Dart – Basics and Data Types

Getting Started

- Dart is easy to learn if you know any of Java, C++, JavaScript, etc.
- The simplest "Hello World" program gives the idea of the basic syntax of the programming language. It is the way of testing the system and working environment.
- There are several ways to run the first program, which is given below:
  - Using Command Line
  - Running on Browser
  - Using IDE

Hello World

```
void main() {
    print("Hello World!");
}
```

Identifiers

- Identifiers are the name which is used to define variables, methods, class, and function, etc.
- An Identifier is a sequence of the letters([A to Z],[a to z]), digits([0-9]) and underscore(_), but remember that the first character should not be a numeric.

Identifiers

- The first character should not be a digit.
- Special characters are not allowed except underscore (_) or a dollar sign ($).
- Two successive underscores (__) are not allowed.
- The first character must be alphabet(uppercase or lowercase) or underscore.
- Identifiers must be unique and cannot contain whitespace.
- They are case sensitive. The variable name Tushar and tushar will be treated differently.

Printing and String Interpolation

- The print() function is used to print output on the console, and $expression is used for the string interpolation. Below is an example.

```
void main()
{
   var name = "Tushar";
   var marks = 78.56;
   print("My name is ${name} My marks are ${marks}");
}
```

Semicolon

- The semicolon is used to terminate the statement that means, it indicates the statement is ended here. It is mandatory that each statement should be terminated with a semicolon(;).
- We can write multiple statements in a single line by using a semicolon as a delimiter. The compiler will generate an error if it is not use properly.
- Example -

```
var msg1 = "Hello World!";
var msg2 = "How are you?"
```

Whitespace and Line Breaks

- The Dart compiler ignores whitespaces. It is used to specify space, tabs, and newline characters in our program.
- It separates one part of any statement from another part of the statement.
- We can also use space and tabs in our program to define indentation and provide the proper format for the program.
- It makes code easy to understand and readable.

Block

- The block is the collection of the statement enclosed in the curly braces. In Dart, we use curly braces to group all of the statements in the block.
- Consider the following syntax.
- Syntax:

```
{ //start of the block
    //block of statement(s)
}// end of the block
```

Comments

- Comments are the set of statements that are ignored by the Dart compiler during the program execution. It is used to enhance the readability of the source code.
- Generally, comments give a brief idea of code that what is happening in the code.
- We can describe the working of variables, functions, classes, or any statement that exists in the code.
- Programmers should use the comment for better practice.

Comments

- Dart provides three kinds of comments
  - Single-line Comments
  - Multi-line Comments
  - Documentation Comments

Single-line Comment

- We can apply comments on a single line by using the // (double-slash). The single-line comments can be applied until a line break.
- Example -

```
void main(){
    // This will print the given statement on screen
    print("Welcome to MITU Skillologies");
}
```

Multi-line Comment

- Sometimes we need to apply comments on multiple lines; then, it can be done by using /*.....*/. The compiler ignores anything that written inside the /*...*/, but it cannot be nested with the multi-line comments. Let's see the following example.
- Example -

```
void main(){
   /* This is the example of multi-line comment
   This will print the given statement on screen */
   print("Welcome to MITU Skillologies");
}
```

Documentation Comment

- The document comments are used to generate documentation or reference for a project/software package. It can be a single-line or multi-line comment that starts with /// or /*. We can use /// on consecutive lines, which is the same as the multiline comment.
- These lines ignore by the Dart compiler expect those which are written inside the curly brackets. We can define classes, functions, parameters, and variables. Consider the following example.
- Syntax

```
///This
///is
///a example of
/// multiline comment
```

Keywords

abstract	continue	new	this	as
false	true	final	null	default
throw	finally	do	for	try
catch	get	dynamic	rethrow	typedef
if	else	return	var	break
enum	void	int	String	double
bool	list	map	implements	set
switch	case	while	static	import
export	in	external	this	super
with	class	extends	is	const
yield	factory			

Data Types

- The data types are the most important fundamental features of programming language.
- In Dart, the data type of the variable is defined by its value.
- The variables are used to store values and reserve the memory location.
- The data-type specifies what type of value will be stored by the variable. Each variable has its data-type.
- The Dart is a static type of language, which means that the variables cannot modify.

