Korean Morphological Richness Analyzer (KOMORA) Version 1.0

User Manual for KOMORA 1.0

This manual is written for users of KOMORA to analyze their data. It includes (a) a brief tutorial of how to install and use the application.

When using KOMORA 1.0 in your project, please cite this paper:

> Hwang, H. (submitted). Development of morphological diversity in second language Korean: An NLP analysis using Korean Morphological Richness Analyzer.

- Installment
  Download the version of KOMORA appropriate for your operating system (**Mac** or **Windows**) and open it. For Windows users, if the application does not work, please install JAVA following the steps illustrated from p. 3 of this document.
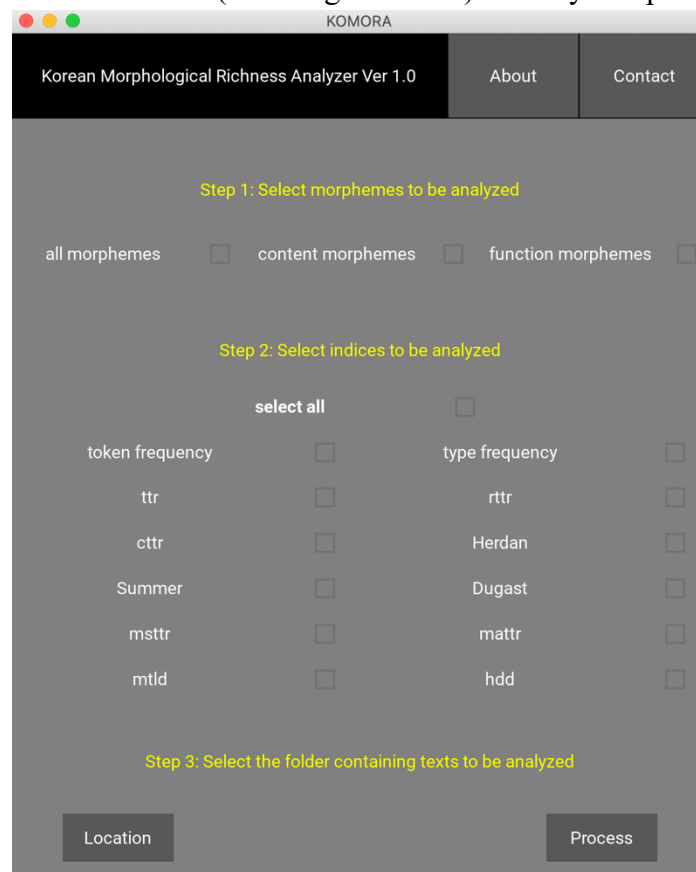
- Morphological indices in KOSCA 1.0

Category	Index	Measurement
Length of production	Number of sentences	total number of sentences in text
	Number of eojeols	total number of eojeols in text
Lexical diversity (or richness)	Token frequency of morphemes	total number of individual morphemes (i.e., tokens) in text
	Type freuqnecy of morphemes	total number of unique morphemes (i.e., types) in text
	Type-token ratio (Chotlos 1944)	total number of types ÷ total number of tokens
	Root type-token ratio (RTTR; Guiraud, 1960)	total number of types ÷ sqrt (total number of tokens)
	Corrected type-token ratio (CTTR; Carrol, 1964)	total number of types ÷ sqrt(2 × total number of tokens)
	Herdan (Herdan, 1960)	log(total number of types) / log(total number of tokens)
	Summer (Somers, 1966)	log{log(total number of types)} ÷ log{log(total number of tokens)}
	Dugast (Dugast, 1978)	{log(total number of tokens)^2} ÷ {log(total number of tokens) − log(total number of types)}
	Maas (Maas, 1972)	{log(total number of tokens) − log(total number of types)} ÷ {log(total number of tokens)^2}

Mean segmental type-token ratio (MSTTR; Johnson, 1944)	Please refer to the reference.
Moving-window type-token ratio (MATTR; Covington & McFall, 2010)	Please refer to the reference.
Measure of textual lexical diversity (MTLD; McCarthy & Jarvis, 2010),	Please refer to the reference.
HD-D (McCarthy & Jarvis, 2007)	Please refer to the reference.

- Input
  (1) Select the morpheme types for analysis.
  (2) Select the indices for analysis.
  (3) Click on the "Location" button (at the left bottom) to locate a folder in which text data for analysis are available. Note that all input files must be text files (.txt). All .txt files in the chosen input folder will be processed by KOMORA 1.0.
  (4) Click on the "Process" button (at the right bottom) to analyze inputted data.

- Output
  An output of the inputted data analyzed in selected morphological indices will be saved as a comma-separated file named "results.csv", which is runnable in a software, like Number or Excel.

Important for **Windows** users only:
Follow the steps below to make the application work.

1. Download and install the version of Java that is appropriate for your operating system.

(1) Go to https://www.oracle.com/java/technologies/downloads/
(2) Download Java by clicking "Windows" and download the Java Development Kit (JDK) for "x64 Installer". (Note: You may be required to create an Oracle Account to download JAVA).

