Microsoft

# System Management Fundamentals

## 使用Unix Shell整理系统日志

### Use Unix Shell to wrangle log data

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Microsoft Reactor | Ryan Chung

Microsoft

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# Reactor

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1000 XP

# 使用 UNIX shell 整理日志数据

2 分钟 剩余 • 模块 • 已完成 7 个单元，共 9 个

★★★★½ 4.5 (12) 对其进行评级

初级 学生 数据科学家 数据工程师 开发人员 Visual Studio Code

了解如何使用 UNIX shell 整理数据和检查数据文件。

## 学习目标

在本模块中，你将学习如何：

- 使用命令（如 `head`、`tail`、`wc`、`less` 和 `sort`）执行基本文件检查。
- 使用 `cat` 创建、追加、显示和连接文件。
- 编写和使用 `regex`（正则表达式）进行文本模式匹配。
- 使用 `grep` 搜索文件或使用 `stdin` 和 `regex` 进行模式匹配 。
- 使用 `sed` 和 `regex` 对输入流执行基本文本转换。
- 使用管道和筛选器进行数据整理。

## 先决条件

- 命令行和基本 shell 命令的基本知识



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# 学习目标

- 使用指令进行档案观察
- 建立、新增、显示、串接档案
- 正规表达式 (Regular Expression)
- 档案搜寻
- 文字转换
- 管线、筛选器



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# 操作环境 - Bash

- Azure Cloud Shell
  - https://shell.azure.com
  - 或至 MS Learn Sandbox使用

    https://docs.microsoft.com/en-us/learn/modules/unix-shell-wrangle-data/1-file-inspection
- Git BASH
- Cmder

# 确认操作环境

- 输入 echo $SHELL

```
/usr/bin/bash
```



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# 取得数据

- 建立data资料夹

```
mkdir data
```

- 下载数据集

```
wget -P data/ https://raw.githubusercontent.com/MicrosoftDocs/mslearn-data-wrangling-shell/main/NASA-logs-1995.txt
wget -P data/ https://raw.githubusercontent.com/MicrosoftDocs/mslearn-data-wrangling-shell/main/NASA-software-API.txt
```

- 确认已下载

```
cd data
ls
```

```
NASA-logs-1995.txt  NASA-software-API.txt
```



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# 两个档案

- NASA-Software-API.txt
  - NASA使用软体清单
- NASA-logs-1995.txt
  - NASA Kennedy 太空中心伺服器请求日志纪录



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# UNIX系统中的三个数据流

- 输入

  stdin – 标准输入(键盘)

- 输出

  stdout – 终端机输出

  stderr – 状态回报，亦透过终端机输出



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# 头尾瞧一瞧

- Head

head -n 5  NASA-software-API.txt

```
ARC-14136-1 ARC 2001-10-19T00:00:00.000 "Academic Worldwide" "Adaptive Relevance-Learning Software Component (ARNIE)"
ARC-14293-1 ARC 2005-09-19T00:00:00.000 "Open Source" "Genetic Graphs (JavaGenes)"
ARC-14297-1 ARC 2003-11-06T00:00:00.000 "General US" "Automated Domain Decomposition Software, PEGASUS Version 5.0"
ARC-14379-1 ARC 2002-03-27T00:00:00.000 "General US" "Man-machine Integration Design And Analysis System (MIDAS)"
ARC-14400-1 ARC 2001-01-29T00:00:00.000 "General US" "PLOT3D Version 4.0"
```

- tail

tail -n 5  NASA-software-API.txt

```
SSC-00393 SSC 2013-05-17T00:00:00.000 "General Public" "Software Suite to SupportIn-Flight Characterization of Remote Sensing Systems"
SSC-00424 SSC 2013-09-06T00:00:00.000 "General Public" "SSC Site Status Mobile Application"
GSC-14732-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Tool For Interactive Plotting, Sonification, And 3D Orbit Display (TIPSOD)"
GSC-14730-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Space Physics Data Facility Web Services"
GSC-14726-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Earth Observing System (EOS) Clearinghouse (ECHO)"
```



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# 一行一行来

- nl (numbers the lines)

  nl -s = NASA-software-API.txt

```
695=SSC-00339 SSC 2009-10-05T00:00:00.000 "General Public" "A Tool for the Automated Verification of Spatial Resolution in Remotely Sensed Imagery"
696=SSC-00393 SSC 2013-05-17T00:00:00.000 "General Public" "Software Suite to Support In-Flight Characterization of Remote Sensing Systems"
697=SSC-00424 SSC 2013-09-06T00:00:00.000 "General Public" "SSC Site Status Mobile Application"
698=GSC-14732-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Tool For Interactive Plotting, Sonification, And 3D Orbit Display (TIPSOD)"
699=GSC-14730-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Space Physics DataFacility Web Services"
700=GSC-14726-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Earth Observing System (EOS) Clearinghouse (ECHO)"
```



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# 行数、字数、字元数统计

- wc

  wc NASA-software-API.txt

```
703  8917 81115 NASA-software-API.txt
```

行数 字数 字元数



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# 行数、字数、字元数统计

- wc

  wc NASA-software-API.txt

```
703  8917 81115 NASA-software-API.txt
```

行数 字数 字元数

等等，刚刚最后一笔不是第700行吗? 怎么有703行



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# 一行一行来并且要包含空行

- nl

```
nl -b a -s = NASA-software-API.txt
```

```
698=SSC-00339 SSC 2009-10-05T00:00:00.000 "General Public" "A Tool for the Automated Verification of Spatial Resolution in Remotely Sensed Imagery"
  699=SSC-00393 SSC 2013-05-17T00:00:00.000 "General Public" "Software Suite to Support In-Flight Characterization of Remote Sensing Systems"
  700=SSC-00424 SSC 2013-09-06T00:00:00.000 "General Public" "SSC Site Status Mobile Application"
  701=GSC-14732-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Tool For Interactive Plotting, Sonification, And 3D Orbit Display (TIPSOD)"
  702=GSC-14730-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Space Physics DataFacility Web Services"
  703=GSC-14726-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Earth Observing System (EOS) Clearinghouse (ECHO)"
```



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# 用cat检视档案、建立档案、新增内容至档案

- 检视档案内容

cat NASA-software-API.txt

```
SSC-00156-1 SSC 2003-04-24T00:00:00.000 "General Public" Storeplex
SSC-00161-1 SSC 2003-05-23T00:00:00.000 "General Public" "Generalized Computer Based Computation Of Venturi And Orifice Pressure Drops"
SSC-00181 SSC 2007-06-18T00:00:00.000 "General Public" "Application Research Toolbox (ART)"
SSC-00339 SSC 2009-10-05T00:00:00.000 "General Public" "A Tool for the Automated Verification of Spatial Resolution in Remotely Sensed Imagery"
SSC-00393 SSC 2013-05-17T00:00:00.000 "General Public" "Software Suite to SupportIn-Flight Characterization of Remote Sensing Systems"
SSC-00424 SSC 2013-09-06T00:00:00.000 "General Public" "SSC Site Status Mobile Application"
GSC-14732-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Tool For Interactive Plotting, Sonification, And 3D Orbit Display (TIPSOD)"
GSC-14730-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Space Physics Data Facility Web Services"
GSC-14726-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Earth Observing System (EOS) Clearinghouse (ECHO)"
```



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# 用cat检视档案、建立档案、新增内容至档案

- 建立档案
  - cat > file1
  - 按下Enter进入下一行后输入：NASA headquarters
  - 再按下Enter，然后按下Ctrl + D 离开

```
@Azure:~/data$ cat > file1
NASA headquarters
@Azure:~/data$ cat file1
NASA headquarters
```



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# 用cat检视档案、建立档案、新增内容至档案

- 新增内容至档案
  - cat >> file1
  - 按下Enter进行下一行后输入：Goddard Space Flight Center
  - 再按下Enter，然后按下Ctrl + D 离开

```
@Azure:~/data$ cat >> file1
Goddard Space Flight Center
@Azure:~/data$ cat file1
NASA headquarters
Goddard Space Flight Center
```