Data Types

- Dart supports the following built-in Data types.
  - Number
  - Strings
  - Boolean
  - Lists
  - Maps
  - Runes
  - Symbols

Numbers

- The Darts Number is used to store the numeric values. The number can be two types - integer and double.
- Integer - Integer values represent the whole number or non-fractional values. An integer data type represents the 64-bit non-decimal numbers between -2^{63} to 2^{63}. A variable can store an unsigned or signed integer value. Ex.

  int marks = 80;
- Double - Double value represents the 64-bit of information (double-precision) for floating number or number with the large decimal points. The double keyword is used to declare the double type variable.

  double pi = 3.14;

Strings

- A string is the sequence of the character. If we store the data like - name, address, special character, etc.
- It is signified by using either single quotes or double quotes. A Dart string is a sequence of UTF-16 code units.

```
var msg = "Welcome to MITU";
print("सुस्वागतम");
```

Boolean

- The Boolean type represents the two values - true and false.
- The bool keyword uses to denote Boolean Type.
- The numeric values 1 and 0 cannot be used to represent the true or false value.
- bool isValid = true;

List

- The list is a collection of the ordered objects (value).
- The concept of list is similar to an array. An array is defined as a collection of the multiple elements in a single variable.
- The elements in the list are separated by the comma enclosed in the square bracket[].
- The sample list is given below.

  var list = [1,2,3]

Map

- The maps type is used to store values in key-value pairs. Each key is associated with its value.
- The key and value can be any type. In Map, the key must be unique, but a value can occur multiple times.
- The Map is defined by using curly braces ({}), and comma separates each pair.

  var student = {'name': 'Rajesh', 'age':22, 'Branch': 'Statistics'}

Runes

- As we know that, the strings are the sequence of Unicode UTF-16 code units. Unicode is a technique which is used to describe a unique numeric value for each digit, letter, and symbol.
- Since Dart Runes are the special string of Unicode UTF-32 units. It is used to represent the special syntax.
- For example - The special heart character ♥ is equivalent to Unicode code \u2665, where \u means Unicode, and the numbers are hexadecimal integer.
- If the hex value is less or greater than 4 digits, it places in a curly bracket ({}). For example - An emoji 😀 is represented as \u{1f600}.

Example

```
void main( ){
    var heart_symbol = '\u2665';
    var laugh_symbol = '\u{1f600}';
    print(heart_symbol);
    print(laugh_symbol);
}
```

Symbol

- The Dart Symbols are the objects which are used to refer an operator or identifier that declare in a Dart program.
- It is commonly used in APIs that refers to identifiers by name because an identifier name can changes but not identifier symbols.

Dynamic Type

- Dart is an optionally typed language.
- If the variable type is not specified explicitly, then the variable type is dynamic. The dynamic keyword is used for type annotation explicitly.

Variable Default Value

- While declaring the variable without initializing the value then the Dart compiler provides default value (Null) to the variable.
- Even the numeric type variables are initially assigned with the null value.
- Let's consider the following example.

```
int count;
```

Final and const

- When we do not want to change a variable in the future then we use final and const. It can be used in place of var or in addition to a type.
- A final variable can be set only one time where the variable is a compile-time constant. The example of creating a final variable is given below.
- Example -

```
final name = 'Rashmi';
// final variable without type annotation.
final String msg = 'Hi?';
// final variable with type annotation.
```

Final and const

- The const is used to create compile-time constants. We can declare a value to compile-time constant such as number, string literal, a const variable, etc.

  const a = 1000;

