIM(Name) | [ Sam] → [Sam] |
| LEN(col) | LEN(Name) | Returns int length of string |
| REVERSE(col) | REVERSE(Name) | Sam → maS |



```
SELECT UPPER('Woodville') AS Suburb
```




https://msdn.microsoft.com/en-us/library/ms181984.aspx

# SQL – Functions – STRING

- Functions are calculations performed by the DBMS
- Common functions include:

| Function | Example | Output |
|---|---|---|
| LEFT(string, length) | LEFT('Sam', 2) | Sam → Sa |
| RIGHT(string, length) | Right('Sam', 2) | Sam → am |
| CHARINDEX(string1, string2) | CHARINDEX('FUN', 'FUN with SQL Functions') | 3 |
| SUBSTRING(col, start, length) | SUBSTRING(Name, 1, 1) | Returns char(s) at start position |



CHARINDEX starts from 0 and counts to the length

```
SELECT SUBSTRING(FirstName, 1, 1) AS Initial
```

https://msdn.microsoft.com/en-us/library/ms181984.aspx

# SQL – Functions – SUBSTRING

- Syntax
  - SUBSTRING ( expression ,start , length )
    - Returns part of a character or text in SQL server

```
SELECT SUBSTRING(FirstName, 1, 1) AS Initial
```

- Arguments
  - expression
    - Is a character or text
  - start
    - Is an integer that specifies where the returned characters start.
    - If start is less than 1, the returned expression will begin at the first character that is specified in expression.
    - If start is greater than the number of characters in the value expression, a zero-length expression is returned.
  - length
    - Is a positive integer that specifies how many characters of the expression will be returned.
    - If the sum of start and length is greater than the number of characters in expression, the whole value expression beginning at start is returned.
    - If length is negative, an error is generated and the statement is terminated.



More generous than Java strings!

# SQL – Functions – CHARINDEX

- Syntax
  - CHARINDEX ( expressionToFind ,expressionToSearch [ , start_location ] )
    - Searches an expression for another expression and returns its starting position if found
- Arguments
  - expressionToFind
    - Is a character expression that contains the sequence to be found.
    - expressionToFind is limited to 8000 characters.
  - expressionToSearch
    - Is a character expression to be searched.
  - start_location
    - Is an integer at which the search starts.
    - If start_location is not specified, is a negative number, or is 0, the search starts at the beginning of expressionToSearch.



More generous than Java strings!

# SQL – Functions – STRING

- Working with Strings in SQL is not easy:

```
DECLARE @address varchar(100) = '13 Wayville road, Woodville, SA 5000'

SELECT
  LEFT(@address, CHARINDEX(',', @address) - 1) AS streetAddress,
  LEFT(secondPart, LEN(secondPart) - CHARINDEX(' ', REVERSE(secondPart)) -1) AS suburb,
  RIGHT(secondPart, CHARINDEX(' ', REVERSE(secondPart))) AS state,
  REVERSE(SUBSTRING(REVERSE(@address), 1, 4)) AS postcode
  FROM (
  SELECT
    RTRIM(
          REVERSE(
                SUBSTRING(
                      REVERSE(@address), 6, LEN(@address) - CHARINDEX(',', @address) – 5
                          )
                )
          ) AS secondPart
) AS t1
```



| streetAddress | suburb | state | postcode |
|---|---|---|---|
| 13 Wayville road | Woodville | SA | 5000 |

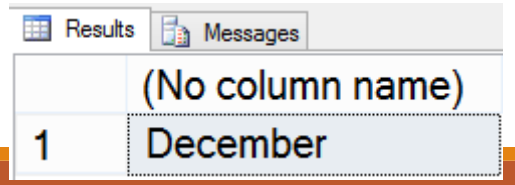
# SQL – Functions – DATE

- Functions are calculations performed by the DBMS
- Common functions include:

| Function | Example | Output |
|---|---|---|
| GETDATE() | | 01/09/2015 |
| DATEPART(datepart, date) | DATEPART(d, GetDate()) | 3 |
| DATENAME(datepart, date) | DATENAME(dw, GetDate()) | Wednesday |
| | DATENAME(m, GetDate()) | September |
| DATEADD(datepart, number, date) | DATEADD(d, 7, GetDate()) | Date 7 days from today! |



- Dateparts:
  - **d** | **m** | **yy/yyyy** => day | month | year number of the calander date
  - **y** |**dy** => day of year (note the difference from yy/yyyy!!!)
  - **dw** returns the day of the week number except when used with DATENAME where it returns the name of the day!
  - **m** will return the name of the month when used with DATENAME
  - Test it out for yourself by placing SELECT before the function
  - SELECT DATENAME(m, '31/Dec/2015')

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# SQL CONTROL – IF and ELSE

- Control statements allow actions to happen depending on a condition
  - The action may involve setting a value
  - The action may involve running a different query

