

# User Manual for QS-Net

## Introduction

The QS-Net is a phylogenetic network reconstruction method taking advantage of information on the relationship among six taxa.

## Compile and run

The program runs under Windows. The user can directly run the executable file "QS-Net.exe" in the command window. All source code is in the "cpp" folder, which has been compiled and can be run directly. And the software used is Dev-cpp, which can be downloaded and installed on the website <https://sourceforge.net/projects/orwelldevcpp/>, or you can search for other versions directly by browser.

## Use from command-line

QS-Net takes Multiple Sequence Alignments (MSAs) as an input file and the .NEXU file format is used to store all splits.

Command description:

QS-Net [-PARAMS PARAM\_VALUE]

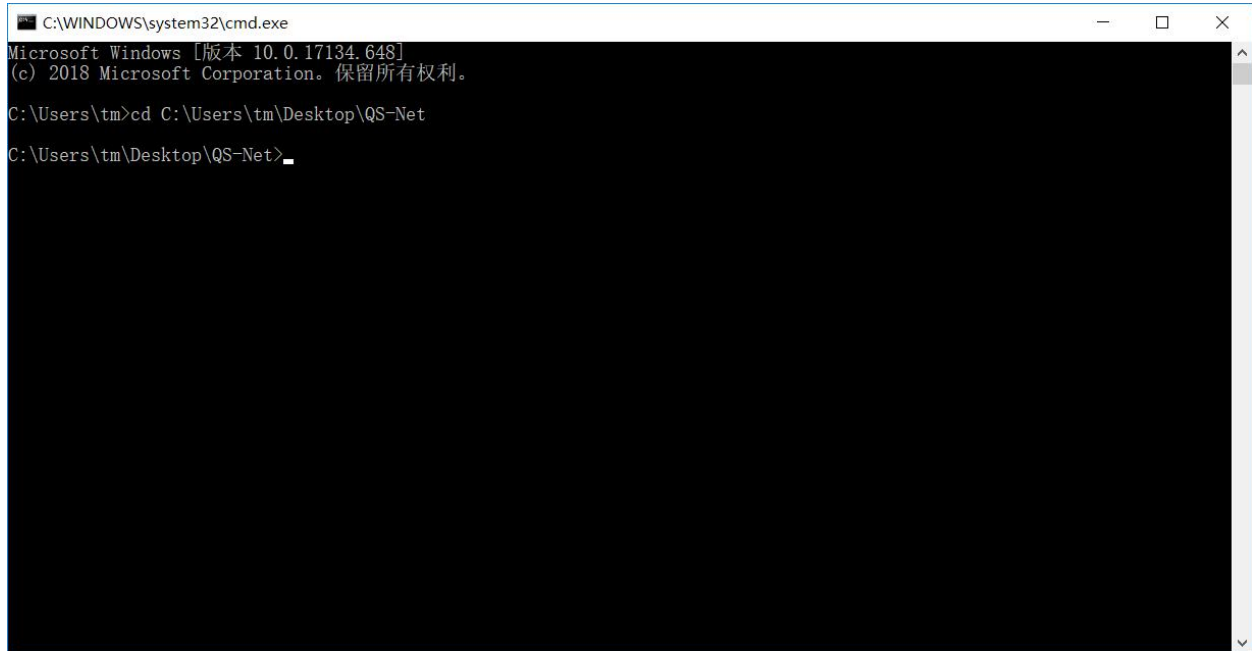
PARAMS:

- f    InputFile Name
- c    Threshold to determine the splits to be filtered.
- o    Output File Name

Example:    QS-Net -f data/five1.fas -c 1 -o output/five1.fas

## Running steps

First download the code and data on the github website <https://github.com/Tmyiri/QS-Net> and save it on a disk (for example, directly on the desktop). Next open a command line window, enter the command to jump to the specified area of the workspace, as shown below:



```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [版本 10.0.17134.648]
(c) 2018 Microsoft Corporation. 保留所有权利。

C:\Users\tm>cd C:\Users\tm\Desktop\QS-Net
C:\Users\tm\Desktop\QS-Net>
```

Next, enter the command in the example.

```
C:\WINDOWS\system32\cmd.exe
Microsoft Windows [版本 10.0.17134.648]
(c) 2018 Microsoft Corporation。保留所有权利。

C:\Users\tm>cd C:\Users\tm\Desktop\QS-Net

C:\Users\tm\Desktop\QS-Net>QS-Net -f data/five/five1.fas -c 1 -o output/five1.nex
7
-----
Reading Multiple alignment file starts!
Reading Multiple alignment file finished!
-----
Generating quintets starts!
Generating quintets ended!
-----
Generating septets starts!
Generating septets ended!
-----
Calculating complete non-trivial splits weights starts!
Step 9 Starts!
Step 9 Ends!
Step 10 Starts!
Step 10 Ends!
Step 11 Starts!
Step 11 Ends!
Step 12 Starts!
Step 12 Ends!
Calculating complete non-trivial splits ended!
-----
Generating trivial splits starts!
Generating trivial splits ended!
-----
Writing the complete splits to OutputFile starts!
1% of the average weight:57.9658
Writing the complete splits to OutputFile ended!
-----
The total Time is 24.073 Seconds.

C:\Users\tm\Desktop\QS-Net>_
```

After the program is executed, there will be a **five1.nex** file in the output folder, and the result of the build will be saved in this file.

## Visualization

The output file will be a file in Nexus format, which can be viewed by SplitsTree <http://www.splitstree.org/>.