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# 用cat串接档案

- 串接两个档案的内容
  - cat file1 file1

```
@Azure:~/data$ cat file1 file1
NASA headquarters
Goddard Space Flight Center
NASA headquarters
Goddard Space Flight Center
```



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# 用cat串接档案

- 串接两个档案的内容，并且输出成另一档案
  - cat file1 file1 > file2

```
@Azure:~/data$ cat file1 file1 > file2
@Azure:~/data$ cat file2
NASA headquarters
Goddard Space Flight Center
NASA headquarters
Goddard Space Flight Center
```



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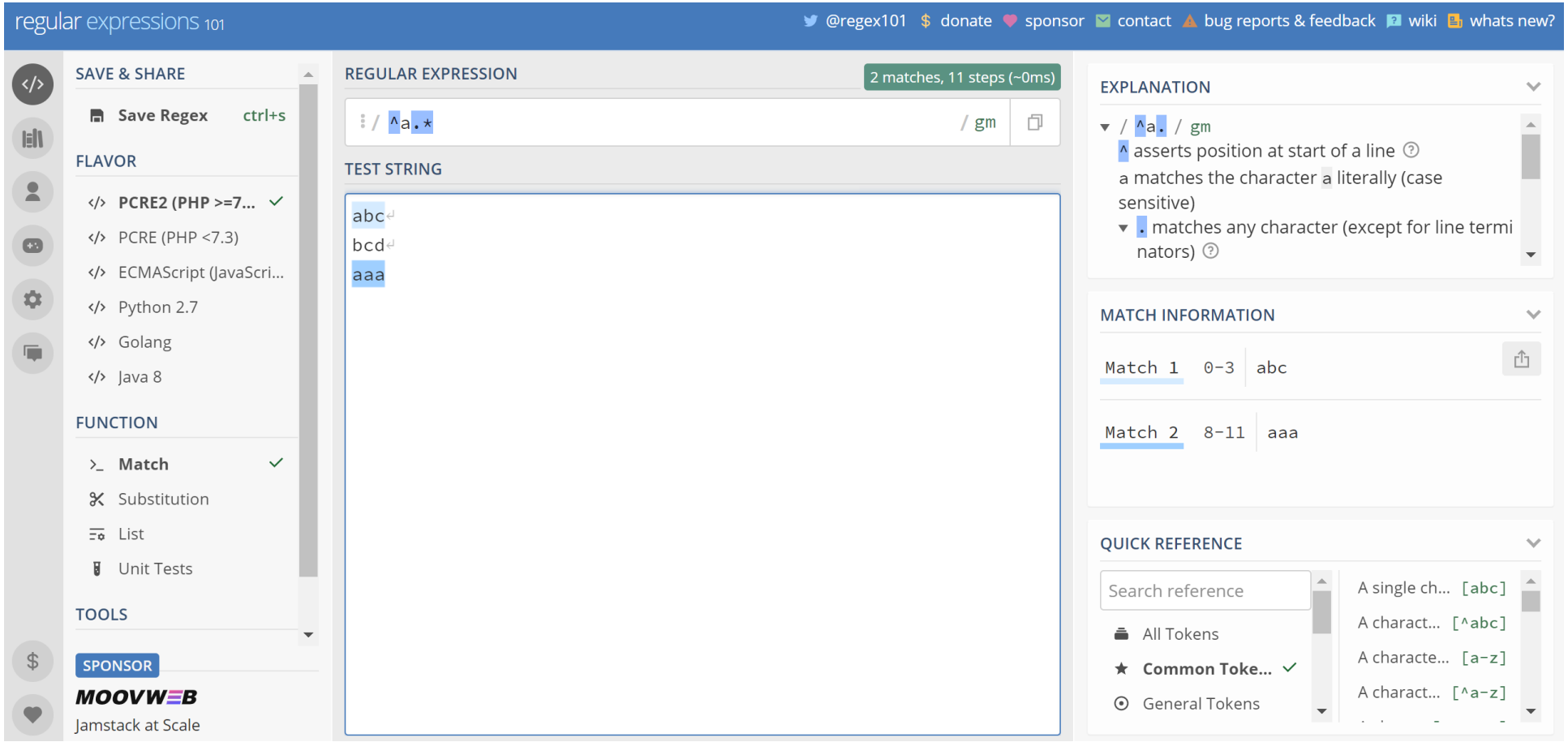
# 正规表达式 Regular Expression

- 测试语法的好地方




https://regex101.com/



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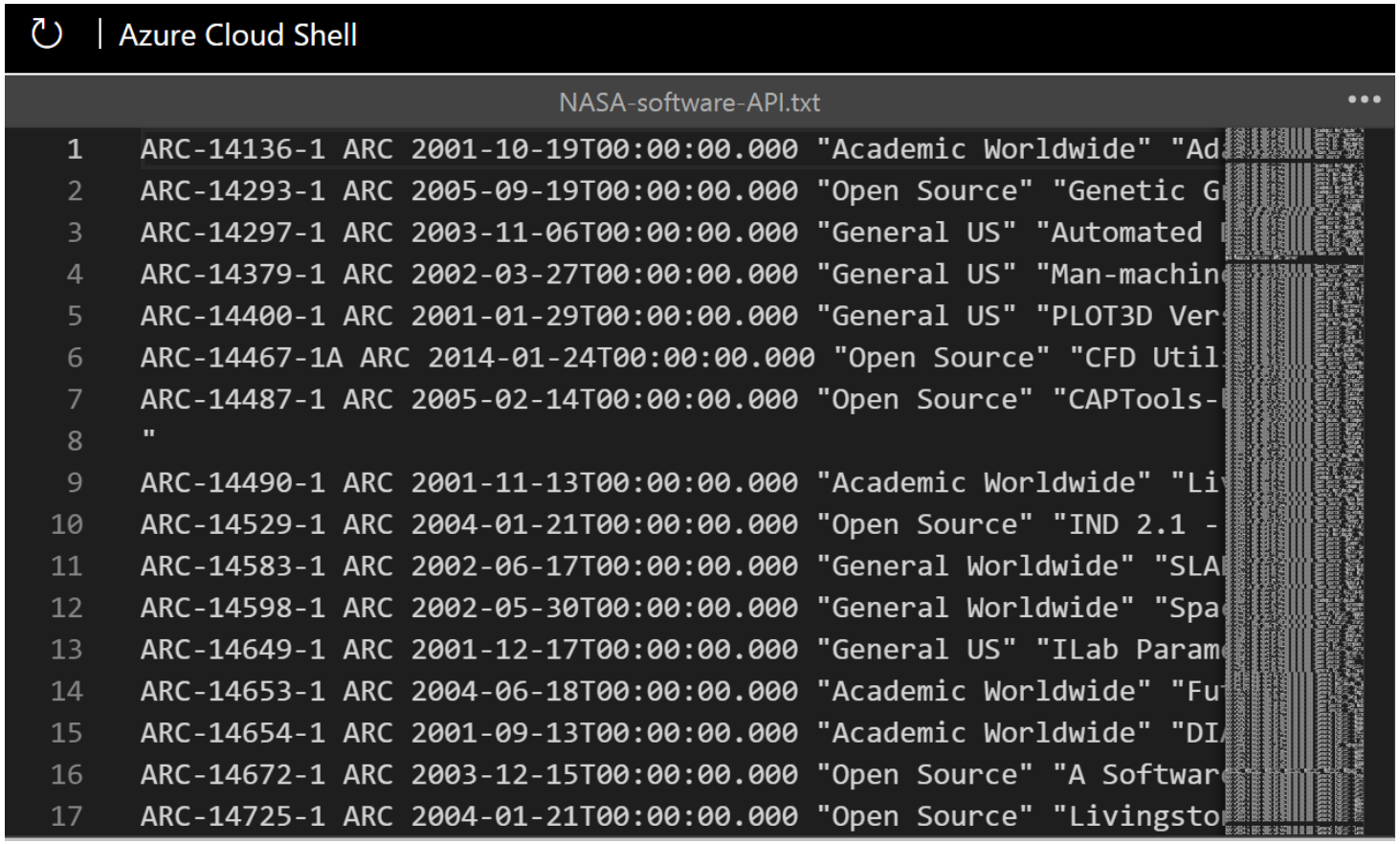
# 开启 code 检视 NASA-software-API.txt 档案

