INST-FINDER
(Utility for EXFOR INSTITUTE coding)

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Abstract
INST-FINDER is a utility code (Python script) to support EXFOR compilers by constructing a code string for the keyword INSTITUTE. A text string copied from an electronic content such as web page is compared with the expansions of the institute codes defined in EXFOR/CINDA Dictionary 3 (Institutes). Their similarity is evaluated according to Gestalt pattern matching, and the institute codes having high scores are shown as the candidates of the institute code to be coded.

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Introduction

It is time consuming to choose the right institute code from Dictionary 3 when the authors of the source article are from many institutes. INST-FINDER is a code (Python script) proposing an institute code to be coded. Once the institute list is copied from an electronic content (e.g., article website), the script shows candidates of the institute code to be coded under the keyword INSTITUTE.

The script compares the text string on website and dictionary and calculate a similarity score according to the “Gestalt pattern matching”, which calculates a similarity score by

$$2 \sum_{i=1}^{n} \frac{M_i}{(T_1 + T_2)}$$

where $M_i$ is the length of the matching characters and $T$ is the total length of the two strings.

Example

The similarity score between “iThemba Laboratory for Accelerator Based Sciences, Somerset West 7129” copied form the article ($T_1=69$) and “iThemba LABs” in Dictionary 3 ($T_2=27$):

```
-----1-------2-------3-------4-------5-------6-------7
iThemba Laboratory for Accelerator Based Sciences, Somerset West 7129
iThemba LABS, Somerset West
```

<table>
<thead>
<tr>
<th>Characters in both strings</th>
<th>Length of match ($M_i$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>iThemba L</td>
<td>9</td>
</tr>
<tr>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>B</td>
<td>1</td>
</tr>
<tr>
<td>S</td>
<td>1</td>
</tr>
<tr>
<td>, Somerset West</td>
<td>15</td>
</tr>
<tr>
<td>Sum of $M_i$</td>
<td>27</td>
</tr>
</tbody>
</table>

The total lengths of the two strings are 69 and 27. Therefore, the score is $2 \times 27/(69+27)=0.5625$.

The code detects the country of the copied text string and compare the text string with the expansions of the institute codes belonging to the same country. After evaluation of the similarity scores, the institute codes are sorted so that the institute code having the highest similarity score as the top candidate and proposed to the compiler.

You can download the Python script from the NRDC Software webpage (https://nds.iaea.org/nrdc/nrdc_sft/).
Files

Place the following six files in the same directory.

1. **inst-finder.py**: The Python script file

2. **dict_alia.txt**: Dictionary defining aliases other than country names (e.g., “INFN” is defined as an alias of the “Istituto Nazionale di Fisica Nucleare, Sezione di”. It has fixed length format. If the alias is the full stop symbol, the words are removed without any replacement.

   Example
   
   Istituto Nazionale di Fisica Nucleare, Sezione di
   Cracow
   INFN
   Krakow

3. **dict_cnab.txt**: Dictionary defining aliases of country names (e.g., “USA” is defined as an alias of the “United States of America” which is the expansion of 1USAUSA.). It has fixed length format.

   Example
   
   South Korea
   The Netherlands
   UK
   USA
   Republic of Korea
   Netherlands
   United Kingdom
   United States of America

4. **dict_pref.txt**: Dictionary defining a part of words separated by a comma to be removed (e.g., “Faculty of Science, University of Zagreb” becomes “University of Zagreb”.)

   Example
   
   Dipart
   Depart
   Facul

5. **dict_zzzc.txt**: Dictionary defining countries of international organization locations (e.g., “2AUS” is defined as the location of “3ZZZIAE”). It has fixed length format.

   Example
   
   2ZZGEL 2BLG EC Joint Research Centre (EC-JRC), Geel
   3ZZZIAE 2AUS IAEA, Vienna
   4ZZDUB 4RUS Joint Institute for Nuclear Research (JINR), Dubna

6. **EXFOR/CINDA Trans dictionary** (Distributed from the NDS open area, e.g., TRANS.9127.).
Installation

1. Install Python3 (e.g., https://www.python.org/downloads/).

2. Install a Python modules “pyperclip”.
   
   (e.g., “> pip install pyperclip”)

3. Place the four files and a trans dictionary on the same folder.

Execution

1. Run the script with the trans dictionary name as the argument.
   
   (e.g., “> python3 inst-finder.py trans.9127”).

