Supplementary material for Bimodal Modelling of Source Code and Natural Language

May 29, 2015

1 Datasets Samples

1.1 Synthetic Data -Text

Sample 1

```
string result = String.Join("\\n",input_string.Split(\’\\n\’)
       .Select((string x) => x.ToLower()).OrderBy(x => x));
```

- all elements to small letters for each line and sort
- all elements to small letters for each line and order
- all elements to lowercase for each line and sort
- all elements to lowercase for each line and order
- all elements lowercase for each line and sort
- all elements lowercase for each line and order
- all elements to lower case for each line and sort
- all elements to lower case for each line and order
- all elements to small letters for each new line and sort

Sample 2

```
var result = input_string.Split(’,’).Select(
  (string x) => x.Substring(x.Length-1)).First();
```

- get last character of each element separated by a comma and get first element
- get last character of each element separated by a comma and get 1st element
- each element get last character separated by a comma and get first element
- each element get last character separated by a comma and get 1st element
- each element get last letter separated by a comma and get first element

- each element get last letter separated by a comma and get 1st element
- each element last char separated by a comma and get first element
- each element last char separated by a comma and get 1st element
- each element last letter separated by a comma and get first element
- each element last letter separated by a comma and get 1st element

Sample 3

```
var result = input_string.Split('\n').Select({}
     (string x) => Double.Parse(x)).Average();
```

- each element parse double for each line and get mean
- each element convert to double for each new line and get average
- all elements parse to double for each line and get mean
- all elements parse number for each line and find mean
- all elements parse double for each new line and average
- all elements as number for each new line and get mean
- all elements as number for each new line and get average

1.2 StackOverflow

These are three random example from the StackOverflow dataset.

Sample 1

```
Assert.AreEqual(dict, dictClone)
```

- dictionary with equals keys
- dictionaries have same keys and values but aren't equal

Sample 2

```
int minutes = (int)elapsed.TotalMinutes;
double fsec = 60 * (elapsed.TotalMinutes - minutes);
int sec = (int)fsec;
int ms = 1000 * (fsec - sec);
string tsOut = String.Format("{0}:{1:D2}.{2}", minutes, sec, ms);
```

- stopwatch
- minutes
- how to generate seconds elapsed
- stopwatch get seconds
- string formats time stopwatch

- convert of a second to millisecond
- show stopwatch in seconds
- stopwatch get minute second hours

Sample 3

```
Newtonsoft.Json.JsonSerializer serializer = new Newtonsoft.Json.JsonSerializer();
serializer.Converters.Add(new DTOJsonConverter());
Interfaces.IEntity entity = serializer.Deserialize(jsonReader);
```

- deserializing using interface
- json serialization down casting

1.3 DotNetPerls

These are three random example from the DotNetPerls dataset.

Sample 1

```
using System;

class Program
{
  static void Main()
  {
  // Sort range of elements.
  int[] values = { 4, 7, 2, 0 };
  Array.Sort(values, 0, 3);
  foreach (int value in values)
  {
    Console.Write(value);
    Console.Write(' ');
  }
  Console.WriteLine();
  }
}
```

- sorted int array search
- sort adjust other item sort
- sorting array without using any array
- sort numbers starting with 0
- sorted array of int
- integer array sort ascending
- write a function to sort 2 arrays of numbers
- how to sort the two different array
- order by array values
- sort indexes of an array

- provide sorting function in place
- how to keep the index of sorted int array with string array
- reorder array
- simple string sort

Sample 2

```
using System;
using System.Web.UI;

namespace WebApplication1
{
  public partial class List : Page
  {
    protected void Page_Load(object sender, EventArgs e)
  {
    // Get response.
    var response = base.Context.Response;
    // Redirect permanently.
    response.RedirectPermanent("http://www.dotnetperls.com/list", false);
  }
  }
}
```

- response . redirct in asp
- asp redirect methods
- asp redirect to website
- response redirect in page_load
- 302 redirect
- asp redirect old links
- asp redirect page
- httpresponse redirect asp
- response asp response transfer
- asp response redirect
- asp response.redirect 301
- redirect to another page by class asp
- asp redirect
- page moved redirect

Sample 3

```
// Custom method
string s1 = CharTool.CharCombine(a, b, c, d); // [above]
string s2 = CharTool.CharCombine(d, c, b, a);

// Concatenation
string s1 = a.ToString() + b.ToString() + c.ToString() + d.ToString();
string s2 = d.ToString() + c.ToString() + b.ToString() + a.ToString();
```

- concat char
- char combine
- array concat benchmark
- concatenate two char arrays
- concatenate two char
- combine character
- comining arrays
- can you concat char and string
- combine two arrays in constructor
- char array concat
- combine two arrays in constructor
- concat benchmark
- concanate two char

2 Code Generation Samples and ground truth

Randomly generated samples, given a test query.

2.1 StackOverflow

2.1.1 Example 1

Input Query: timespan day the week

Generated:

```
DateTime DateTime = DateTime . Now ( 0 ) ;
```

Ground-truth:

```
foreach(string s in Days(new DateTime(2010, 1, 1), new DateTime(2010, 2, 1))) {
    Console.WriteLine(s);
}
```

2.1.2 Example 2

Input Query: regex remove leading lowercase

Generated:

```
  string Regex = str.Replace( , 'char').s( , , str) ;
```

Ground-truth:

```
var input = "Blue Cross Blue Shield 12356";
var sb = new StringBuilder();
foreach (var ch in input) {
  if (char.IsUpper(ch)) { // only keep uppercase
    sb.Append(ch);
  }
}
sb.ToString(); // "BCBS"
```

2.1.3 Example 3

Input Query: file exists on directory

Generated:

```
var path = new File ( Directory )
```

Ground-truth:

```
System.IO.File.Exists(path)
```

2.2 DotNetPerls

Input Query: char ispunctuation

Generated

```
using System;
class Program{
  static char Main () {
    if (value.s2()) {
      _max = StartNew.StartNew('_') && (s1._max*1000000).s1("0.00 ns", '%') ;
    }
    return new Punctuation() ;
  }
}
```

Ground truth

```
using System;
class Program {
  static void Main() {
    for (int i = 0; i < 128; i++) {
    if (char.IsPunctuation((char)i)){
      Console.WriteLine("case '{0}':", (char)i);
    }
  }
  }
}
```