Java SE Development Kit 18.0.2.1 downloads

Thank you for downloading this release of the Java™ Platform, Standard Edition Development Kit (JDK™). The JDK is a development environment for building applications and components using the Java programming language.

The JDK includes tools for developing and testing programs written in the Java programming language and running on the Java platform.

Linux   macOS   **Windows**

| Product/file description	File size	Download
x64 Compressed Archive	172.93 MB	https://download.oracle.com/java/18/latest/jdk-18_windows-x64_bin.zip (sha256)
x64 Installer	153.45 MB	https://download.oracle.com/java/18/latest/jdk-18_windows-x64_bin.exe (sha256)
x64 MSI Installer	152.33 MB	https://download.oracle.com/java/18/latest/jdk-18_windows-x64_bin.msi (sha256)

(3) Once the Java download is complete, run the exe and install Java.

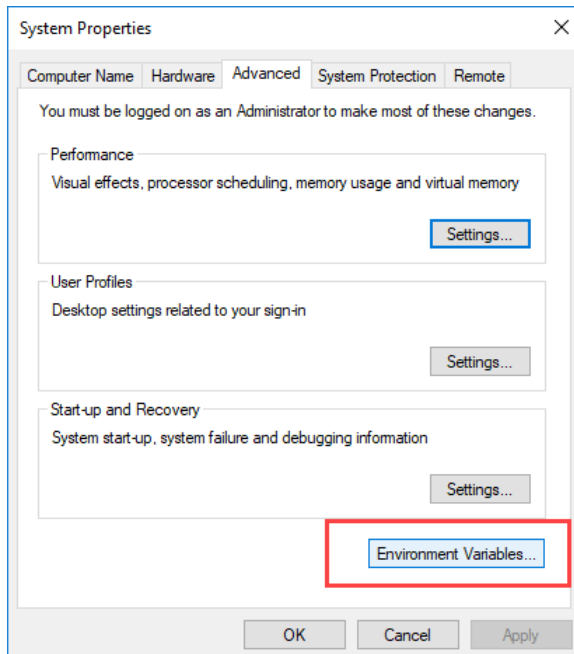2. Set Environment Variables in Java in the following manner.
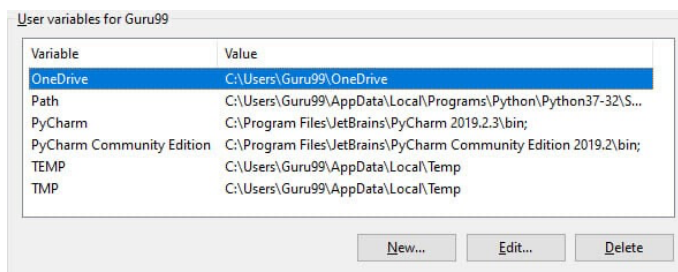(1) Right click on the "My Computer" on the desktop and select the "properties".
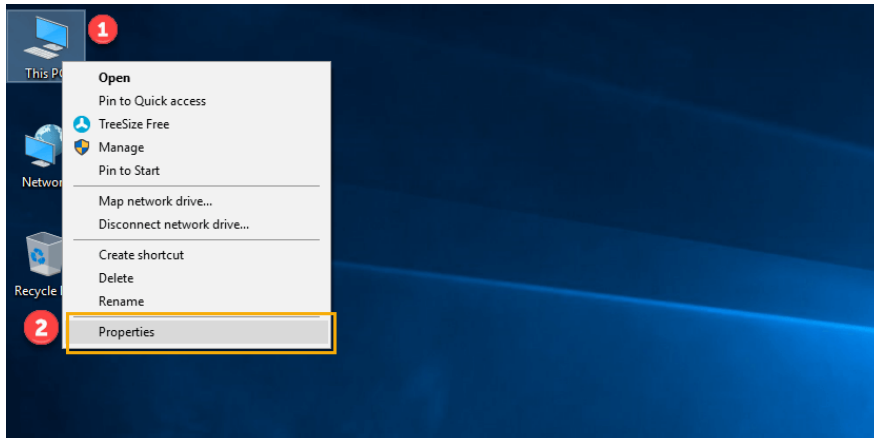
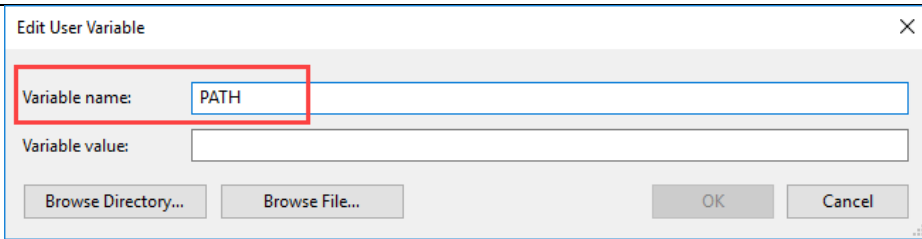
(2) Click on "advanced system settings".
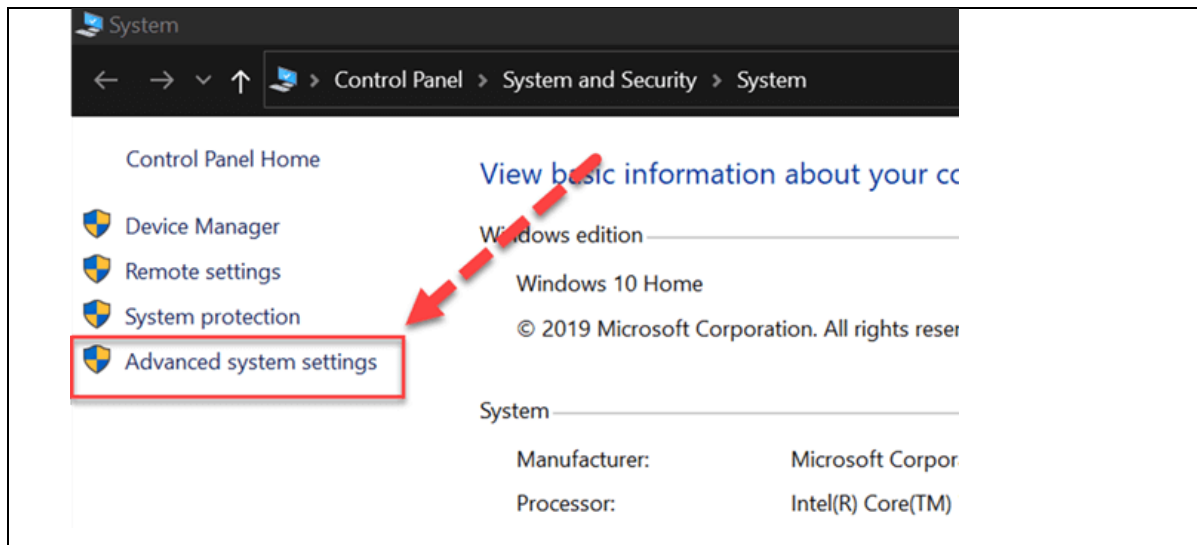
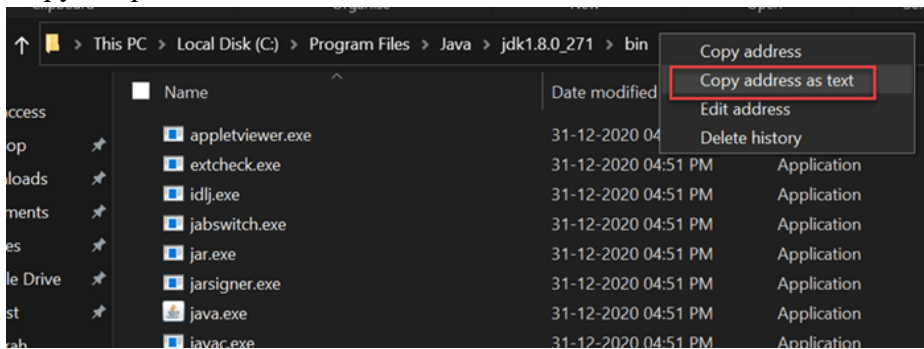(3) Click on "Environment Variables" to set a runtime environment for Java.

