RUBY LANGUAGE

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Principles of programming

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(RUBY LANGUAGE)

1. *Developing History of Ruby language*:

1.1990s:

- ***Ruby language was created in the mid of this year by yukihiro "Mats" Matsumoto in japan.***

2.1993:

- ***The development of Ruby began in 1993, when Matsumoto started work on the language as a hobby project.***

3.1995:

- ***The first public release of ruby language, version 0.95 was made in December in this year. This early version of the language included many of the features that are still present in modern versions of Ruby, including object-oriented programming, dynamic typing, and garbage collection.***

4.1996:

- ***Matsumoto and other developers continued to refine and improve the language, releasing a number of new versions and adding new features.***

5. 2004:

- ***One of the factors that has contributed to Ruby's popularity is the development of the Ruby on Rails web framework, which was first released in 2004***

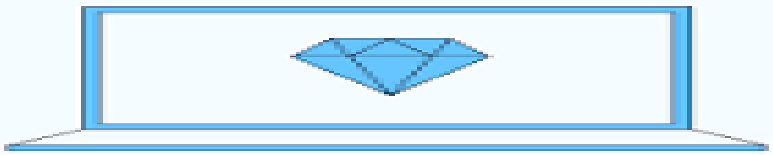
- ***The history of Ruby is characterized by a focus on simplicity, flexibility, and developer productivity. Matsumoto's vision for the language was to create a tool that would make programming easier and more enjoyable, and this focus on user experience has contributed to Ruby's ongoing popularity and success. Today, Ruby is widely used for web development, data analysis, scientific computing, and a wide range of other applications, and continues to evolve and adapt to the changing needs of developers and users.***

- ***Ruby is mainly used to build web applications and is useful for other programming projects***

2.Domain and category of Ruby language:

- ***Ruby is often the creation of domain-specific languages, or DSLs. A DSL is just an extension of Ruby's syntax (with methods that look like keywords) or API that allows you to solve a problem or represent data more naturally than you could otherwise. For our examples, we'll take the problem domain to be the output of XML formatted data, and we'll define two DSLs—one very simple and one more clever—to tackle this problem.***

Such as: XML SIMPLE



- ***Ruby is a dynamic, high-level, general-purpose programming language that was created in the mid-1990s by Yukihiro "Matz" Matsumoto in Japan. The language is designed to be both simple and powerful, with a syntax that is easy to read and write.***

- ***Ruby is also known for its focus on developer productivity, with a number of built-in features and libraries that make common tasks easier and faster to accomplish. For example, Ruby has a powerful string manipulation library, as well as built-in support for regular expressions, which are commonly used in text processing.***

- ***Ruby is also highly extensible, with a large and active community of developers who have created thousands of libraries and frameworks for the language. Some popular examples include the Ruby on Rails web framework, the RSpec testing framework, and the Sinatra micro-framework.***

- ***Ruby is a powerful and flexible programming language that is well-suited for a wide range of applications, from web development to data analysis to scripting and automation.***

3.goals,Concernes, success and contribution of Ruby:

- ***Ruby is a powerful programming language that can be used to make :***

Web development :

- ***Ruby is a very popular programing language in this part because of the ruby on rails framework (is a full stack framework ,it consist of all the tools needed to build web apps)***

- ***When rails came out in 2005, it made it easy for developers to write code that was repetitive and standard in less time and gave them everything they needed to build a website right out of the box.***

- ***Why should choose ruby on rails over another framework???***
  1. ***It's perfect for web technologies.***
  2. ***Saves money.***
  3. ***Saves time.***
  4. ***Active community and helpful.***
  5. ***Build your own play Apps.***

- ***From March 2021, '380,996' web sites were created sites were created globally with ruby on rails.***

Web Serves:

A. *Passenger and puma ,two of the most popular web application servers ,both support ruby , web applications servers like these are in charge of handling HTTP requests managing processes and resources and letting people keep an eye on things and figure out what's wrong*

.apache

B. *The best webserver for ruby because it is optimized for high performance and can handle a lot of technologies and it is a reliable and powerful web serve.*

.web rick

C. *The default server in ruby*

Data processing:

- *Ruby is a great language for processing data because its syntax is easy to read and it has built-in like map, reduce, select. These functions, it's easy to process, clean and filter data.*

Web scarling&crawling:

- ***Web scarping:***
  - ***Means extracting the data from web pages.***
- ***Web crawling:***
  - ***Means index and find webpages.***