- 开启档案
  - code NASA-software-API.txt



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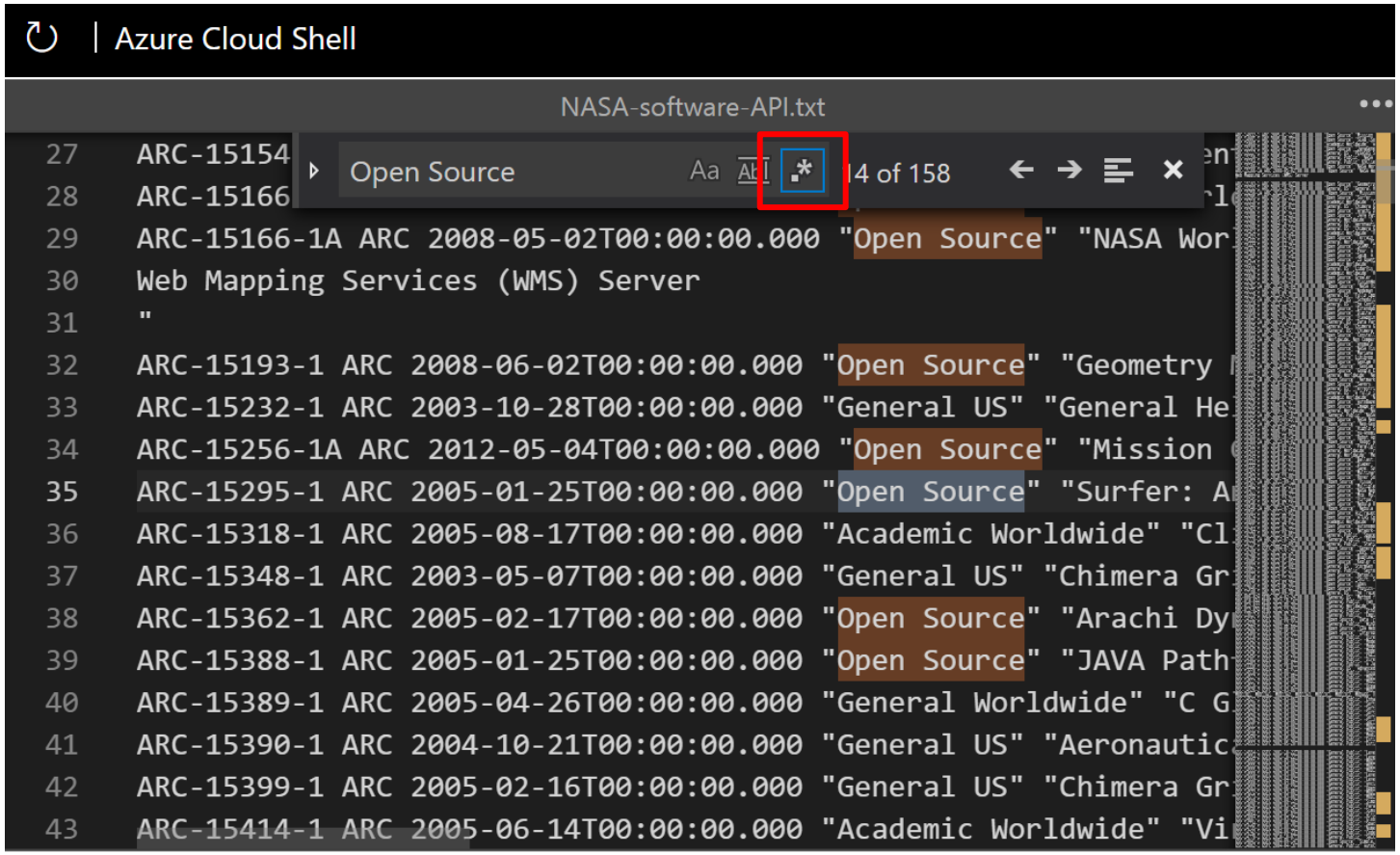
# 搜寻关键字，并确认RegEx功能开启

- Ctrl+F or Command+F，搜寻Open Source
  - 并确认RegEx功能有开启



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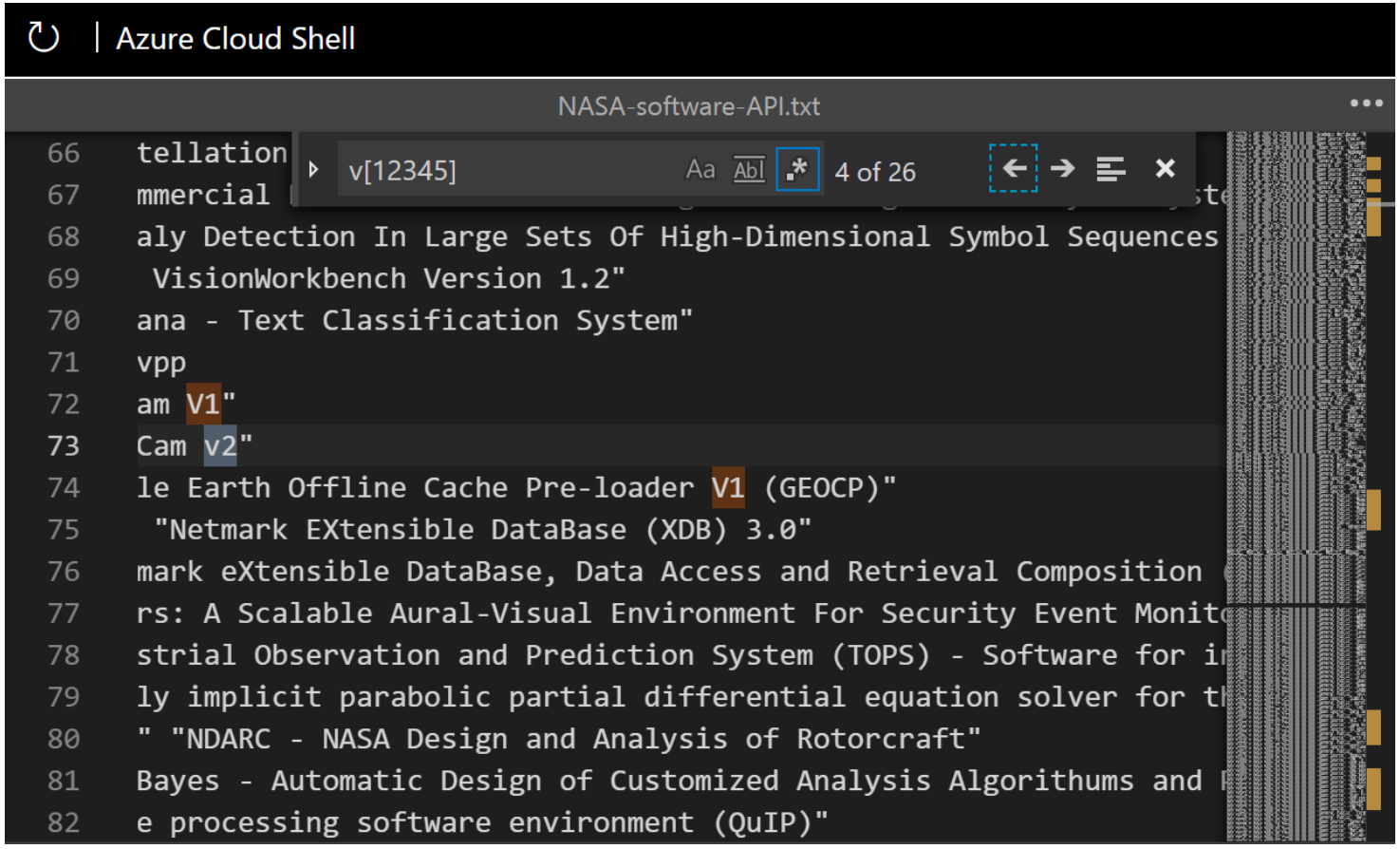
# 查找版本号