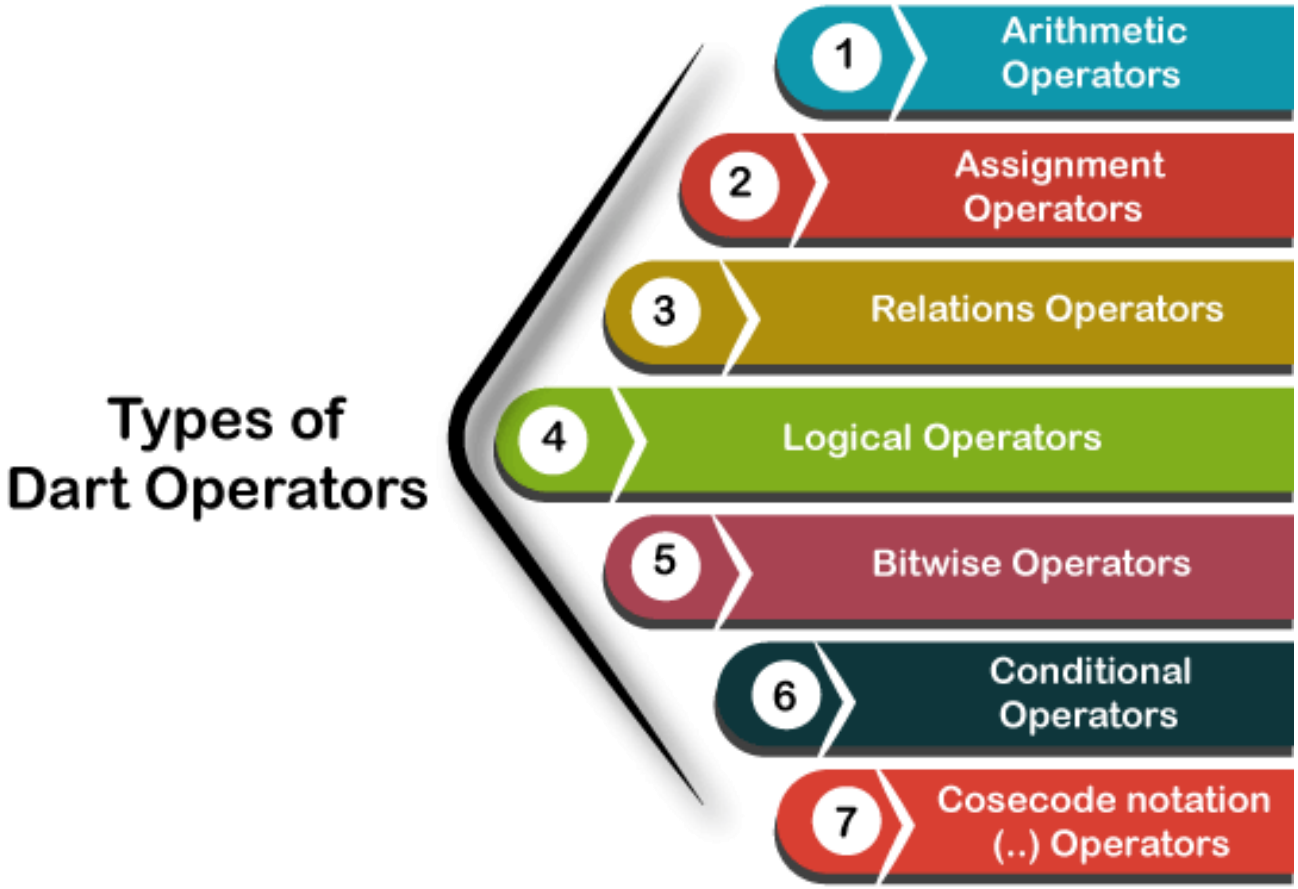
- The const keyword is also used to create a constant value that cannot be changed after its creation.

  var f = const[];

- If we try to change it, then it will throw an error.

  f = [12]; //Error, The const variable cannot be change

Operators


Types of
Dart Operators
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Arithmetic Operators

