

Programming Language Paradigms

Tutorial 18/9

Reading for this tutorial: supplementary material 9, and Bansal chapter 12. Chapter 3 of Comparative Programming Languages and Chapter 16 of Watt are relevant.

You might also google “scripting languages”, specific languages such as “PHP”, “Javascript”, “Perl”, “Python”, “Ruby on Rails” etc, or features such as “dynamic typing”, “associative arrays”, “regex”, “PHP pattern matching”, “preg_match” etc.

1. What is the difference between a client-side and a server-side scripting language? Name some of each. Why is scripting so popular on the web?
2. What are the advantages of embedding a scripting language within HTML (as is done by PHP and Javascript, and especially HTML5), rather than using a scripting/programming language which works on its own (e.g. on the server) to produce a complete HTML page?
3. When Java was first released, it was described as the ‘language for the Internet’. Is this still true? If not, which language do you think is most widely used on the Internet? Why?
4. What does it mean to say that a language is dynamically typed? Do you think that such a language will be easier for a beginner to learn? What are the drawbacks? Why is dynamic typing helpful for a scripting language?
5. What is the current type of the variables a, b, c and d and what are the current values of c and d after execution of the following Javascript statements:

```
a = 6;  
b = "2";  
c = a - b;  
d = a + b;
```
6. What strings will be matched by the following regular expressions?
 - (1) while
 - (2) for..
 - (3) end*
7. Your University email address has the form: xx12@students.stir.ac.uk where the initial string consists of two or more lower case letters followed by one or more digits. Write a regular expression that will match any Stirling University student email address.
8. We wish to convert a University student email address into a Computing Science email address of the form xx12@cs.stir.ac.uk where the string to the left of @ is the same. Show how this can be done in PHP using pattern matching of substrings.

9. What is the difference between an ordinary array and an associative array? Why are associative arrays important in scripting languages? How are associative arrays usually implemented?

10. Suppose that we had the following PHP associative array:

```
$books = array("Austen" => "Pride and Prejudice",  
              "Sommerville" => "Software Engineering",  
              "Blyton" => "Noddy");
```

What would be the effect of executing the PHP statements:

```
echo "Austen wrote ".$books["Austen"]."<br />";  
echo "Sommerville wrote ".$books["Sommerville"]."<br />";  
echo "Blyton wrote ".$books["Blyton"]."<br />";
```

Rewrite the echo statements using a PHP foreach loop.

11. What are the key features of a scripting language (as compared with an object-oriented language)?