- 想要找v1, v2, v3, v4, v5
  - 搜寻 v[12345]

[ ] 任何在这list中的字元



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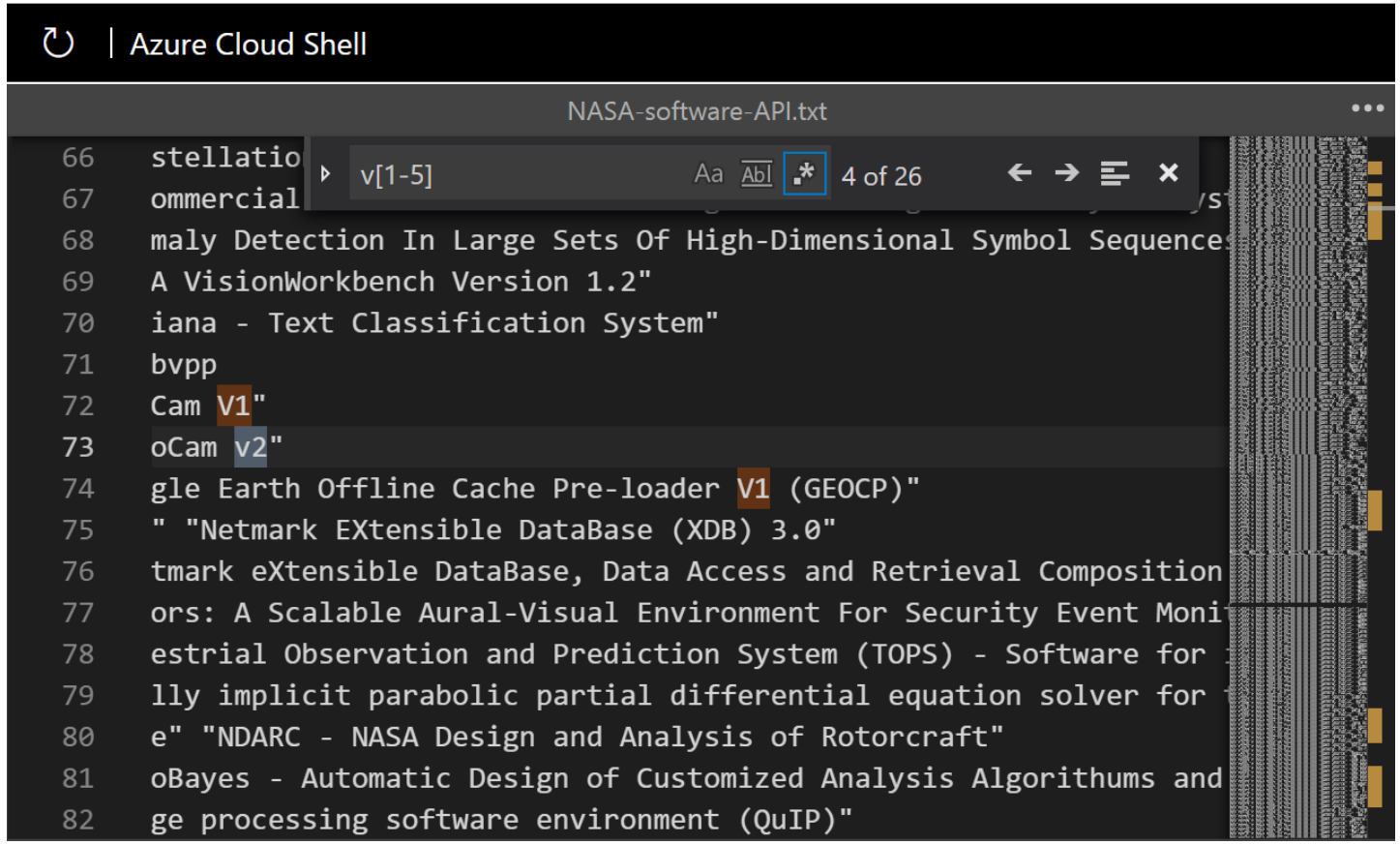
# 查找版本号

- 想要找v1, v2, v3, v4, v5
  - 也可以写成 v[1-5]

[ ] 任何在这list中的字元



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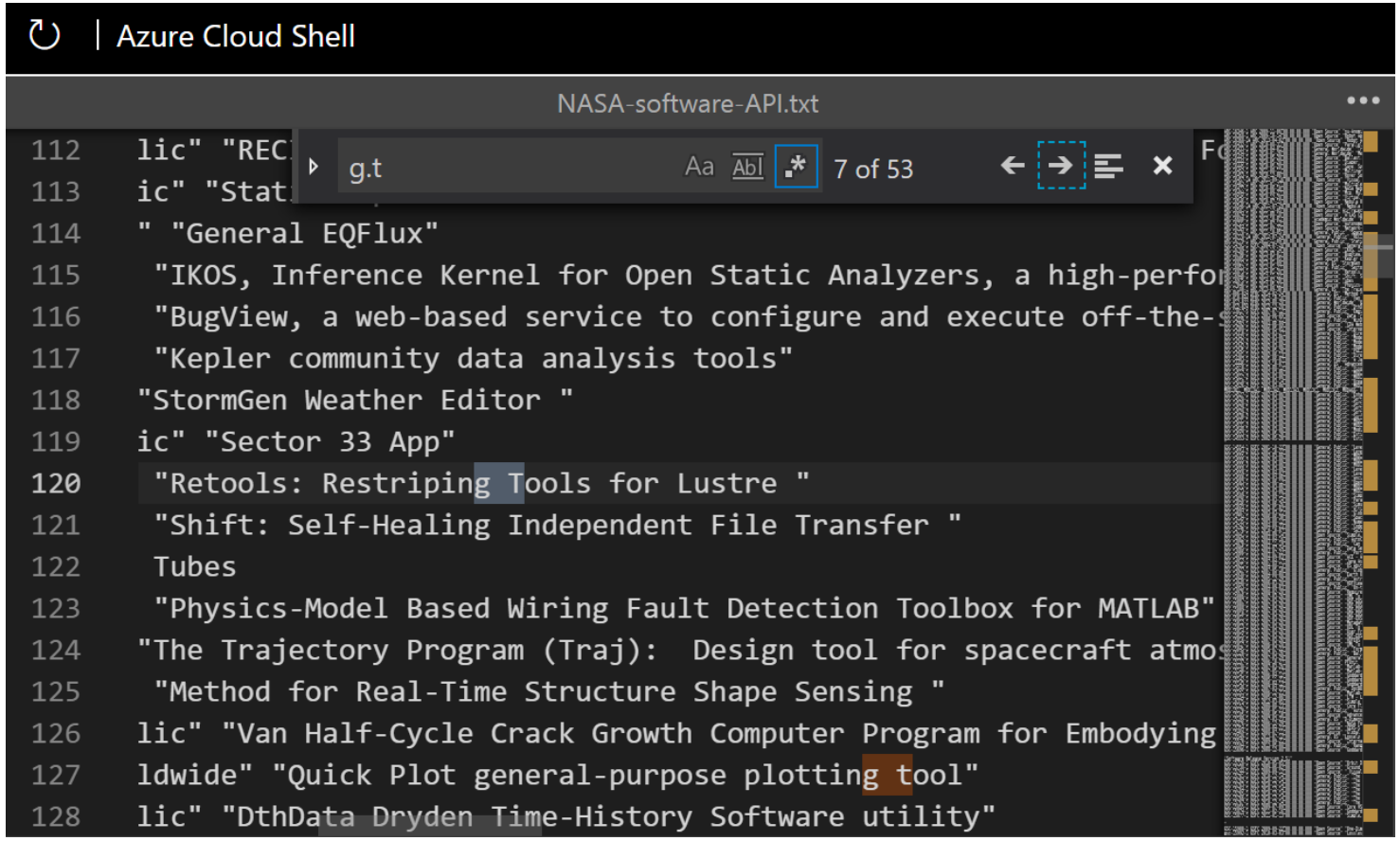
# . wildcard (任意字元/数字/空白/换行/标点/符号)