- +
- -
- *
- /
- %
- Unary –

Arithmetic Operators

```
void main(){
  print("Example of Assignment operators");
  var n1 = 10;
  var n2 = 5;

  print("n1+n2 = ${n1+n2}");
  print("n1-n2 = ${n1-n2}");
  print("n1*n2 = ${n1*n2}");
  print("n1/n2 = ${n1/n2}");
  print("n1%n2 = ${n1%n2}");
}
```

Increment and Decrement

- ++ and -- operators are known as increment and decrement operators and also known as unary operators, respectively.
- Unary operators, operate on single operand where ++ adds 1 to operands and -- subtract 1 to operand respectively.
- The unary operators can be used in two ways - postfix and prefix.
- If ++ is used as a postfix(like x++), it returns the value of operand first then increments the value of x. If -- is used as a prefix(like ++x), it increases the value of x.

Assignment Operators

- =
- +=
- -=
- *=
- ~/=
- %=

Relational Operators

- ==
- !=
- <
- >
- <=
- >=

Bitwise Operators

- AND &
- OR |
- EX-OR ^
- >>
- <<
- ~

Type Test Operators

- as
  - It is used for typecast.
- is
  - It returns TRUE if the object has specified type.
- is!
  - It returns TRUE if the object has not specified type.

Type Test Operators

```
void main()
{
  var num = 10;
  var name = "Skillologies";
  print(num is int);
  print(name is! String );
}
```

Logical Operators

- &&
- ||
- !

Conditional Operators

- The Conditional Operator is same as if-else statement and provides similar functionality as conditional statement.
- It is the second form of if-else statement. It is also identified as "Ternary Operator". The syntax is given below.
- Syntax 1 -

  condition ? exp1 : exp2

  If the given condition is TRUE then it returns exp1 otherwise exp2.

Conditional Operators

- Syntax 2 -

  exp1 ?? expr2

  If the exp1 is not-null, returns its value, otherwise returns the exp2's value.

Conditional Operators

```
void main() {
  var x = null;
  var y = 20;
  var val = x ?? y;
  print(val);
}
```

Conditional Operators

```
void main() {
  var a = 30;
  var output = a > 38 ? "value greater than 10":"value lesser than equal to 30";
  print(output);
}
```

The parse()

- The parse() function converts the numeric string to the number. Consider the following example -

```
void main(){
var a = num.parse("20.56");
var b = num.parse("15.63");
var c = a+b;
print("The sum is = ${c}");
}
```

The number properties

hashcode	It returns the hash code of the given number.
isFinite	If the given number is finite, then it returns true.
isInfinite	If the number infinite it returns true.
isNan	If the number is non-negative then it returns true.
isNegative	If the number is negative then it returns true.
sign	It returns -1, 0, or 1 depending upon the sign of the given number.
isEven	If the given number is an even then it returns true.
isOdd	If the given number is odd then it returns true.

The number methods

abs()	It gives the absolute value of the given number.
ceil()	It gives the ceiling value of the given number.
floor()	It gives the floor value of the given number.
compareTo()	It compares the value with other number.
remainder()	It gives the truncated remainder after dividing the two numbers.
round()	It returns the round of the number.
toDouble()	It gives the double equivalent representation of the number.
toInt()	Returns the integer equivalent representation of the number.
toString()	Returns the String equivalent representation of the number
truncate()	Returns the integer after discarding fraction digits.

Strings

- String is a sequence of the character or UTF-16 code units. It is used to store the text value. The string can be created using single quotes or double-quotes.
- The multiline string can be created using the triple-quotes. Strings are immutable; it means you cannot modify it after creation.
- In Dart, The String keyword can be used to declare the string.

Strings

- String msg = 'Welcome to MITU';

  or
- String msg1 = "This is double-quoted string example.";

  or
- String msg2 = ' ' ' line1

  line2

  line3'''

Strings

- The + or += operator is used to merge the two string.
- String Interpolation
  - The string interpolation is a technique to manipulate the string and create the new string by adding another value.
  - It can be used to evaluate the string including placeholders, variables, and interpolated expression.
  - The ${expression} is used for string interpolation. The expressions are replaced with their corresponding values.
- Properties and Methods

Thank you