✓ ***Ruby can extract data from websites and parse the information, web scraping using in ,market research ,competitor analysis ,in ruby we can create web scraping apps to scrape content from the web and turn it into useful information.***

Desktop Application&commands

- ***By Ruby we can write programs that run from the terminal.***

Data Base:

- ***Ruby used to connect queries. By installing Ruby libraries and connected it to SQL, MySQL, Oracle or any other database.***

Contribution:

- ***web development and higher-level server management projects.***

. *Success :*

- ***There are many features of Ruby languages such as:***

1. *Is open-source and available on the web.*
2. *Simplicity-the syntax of Ruby is very simple and readable.*
3. *Easy code maintenance and updates.*
4. *Ruby is known for stability.*
5. *Ruby can run on the free open-source Linux with many free servers and databases.*
6. *Ruby can be used for developing applications.*
7. *Ruby can be installed in windows and posit environments.*
8. *Ruby easily is connected to MySQL, Oracle, and Sybase.*
9. *It has a lot of built-in Functions which use in ruby script.*
10. *Writing a function in ruby requires less lines of code.*

Concerns of Ruby:

- **speed :**
  - *Ruby is not a fast programming language ,But we an improve that by using a faster interpreter.*
- **Limited libraries and tools.**
- **Smaller Community.**
  - *This can be a disadvantage because there are fewer people to ask help when you are stuck on a problem.*

4.what is the special or new in Ruby language?

- *We always ask what is the thing that specific Ruby language from the other languages, so we find many specials in the Ruby language that are>>>>>>>>>>*

- ***Developers like using Ruby because it's high level and has a simple syntax. You have less code to write and can focus on finding a solution to your problem. Because of the high level and abstracted nature of Ruby, this adds up to a language that is easy to learn and put into practice.***

- ***5.Overview of ruby language***
  including(coding&commands&Examples):

- **Ruby is a high level and portable language.it can be used just as easily on windows, Masco's, Linux, UNIX and DOS.**

- **Ruby works on UNIX platform; Ruby is an interpreted scripting language for easy and quick object-oriented programming. In the Ruby we use a terminal to perform commands and tasks.**
  >>When you start a terminal, you need to have a command to start the interpreter which is "rib" this commend is a tool to execute the expression from standard input.

- **Comments are lines that are ignored at runtime.**

1. **A single line comment starts with #**
    i. **# hello**
2. **A multiline comment using =begin and =end**
    i. **= begin**

    Hello

    Ruby

    =end

Input&outputs:

I. Ruby asks user to enter value by gets method.

Variable=gets

II. To show a message or out a value uses a puts keyword.

Puts Variable

Operators:

- ***We use a:***

1. Logical operator in English and symbols (&&, and, ||, or, not,!)

2. Ternary operator (? :) which mean If Condition is true? Then value X: Otherwise, value Y.

3. Comparison operator (==, >, <, <= ,>= ,!=)

4. arithmetic operation (+, -, *, /, %,)**

5. parallel assignment :

*** a, b, c = 10,20,30 it will be :**

- ✓ **a=10**
- ✓ **b=20**
- ✓ **c=30**

Data Types:

- We don't use data type in python, because Ruby is interpreted language, unlike compiled language, the data type of each value must be known. Like python we can use built-in function to know:

A. Data type of variable "class".

i. X=10.4

ii. X. class …..output will be "float"

B. Address of value in the memory use "object_id" .

X. object_id…….. output will be"21"

Note:

- Ruby is act with value not variable for ex:

x=10	x. object_id=21
x=20	x. object_id=41
y=10	y. object_id=21

- **We found that when we change variable value address change but when we assign old value at another variable it took the same address it means that it didn't remove from memory.**

Strings:

- ***A string is a sequence of characters, number or symbols can write in a single' or double quote ".***

1-Variable name:

1. Cannot begin with a numerical value.
2. If you begin variable in upper case it will be a constant.
3. Names are case sensitive Thus X and x are not the same variable.
4. Cannot use the space.
5. You can use underscore (_).
6. Cannot contain a special character.

Assign value in variable by using (=) operator.