- 我想要找g开头、中间1个任意字元、t结尾的
  - 搜寻 g.t



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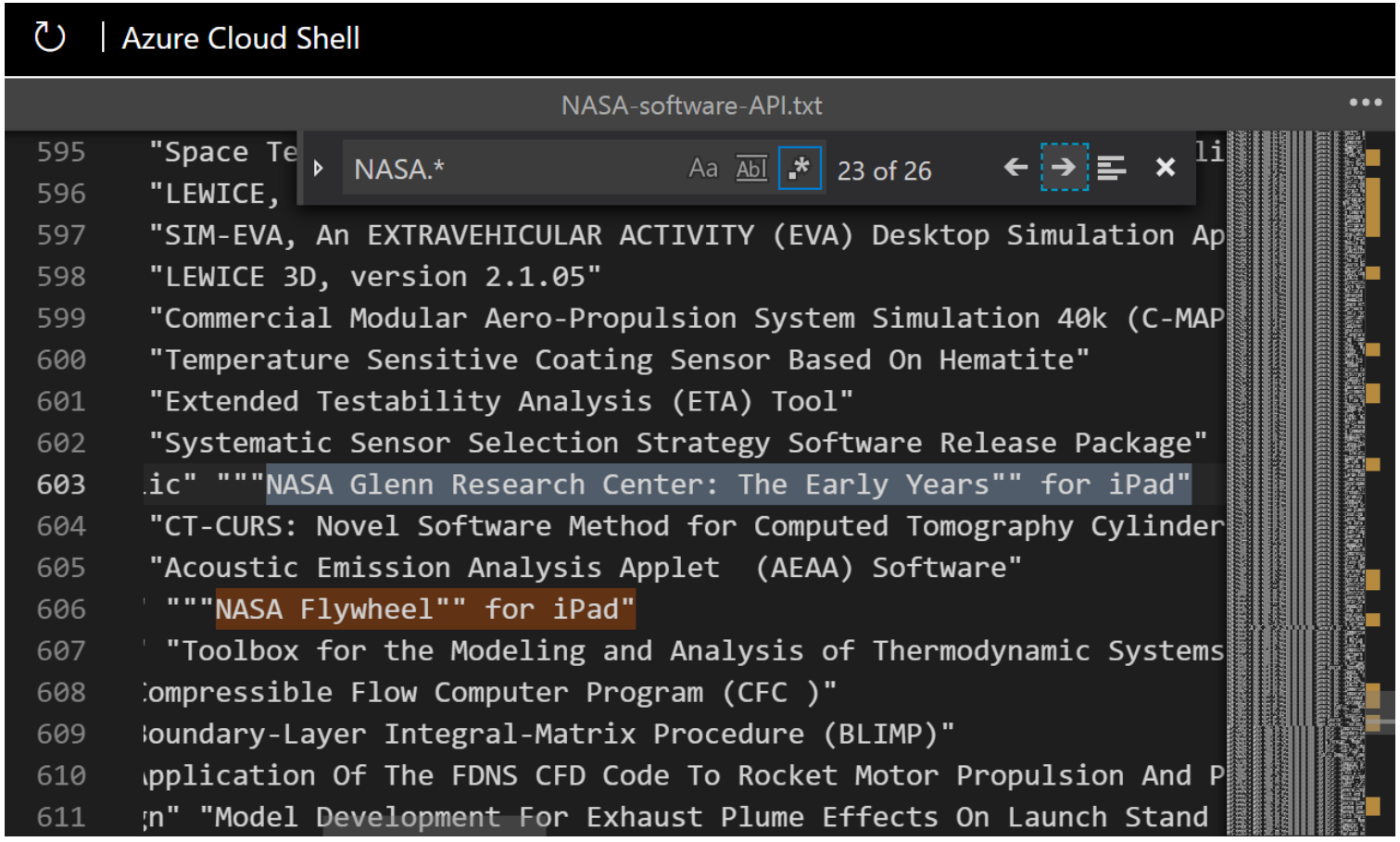
# * 0 ~ 多次

- 我想要找NASA后面跟着0个或多个任意字元均可
  - 搜寻 NASA.*



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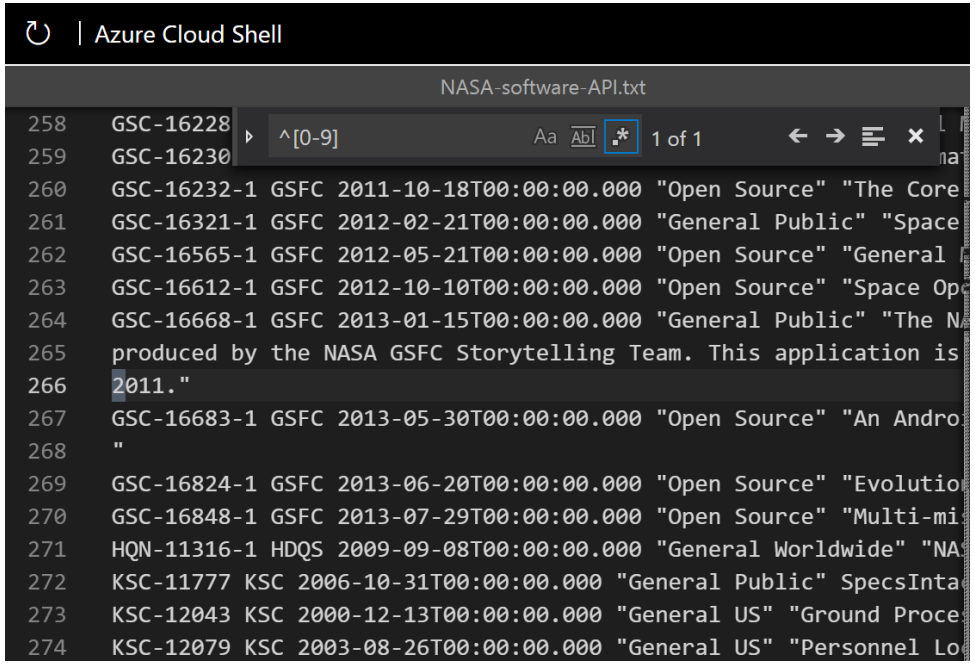
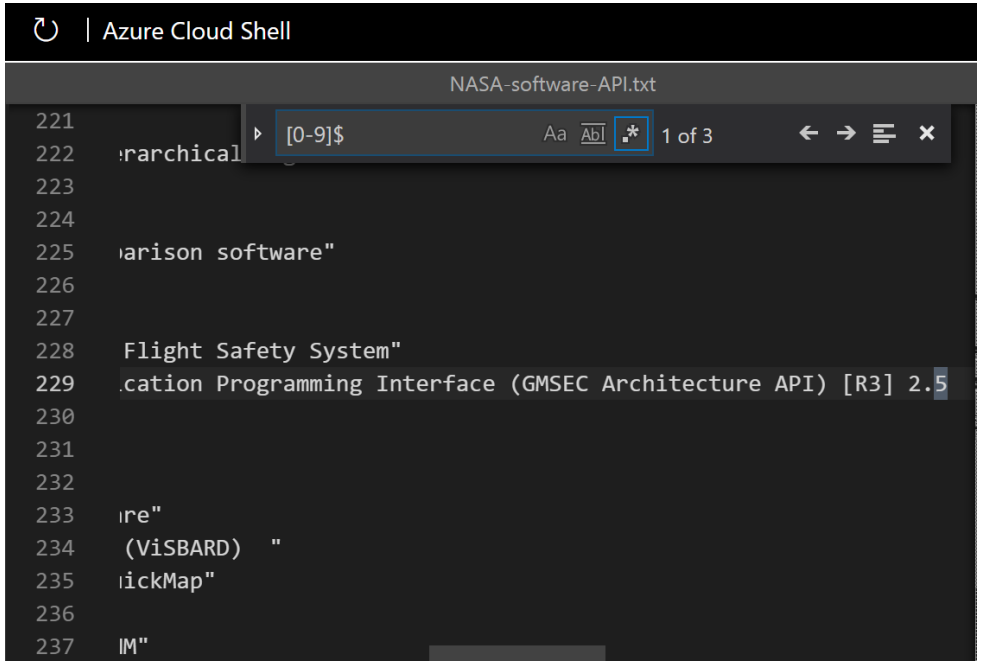
# ^ 开头、 $结尾