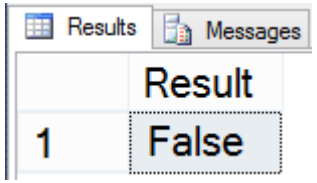


- Basic Syntax

```
IF (<someTrue|FalseCondition>)
-- Do Something

ELSE
-- Do Something Else
```

```
IF (1 = 0)
SELECT 'True' AS Result
ELSE
SELECT 'False' AS Result
```



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```
IF (<someTrue|FalseCondition>)
-- Do Something

ELSE
-- Do Something Else
```

```
IF (1 = 0) -- (false)
SELECT 'Unlikely' AS Result

ELSE IF (1 = 2) -- (false)
SELECT 'Just as Unlikely' AS Result

ELSE
SELECT 'False' AS Result
```

Results | Messages

| | Result |
|---|---|
| 1 | False |

# SQL CONTROL – CASE WHEN

- Control statements allow actions to happen depending on a condition
  - The CASE WHEN statement is similar to if-else but can be used within a query to change a particular value



- Basic Syntax

```
CASE
  WHEN (<someTrue|FalseCondition>)
  THEN -- Do Something

  WHEN (<someTrue|FalseCondition2>)
  THEN -- Do Something a bit different

ELSE
-- Do Something different again
END
```

```
SELECT (
  CASE WHEN (1 = 0) -- (false)
  THEN  'Unlikely'

  WHEN (1 = 2) -- (false)
    THEN  'Just as Unlikely'

  ELSE
     'False'
  END
  )
  AS Result
```

Results | Messages

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| 1 | False |

# SQL CONTROL – CASE WHEN

- Control statements allow actions to happen depending on a condition
  - The CASE WHEN statement is similar to if-else but can be used within a query to change a particular value
  - Example



```
SELECT FirstName, Surname, Salary,
(
CASE WHEN (E.Salary > 75)
THEN  'Over Paid'

WHEN (E.Salary <= 40)
THEN  'Under Paid'

ELSE
 'Adequately Paid'
END
) AS PayConclusion
FROM Employees AS E
```

Single column result called "PayConclusion" with value that depends on the employee salary

Results | Messages

| | FirstName | Surname | Salary | PayConclusion |
|---|---|---|---|---|
| 1 | Alice | Jackson | 46 | Adequately Paid |
| 2 | Charles | Brown | 80 | Over Paid |
| 3 | Charles | White | 36 | Under Paid |
| 4 | Gus | Green | 40 | Under Paid |
| 5 | Jackson | Neri | 45 | Adequately Paid |
| 6 | Laurence | Chen | 73 | Adequately Paid |
| 7 | Mary | Brown | 45 | Adequately Paid |
| 8 | Pauline | Bradshaw | 40 | Under Paid |

Departments(DeptName, Address, City)
Employee(FirstName, Surname, Dept, Office, Salary, City)
FK(Dept) -> Departments(DeptName)

# SQL – NULL replacement Value

- ISNULL is a function that can be used to provide a value when an unknown or NULL value is returned
  - ISNULL(expressionORattribute, replacementValue)
  - Find ALL Simpsons characters and where available their first aired episode else show 'TBA'



```
SELECT CharacterName,
ISNULL(EpisodeName, 'TBA') AS FirstEpisode
FROM Characters C LEFT OUTER JOIN Episodes E
ON C.EpisodeID = E.EpisodeID
```



Results | Messages

| | CharacterName | FirstEpisode |
|---|---|---|
| 1 | "Mayor "Diamond Joe" Quimby | TBA |
| 2 | Blinky | TBA |
| 3 | Homer Simpson | TBA |
| 4 | Mr. Teeny | TBA |
| 5 | Old Jewish Man | TBA |
| 6 | Rabbi Hyman Krustofski | TBA |
| 7 | Sanjay Nahasapeemapetilon | TBA |
| 8 | Veterinarian | TBA |
| 9 | Waylon Smithers | TBA |
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| 14 | Gloria | "A Hunka Hunka Burns in Love |
| 15 | Chase | "A Milhouse Divided" |
| 16 | Rachel Jordan | "Alone Again, Natura-Diddily" |

# SQL – Functions

- Functions are calculations performed by the DBMS

```
SELECT SUBSTRING(FirstName, 1, 1) AS Initial
FROM Employees
```

Is this safe?



```
SELECT
        CASE WHEN LEN(FirstName) > 0 THEN SUBSTRING(FirstName, 1, 1)
        ELSE ''
        END AS Initial
FROM Employees
```





This will work even if FirstName is Empty/NULL

Remember NULL + string = NULL ☹

LEN(NULL) will return Unknown which is not >0 (it is unknown)
Therefore the ELSE will be used and '' will be the initial.

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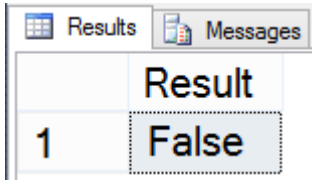

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