2-Concatenation:

- ***Concatenate means joining 2 or more strings together to create a new string .To concatenate we use a (+) symbol.***

"Hello"+"Ruby"

3-casting:

- **we can covert from data type to another one if it possible:**

a. **to convert from int to string:**

(to_s)

b. **to convert from string to int:**

(to_i)

4-*Indexing and string slices*:

- **You can access the characters one at a time with a square bracket" support indexing ":**

  x=" Hello Ruby"

  x [0] ="H"

- **It starts from index zero to size of string – 1.**
- **we can also select a slice from string in 2 ways**:

1. inclusive:

Print from start to end.

i. x [0..2] ="Hel"

2. exclusive:

Print from start to end -1.

x [0...2] =" He"

5-Strings are mutable:

- ***We can change one char in string by index and it will be found at the same address.***

  X =" hi"

  X [0] =?a

  X will be ai

6-Formatting string:

- **We put a value In another string bu use #{variable, operation or value}it will help us if we need to concatenate No + string without casting :**

  X=10

  Y=" count: # {x+10}"

  Y=count: 20

7- String method:

- **in addition to uses some built in function:**

I. Length #to count char in the string.
II. Up case #to make all string in upper case.
III. down case # to make all string in lower case

Reverse #to print string in a reverse order.

- **We can use many function at the same time**
  - **x. reverse. upcase**

8-Formatting string:

- **We put a value In another string bu use #{variable, operation or value}it will help us if we need to concatenate No + string without casting :**

```
X=10
Y=" count: # {x+10}"
Y=count: 20
```

Functions:

- **As python we will use a def keyword for function. function may have a parameter .may have a return statement.**

```
def. name (parameter1, parameter2)
    return parameter1+parameter2.
end
```

- **We need to call a function to execute code.**

1-if fun have a return statement

```
puts name (4,5)
```

2-didn't have a return statement

```
name (3,6)
```

Condition Statements:

- **Popular type of conditional statements which are supported by Ruby:**

1. **If condition**
2. **Case statement**
3. **Unless**

1-if condition

```
if expression
    #code
elsif expression2
    #code
else
    #code
End
```

2-Unless:

***Will execute when condition be false.**

```
unless condition
  #code
end
```

3-case statement:

- **Case statement makes our code more readable.**

```
Case (variable name)
  When(condition)
    #statements
  When(condition)
    #statements
  else
    #statements
  end
```

ARRAYS:

- **Arrays are the collection of ordered, integer-indexed objects which can be store number, integer, string, or even any other array.**

- **Index start from zero to size of array and negative value relative to end of the array.**
  - **Array. new(size)**
- **You can pass value in the same line:**
  - **Array. new (size, value)**
- **We also can assign value without size and array size will be no of assigned values.**
  - **Array. [ ] (1,2,3)**

Size of this array:

>>>Index from 0 to 2

Array built-in method:

A. **Array. push(value) # to assign a new value at the end of array.**
B. **Array.delete_at(index)#delete by index.**
C. **Array.delete(value)#delete by value.**
D. **Array.sort #to sort array from min to max num.**
E. **Array.to_s #to convert data type of array from int to string.**
F. **Like string we can slice array and assign it a new value**

New_array=array (0..9) #include index no 9

New_array=array (0…9) #until index no 8

Str=Array.join(“*”)

Array=[“ hello “,” world”]

Str=hello*world

LOOPS:

- ***We have 4 type***
    1. **While loop**
    2. **For loop**
    3. **Do ... while loop**
    4. **Until loop**

1-*while loop:*

```
while condition
# statements to be executed
End
```

Will execute code until condition come false.

2-for loop:

```
for a in 1..5 do

    puts a    #puts is a print statement

end
```

3-Do…while loop:

In a body of loop we need to use a break keyword in a condition

```
loop do
# statements to be executed
end
```

4-until loop:

```
until conditional [do]
 # code to be executed
 End
```

Will execute code until condition come true.

6-comments&evalution of Ruby:

- group of people used this language send feedback they saw that it have some pros &cons.

1- Pros:

- Easy to read and write due to its simple syntax
- Highly productive language with a lot of built-in features and libraries
- Object-oriented programming (OOP) is at the core of the language.
- Dynamic typing allows for flexibility in coding.
- Rails framework is popular for web development.

2-Cons:

- Slower performance compared to other languages like C++ or Java
- Limited scalability for large-scale applications
- Lack of popularity in some industries or regions
- Difficulty in finding experienced Ruby developers

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7.Conclusion

- ***Overall, Ruby has a strong community of developers who appreciate its simplicity and productivity. However, it may not be the best choice for all types of projects or industries.***

8.References:

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