- 想要找0~9数字开头的
  - 搜寻 ^[0-9]
- 想要找0~9数字结尾的
  - 搜寻 [0-9]$



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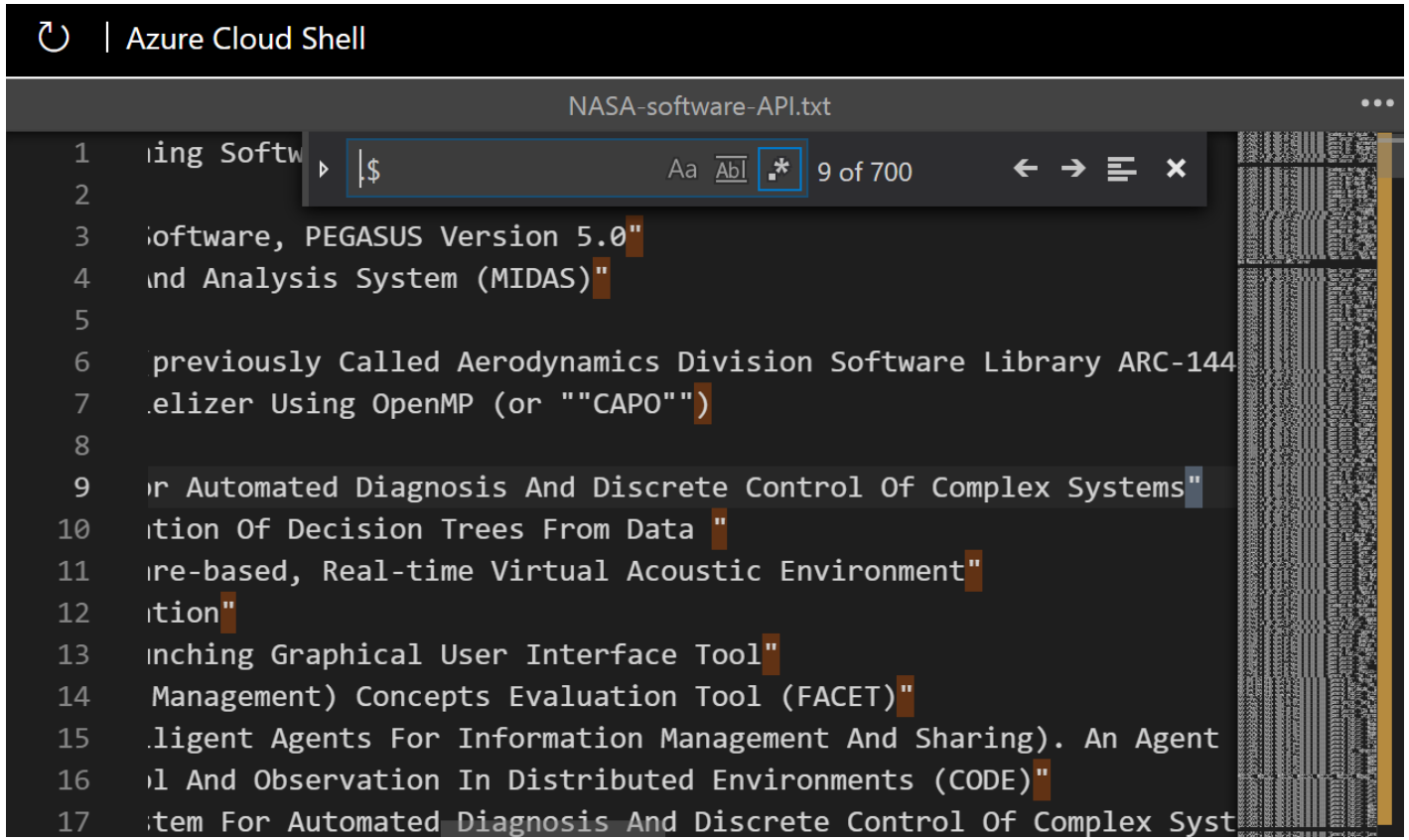
# \ 跳脱字元

- 我想要找 . 结尾的
  - 搜寻 .$ 结果全部都来了(任意字元结尾)



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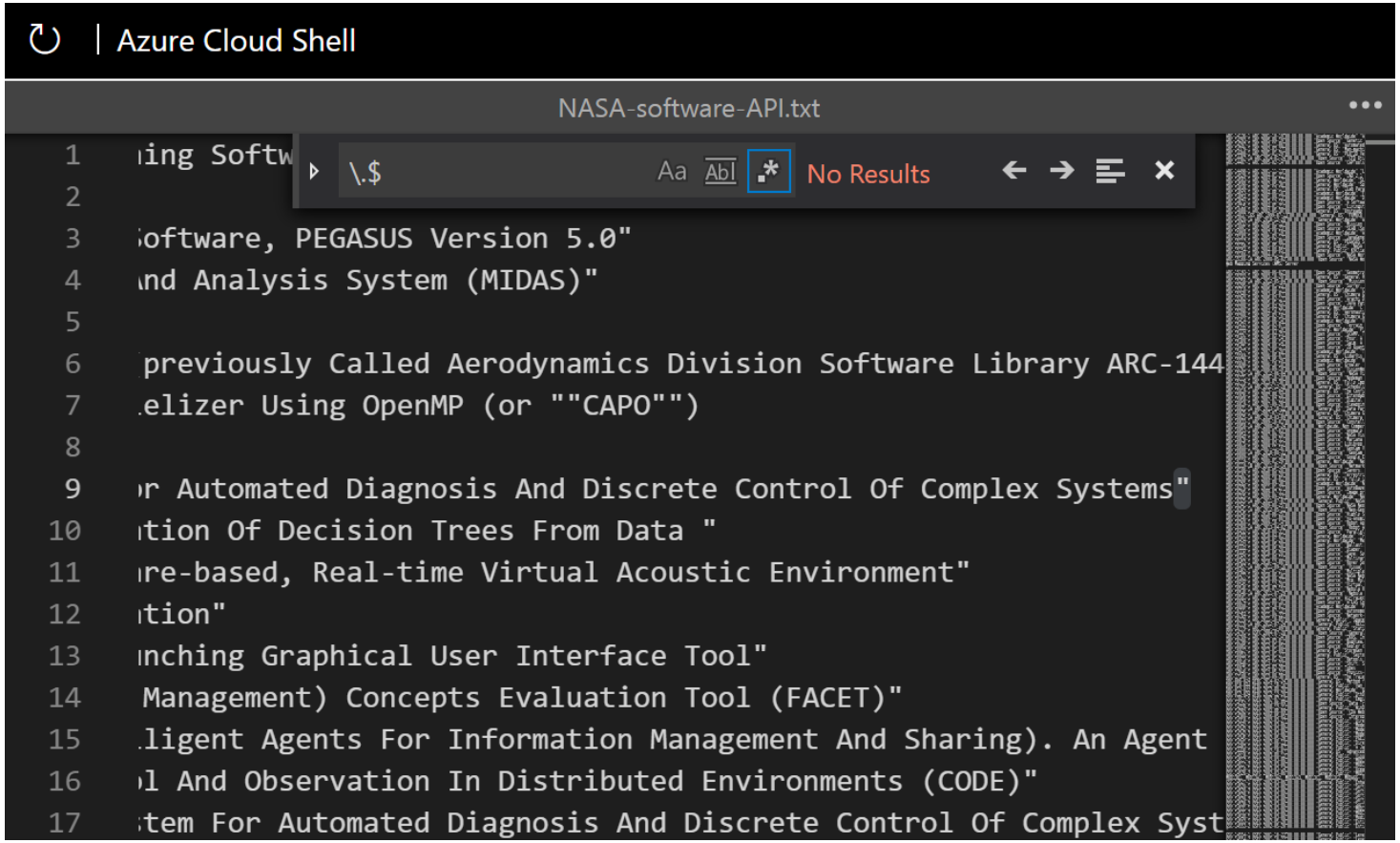
# \ 跳脱字元