2. Type the entry number (e.g., “D1010”).

3. Copy (without paste) the text strings including institute names. (This process can be repeated. The copied lines can include a line other than an institute name such as an email address.)

4. Click “Ctrl + C” to terminate copy.

5. Choose a proposed institute by tying its ID. Hit the enter key to see more candidates. Type “0” to choose the country code for an institute undefined in Dict. 3.

6. When the program cannot find a country code in the text line, the program asks to type the country name (e.g., “Austria”). Just hit the enter key if the line is not for an institute name (e.g., email address).

7. When all text lines are analyzed, the program asks to confirm your selections. If you agree with your selections, type “y” then the institute code string is printed and saved in “inst-find.log”.
Example

Getting the institute codes for A. Budzanowski+, J, NP/A, 161, 610, 1971 (EXFOR D1010) by copying the following text lines from the article website (https://doi.org/10.1016/0375-9474(71)90389-7):

```
[otsukan@NB635819] Python3 inst-finder.py trans.9127
------------------------------------------------------------------
INST-FINDER: EXFOR Institute Code Finder
------------------------------------------------------------------
Type entry number.
D1010
Copy institute text from web page (Ctrl+c when complete):

a Institute of Nuclear Physics, Cracow 23, Poland
b Institute of Physics Jagellonian University, Cracow, Poland
c Institute of Physics Silesian University, Katowice, Poland

^C
Input completed

++ Institute of Nuclear Physics, Cracow 23, Poland
[  1] 3POLLSLS(0.462) Univ. of Silesia, Katowice
[  2] 3POLWRO(0.413) Univ. of Wroclaw, Wroclaw
[  3] 3POLKPS(0.373) Wyzsza Szkoła Pedagogiczna, Katowice
[  5] 3POLPKI(0.329) Wyzsza Szkoła Pedagogiczna, Kielce
[  0] 3POLPOL(0.044) Poland

Hit return to see more candidates. Type 0 to choose the country code ->

(Hit entre key)
++ Institute of Nuclear Physics, Cracow 23, Poland
[  6] 3POLIFJ(0.322) Niewodniczanski Instytut Fizyki Jadrowej, Krakow
[  7] 3POLUJK(0.314) Jagiellonian University, Krakow
[  8] 3POLLOU(0.310) Univ. of Lodz, Lodz
[  9] 3POLPWA(0.290) Politechnika Warszawska
[10] 3POLITJ(0.278) AGH University of Science and Technology
[  0] 3POLPOL(0.044) Poland

Hit return to see more candidates. Type 0 to choose the country code -> 6

Your choice: 3POLIFJ=Niewodniczanski Instytut Fizyki Jadrowej, Krakow
```
++ Institute of Physics Jagellonian University, CracowPoland

If this is an institute, type its country name, otherwise hit the entre key.

Poland
[  1] 3POLUJK(0.595) Jagiellonian University, Krakow
[  2] 3POLWWA(0.444) Warszawa, University
[  3] 3POLSKU(0.410) Curie-Sklodowska University, Lublin
[  5] 3POLIFJ(0.330) Niewodniczanski Instytut Fizyki Jadrowej, Krakow
[  0] 3POLPOL(0.163) Poland

Hit return to see more candidates. Type 0 to choose the country code -> 1

Your choice: 3POLUJK=Jagiellonian University, Krakow

++ Institute of Physics Silesian University, Katowice, Poland

[  1] 3POLSLS(0.605) Univ. of Silesia, Katowice
[  2] 3POLUJK(0.519) Jagiellonian University, Krakow
[  3] 3POLKPS(0.419) Wyzsza Szkoła Pedagogiczna, Katowice
[  4] 3POLSKU(0.376) Curie-Sklodowska University, Lublin
[  5] 3POLWWA(0.371) Warszawa, University
[  0] 3POLPOL(0.143) Poland

Hit return to see more candidates. Type 0 to choose the country code -> 1

Your choice: 3POLSLS=Univ. of Silesia, Katowice


If this is an institute, type its country name, otherwise hit the entre key.

(Hit entre key)

---------------------Summary of your selections---------------------

3POLIFJ  Institute of Nuclear Physics, Cracow 23, Poland
3POLUJK  Institute of Physics Jagellonian University, CracowPoland
3POLSLS  Institute of Physics Silesian University, Katowice, Poland

--------------------------------------------------------------------

Are these correct? (y/n) y

INSTITUTE  (3POLIFJ,3POLUJK,3POLSLS)

Good bye!