Software Documentation

[1985]
Software Documentation is everywhere
Software Documentation is everywhere

Google

Java Collection

100%

java.util

**Interface Collection<E>**

Type Parameters:
- E - the type of elements in this collection

All Superinterfaces:
- **Iterator<E>**

All Known Subinterfaces:
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100%

74%

Software Documentation is everywhere

100% 74% 59%

What is the difference between Collection and List in Java?

Prior to Java 2, Java provided ad hoc classes such as Dictionary, Vector, Stack, and Properties to store and manipulate groups of objects. Although these classes were quite useful, they lacked a central, unifying theme. Thus, the way that you used Vector was different from...
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Java Collection

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44%

Java - Collections Framework

Top 10 questions about Java Collections

The following are the most popular questions of Java collections asked and
Before you look at those questions, it's a good idea to see the class hierarchy.

1. When to use LinkedList over ArrayList?

ArrayList is essentially an array. Its elements can be accessed directly by index.

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Java Collection

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Java - Collections Framework

Prior to Java 2, Java provided ad hoc classes such as Dictionary, Vector, Stack, and Properties to store and manipulate groups of objects. Although these classes were quite useful, they lacked a central, unifying theme. Thus, the way that you used Vector was different from...

Collections in Java

A Collection is a group of individual objects represented as a single unit. Java provides Collection Framework which defines several classes and interfaces to represent a group of objects as a single unit.

The Collection interface (java.util.Collection) and Map interface (java.util.Map) are two main root interfaces of Java collection classes.
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100% 74% 59% 44% 37%

162 different domains in the top 10 for 99 queries
Software Documentation is everywhere

Tensorflow Python API: 309 different domains in the top 10 for 2,192 queries

100% 59% 36%

TensorFlow
API r1.3

Class Tensor

Defined in tensorflow/python/framework/ops.py.
See the guide: Building Graphs > Core graph data structures.
Represents one of the outputs of an Operation.

How to print the value of a Tensor object in TensorFlow

I have been using the introductory example of matrix multiplication in TensorFlow.

```
matrix1 = tf.constant([[1, 2], [3, 4]])
matrix2 = tf.constant([[2, 3], [4, 5]])
product = tf.matmul(matrix1, matrix2)
```

And when I print the product, it is displaying it as a TensorObject(obviously).
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Tensorflow Python API: 309 different domains in the top 10 for 2,192 queries

jQuery Event API: 75 different domains in the top 10 for 57 queries
Navigating documentation is not trivial
Navigating documentation is not trivial

Common Tasks:
- Link
- Link
- Link
- Link
- Link
- Link
- Link
- Link
- Link
- Link
Extracting tasks from documentation

- verb
- noun
- adjective

This can be used to generate a receipt or some other confirmation.
Grammatical dependencies

- **direct object:**
  - generate confirmation

- **direct object:**
  - generate receipt

Grammatical dependencies

passive nominal
subject: set size

Grammatical dependencies

passive nominal
subject: set size

adjective modifier:
set thumbnail size
Grammatical dependencies

**subject:** set size

**passive nominal subject:** set size

**preposition:**
set thumbnail size in templates

**adjective modifier:**
set thumbnail size

TaskNav v1.4

Tutorials: Java Oracle Exceptions Search

Search:

thread in

Tasks
introduce thread interference
prevent thread interference
use ThreadLocalRandom instead_of Math.random()
run threads in program
create threads in thread pool
prevent thread interference without resorting
run thread inside same application
use background thread instead_of event-dispatching thread...
include Thread
include threads
and 8 more results...

Concepts
initial thread

Code Elements
//join framework distributes tasks to worker thread...
Software Documentation is everywhere

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Java Collection

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Java - Collections Framework

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DataSource and DriverManager on J2SE

I'm interested in developing a desktop application that connects to a MySQL DB. After reading this java tutorial on DB connection (and several others) I have a question. Using DataSource seems popular on J2EE while DriverManager is a common choice for desktop applications. Is it still possible to use DataSource on a desktop application? If yes, is it a better choice over DriverManager?

I'll quote the javadoc:

An alternative to the DriverManager facility, a DataSource object is the preferred means of getting a connection.

Normally you use DriverManager when you just want a connection for one time while with DataSource you get other features such as connection pooling and distributed transactions.

Hope this helps.
insight sentence

a sentence from Stack Overflow that is related to a particular API type and that provides insight not contained in the API documentation of that type
Supervised Insight Sentence Extractor

Augment API documentation with insights from Stack Overflow

```java
public interface Map<K, V>
```

An object that maps keys to values. A map cannot contain duplicate keys; each key can map to at most one value.