- 我想要找 . 结尾的
  - 搜寻 \.$ 确保是要搜寻 . 结尾的



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# RegEx Cheat Sheet

| 符号 | 意义 | 符号 | 意义 |
|---|---|---|---|
| **^** | 一行的开头 | **+** | 1 ~ 多次 |
| **$** | 一行的结尾 | **+?** | 1 ~ 多次(non-greedy) |
| **.** | 任意字元 | **[aeiou]** | 符合任一个在list中的字元 |
| **\s** | 空格 | **[^XYZ]** | 符合任一个不在list中的字元 |
| **\S** | 任何非空格字元 | **[a-z0-9]** | 表达范围 |
| ***** | 0 ~ 多次 | **(** | 撷取字串的开头 |
| ***?** | 0 ~ 多次(non-greedy) | **)** | 撷取字串的结尾 |



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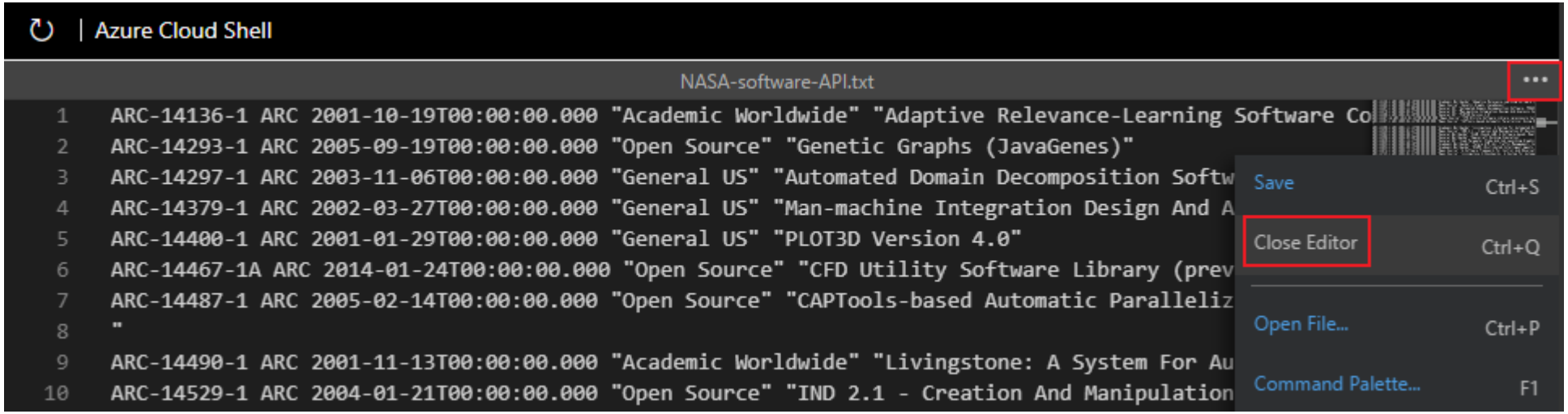
# 在Azure Cloud Shell中关闭Code

- Ctrl + q
- 点击右上方 · · ·



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# 使用 grep 查找档案内容

- 寻找 *.novo.dk

```
grep '\*\.novo\.dk' NASA-logs-1995.txt
```

```
@Azure:~/data$ grep '\*\.novo\.dk' NASA-logs-1995.txt
***.novo.dk 805465029 GET /ksc.html 200 7067
***.novo.dk 805465031 GET /images/ksclogo-medium.gif 200 5866
***.novo.dk 805465051 GET /images/MOSAIC-logosmall.gif 200 363
***.novo.dk 805465053 GET /images/USA-logosmall.gif 200 234
***.novo.dk 805465054 GET /images/NASA-logosmall.gif 200 786
***.novo.dk 805465058 GET /images/WORLD-logosmall.gif 200 669
***.novo.dk 805465068 GET /shuttle/missions/missions.html 200 8678
***.novo.dk 805465071 GET /images/launchmedium.gif 200 11853
***.novo.dk 805465153 GET /images/KSC-logosmall.gif 200 1204
***.novo.dk 805465157 GET /images/NASA-logosmall.gif 200 786
***.novo.dk 805465323 GET /images/launch-logo.gif 200 1713
***.novo.dk 805465328 GET /history/apollo/images/apollo-logo1.gif 200 1173
***.novo.dk 805465381 GET /shuttle/resources/orbiters/columbia.html 2006922
***.novo.dk 807951768 GET /shuttle/missions/sts-69/mission-sts-69.html 200 11264
***.novo.dk 807951775 GET /shuttle/missions/sts-69/sts-69-patch-small.gif 200 8083
***.novo.dk 807951782 GET /images/KSC-logosmall.gif 200 1204
***.novo.dk 807951786 GET /images/launch-logo.gif 200 1713
***.novo.dk 807951792 GET /history/apollo/images/apollo-logo1.gif 200 1173
***.novo.dk 807951832 GET /shuttle/countdown/ 200 4673
***.novo.dk 807951848 GET /shuttle/missions/sts-69/count69.gif 200 46053
***.novo.dk 807951864 GET /images/NASA-logosmall.gif 200 786
***.novo.dk 807951907 GET /htbin/cdt_main.pl 200 3714
***.novo.dk 807951914 GET /shuttle/countdown/images/countclock.gif 200 13994
***.novo.dk 807951938 GET /shuttle/countdown/liftoff.html 200 4665
***.novo.dk 807951981 GET /shuttle/countdown/video/livevideo2.gif 200 69067
***.novo.dk 807952044 GET /htbin/cdt_clock.pl 200 543
***.novo.dk 807952060 GET /shuttle/countdown/lps/fr.html 200 1879
***.novo.dk 807952078 GET /shuttle/countdown/lps/fr.gif 200 30232
***.novo.dk 807952102 GET /shuttle/countdown/lps/back.gif 200 1289
```