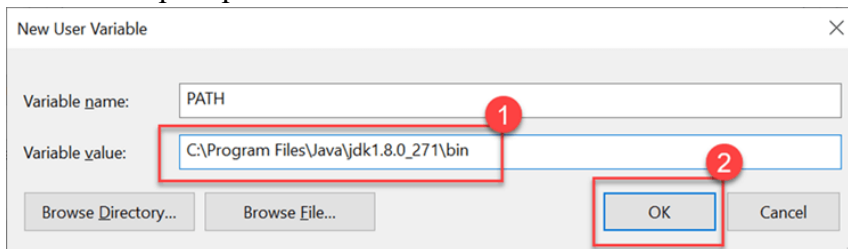

(4) Click on "New…" button.

(5) Type "PATH" in the "Variable name".

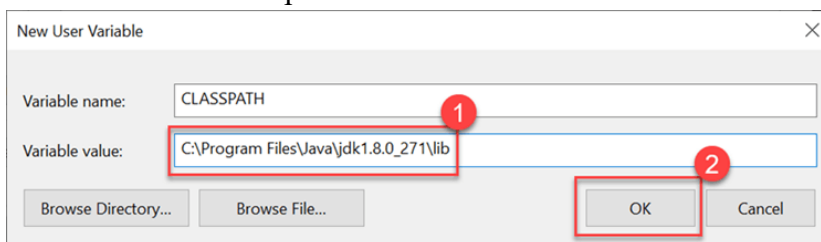(6) Copy the path of "bin" folder under the "JDK" folder.

(7) Paste the copied path in "Variable value" and then click on "OK".

(8) Click on "New…" button.
(9) Type "CLASSPATH" in the "Variable name". And, copy the path of "lib" folder under the "JDK" folder and past it in "Variable value" and then click on "OK".

Pictures from https://www.guru99.com/install-java.html