This interface takes the place of the Dictionary class, which was a totally abstract class rather than an interface.

- `map.entrySet()` gives you a collection of Map.Entry objects containing both key and value.

- `Collections.synchronizedMap(Map)` synchronizes the entire map.

  In ConcurrentHashMap, the lock is applied to a segment instead of an entire Map. Each segment manages its own internal hash table. The lock is applied only for update operations. `Collections.synchronizedMap(Map)` synchronizes the entire map.

  [Link to Stack Overflow question](http://stackoverflow.com/questions/510632/13111472)

- `HashMap` is a map based on hashing of the keys.

- `LinkedHashMap` is very similar to HashMap, but it adds awareness to the order at which items are added (or accessed), so the iteration order is the same as insertion order (or access order, depending on construction parameters).
Bimodal software documentation

Insert elements from one array to another array in Java

I'm trying to identify multiples of 3 from an input array and insert those multiples in to output array. Using a count variable I can declare the output array. But then how can I insert multiples in to output array?

2 Answers

```
public class MultipleOfThreeInAnArray {
    public static void choseMultiplesOfThree(int[] input) {
        int[] output = new int[input.length];
        int index = 0;
        for (int i = 0; i < input.length; i++) {
            if (input[i] % 3 == 0) {
                output[index++] = input[i];
            }
        }
        System.out.println(Arrays.toString(output));
    }
}
```
Challenges in Analyzing Documentation

• Software documentation is technical and often contains references to code elements
• Natural language text written by software developers may not obey all grammatical rules, e.g.,
  – sentences that are grammatically incomplete
  – content that has not authored by a native speaker

Comparing NLP libraries

- CoreNLP
  - Returns the C++ variable.

- SyntaxNet
  - Returns the C++ variable.

- spaCy
  - Returns the C++ variable.

- NLTK
  - Returns the C++ variable.

Comparing NLP libraries

CoreNLP: Returns the C++ variable.

SyntaxNet: Returns the C++ variable.

spaCy: Returns the C++ variable.

NLTK: Returns the C++ variable.

Comparing NLP libraries

CoreNLP
- Returns the `C++` variable.

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1. different tokenization

Comparing NLP libraries

- **CoreNLP**
  - Returns: the C++ variable.
  - Returns: NNS DT NN JJ CC JJ.

- **SyntaxNet**
  - Returns: the C++ variable.
  - Returns: VBZ DT NNP NN.

- **spaCy**
  - Returns: the C++ variable.
  - Returns: VBZ DT NNP NN.

- **NLTK**
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Comparing NLP libraries

CoreNLP

Returns the C++ variable.

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1. different tokenization

2. general part of speech
Comparing NLP libraries

<table>
<thead>
<tr>
<th>Library</th>
<th>Returns</th>
<th>Part of Speech</th>
<th>Example</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>CoreNLP</td>
<td>the C++ variable</td>
<td>NNS</td>
<td>NNS DT NN JJ CC JJ</td>
<td>1. different tokenization</td>
</tr>
<tr>
<td>SyntaxNet</td>
<td>the C++ variable</td>
<td>VBZ</td>
<td>VBZ DT NNP NN</td>
<td>2. general part of speech</td>
</tr>
<tr>
<td>spaCy</td>
<td>the C++ variable</td>
<td>NNP</td>
<td>VBZ DT NNP NN</td>
<td>3. specific part of speech</td>
</tr>
<tr>
<td>NLTK</td>
<td>the C++ variable</td>
<td>NNS</td>
<td>NNS DT NN JJ</td>
<td></td>
</tr>
</tbody>
</table>

Comparing NLP libraries

Only between 60% and 71% of tokens from Stack Overflow, GitHub, and the Java API Documentation were assigned the same part-of-speech tag by all four libraries.

1. different tokenization
2. general part of speech
3. specific part of speech

CoreNLP
SyntaxNet
spaCy
spaCy
NLTK

Bimodal software documentation

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Bimodal software documentation

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```
Code Snippet Content Assist

Insert elements from one array to another array in Java

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Java arrays

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                output[index++] = input[i];
            }
        }
        System.out.println(Arrays.toString(output));
    }
}
public class Test {

    public static void main(String[] args) {
        split string by ...
    }

}
The integration of natural language and code in documentation
The integration of natural language and code in documentation

- **CoreNLP**: Returns the C++ variable.
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creates challenges & opportunities for software engineering tools.
The integration of natural language and code in documentation

Returns the C++ variable.

Thank you!

christoph.treude@adelaide.edu.au

creates challenges & opportunities for software engineering tools.