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# 可同时运用于多个档案

- 同时在两个档案中找寻NASA，并显示符合的行号

  grep -n 'NASA' NASA-logs-1995.txt NASA-software-API.txt

```
NASA-software-API.txt:499:LEW-17324-1 GRC 2001-01-05T00:00:00.000 "General US" "CANCELLED ** Same As LEW-16855-1 (APNASA -  Average Passage Flow Solver)"
NASA-software-API.txt:571:LEW-17952-1 GRC 2005-08-18T00:00:00.000 "General US" "Excel VBA Add-in for Calculating the Drag Coefficient from WakeSurvey Experimental Data Taken at the NASA Glenn Research Center&#39;s Icing Research Tunnel"
NASA-software-API.txt:583:LEW-18229-1 GRC 2007-03-27T00:00:00.000 "General US" "NASA/NESSUS 6.2c Probabilistic Structural Analysis Software"
NASA-software-API.txt:603:LEW-18993-1 GRC 2012-09-12T00:00:00.000 "General Public" """NASA Glenn Research Center: The Early Years"" for iPad"
NASA-software-API.txt:606:LEW-19133-1 GRC 2014-01-16T00:00:00.000 "OpenSource" """NASA Flywheel"" for iPad"
NASA-software-API.txt:687:MSC-24585-1 JSC 2011-09-12T00:00:00.000 "General Public" "NASA Electronic Position Description System (ePDS)"
NASA-software-API.txt:693:MSC-25694-1 JSC 2013-09-10T00:00:00.000 "General Public" "NASA Hazard Management System (HMS)"
```



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# grep 参数

| 参数 | 意义 |
| --- | --- |
| -c | 计算行数 |
| -n | 显示行号与符合样式 |
| -i | 大小写均可 |
| -w | 整个字符合 |
| -H | 包含档案名称 |
| -m<max number lines> | 显示行数上限，例如4行 –m4 |



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# sed 指令

- 输出档案内容

  sed '' NASA-software-API.txt

```
MSC-25184-1 JSC 2011-10-05T00:00:00.000 "General US" "Space Shuttle Cockpit Avionics Upgrade Display Atlas Disclosure (CAU Atlas)"
MSC-25185-1 JSC 2011-10-05T00:00:00.000 "General US" "FCOD Rapid Prototyping Lab Generic Display Software Disclosure (FCOD Generic displays)"
MSC-25186-1 JSC 2011-10-05T00:00:00.000 "General US" "eProc Electronic Procedure System for Spacecraft glass cockpits (eProc System)"
MSC-25694-1 JSC 2013-09-10T00:00:00.000 "General Public" "NASA Hazard Management System (HMS)"
SSC-00151-1 SSC 2003-04-23T00:00:00.000 "General Public" "Engineering Units Generator 'Eugen'"
SSC-00156-1 SSC 2003-04-24T00:00:00.000 "General Public" Storeplex
SSC-00161-1 SSC 2003-05-23T00:00:00.000 "General Public" "Generalized Computer Based Computation Of Venturi And Orifice Pressure Drops"
SSC-00181 SSC 2007-06-18T00:00:00.000 "General Public" "Application Research Toolbox (ART)"
SSC-00339 SSC 2009-10-05T00:00:00.000 "General Public" "A Tool for the Automated Verification of Spatial Resolution in Remotely Sensed Imagery"
SSC-00393 SSC 2013-05-17T00:00:00.000 "General Public" "Software Suite to Support In-Flight Characterization of Remote Sensing Systems"
SSC-00424 SSC 2013-09-06T00:00:00.000 "General Public" "SSC Site Status Mobile Application"
GSC-14732-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Tool For Interactive Plotting, Sonification, And 3D Orbit Display (TIPSOD)"
GSC-14730-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Space Physics Data Facility Web Services"
GSC-14726-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Earth Observing System (EOS) Clearinghouse (ECHO)"
```



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# sed 指令

- 寻找内容并且替代

  sed 's/Target/John/'

```
@Azure:~$ echo "My name is Ryan" | sed 's/Ryan/John/'
My name is John
```

- 练习

  sed 's/NASA/National Aerospace Agency/' NASA-software-API.txt



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# sed 指令

- 寻找内容并且替代

  sed 's/Target/John/'

```
@Azure:~$ echo "My name is Ryan" | sed 's/Ryan/John/'
My name is John
```

- 练习

  sed 's/NASA/National Aerospace Agency/' NASA-software-API.txt

- 练习二：只印出有替代的那几行

  sed -n 's/NASA/National Aerospace Agency/p' NASA-software-API.txt



Microsoft Reactor

# sed 指令

- 寻找内容并且替代

  sed 's/Target/John/'

```
@Azure:~$ echo "My name is Ryan" | sed 's/Ryan/John/'
My name is John
```

- 练习

  sed 's/NASA/National Aerospace Agency/' NASA-software-API.txt

- 练习二：只印出有替代的那几行

  sed -n 's/NASA/National Aerospace Agency/p' NASA-software-API.txt

- 练习三：替代并且输出至档案

  sed -n 's/NASA/National Aerospace Agency/w NASA-replaced.txt' NASA-software-API.txt



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# 管线练习

- 将NASA-software-API.txt的内容送去加上行号

```
cat NASA-software-API.txt | nl
```

```
695  SSC-00339 SSC 2009-10-05T00:00:00.000 "General Public" "A Tool for the Automated Verification of Spatial Resolution in Remotely Sensed Imagery"
  696  SSC-00393 SSC 2013-05-17T00:00:00.000 "General Public" "Software Suite to Support In-Flight Characterization of Remote Sensing Systems"
  697  SSC-00424 SSC 2013-09-06T00:00:00.000 "General Public" "SSC Site Status Mobile Application"
  698  GSC-14732-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Tool For Interactive Plotting, Sonification, And 3D Orbit Display (TIPSOD)"
  699  GSC-14730-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Space Physics Data Facility Web Services"
  700  GSC-14726-1 GSFC 2004-06-09T00:00:00.000 "Open Source" "Earth Observing System (EOS) Clearinghouse (ECHO)"
```



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# 管线练习

- 将所有.txt档案计算行数，并从小排到大

```
wc -l *.txt | sort -n
```

```
@Azure:~/data$ wc -l *.txt | sort -n
     26 NASA-replaced.txt
    703 NASA-software-API.txt
 200000 NASA-logs-1995.txt
 200729 total
```

wc -l 计算行数(line)
sort -n 依数值(number)大小排序，预设为由小到大
sort -n -r 依数值(number)大小排序，由大到小



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# 管线练习

- 将所有.txt档案计算行数，并从小排到大

  wc -l *.txt | sort -n

```
@Azure:~/data$ wc -l *.txt | sort -n
    26 NASA-replaced.txt
   703 NASA-software-API.txt
200000 NASA-logs-1995.txt
200729 total
```

- 只显示前面2行

  wc -l *.txt | sort –n | head -n 2

```
@Azure:~/data$ wc -l *.txt | sort -n | head -n 2
    26 NASA-replaced.txt
   703 NASA-software-API.txt
```



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# 管线练习

- 将NASA-software-API.txt 每行加上行号与等号，然后只显示前5行

nl -s = NASA-software-API.txt | head -n 5

```
@Azure:~/data$ nl -s = NASA-software-API.txt | head -n 5
    1=ARC-14136-1 ARC 2001-10-19T00:00:00.000 "Academic Worldwide" "Adaptive Relevance-Learning Software Component (ARNIE)"
    2=ARC-14293-1 ARC 2005-09-19T00:00:00.000 "Open Source" "Genetic Graphs (JavaGenes)"
    3=ARC-14297-1 ARC 2003-11-06T00:00:00.000 "General US" "Automated Domain Decomposition Software, PEGASUS Version 5.0"
    4=ARC-14379-1 ARC 2002-03-27T00:00:00.000 "General US" "Man-machine Integration Design And Analysis System (MIDAS)"
    5=ARC-14400-1 ARC 2001-01-29T00:00:00.000 "General US" "PLOT3D Version 4.0"
```



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# 管线练习

- 将NASA-software-API.txt 每行加上行号与等号，然后只显示前5行，依行号从小排到大

```
nl -s = NASA-software-API.txt | head -n 5 | sort -n -r
```

```
@Azure:~/data$ nl -s = NASA-software-API.txt | head -n 5 | sort -n -r
     5=ARC-14400-1 ARC 2001-01-29T00:00:00.000 "General US" "PLOT3D Version 4.0"
     4=ARC-14379-1 ARC 2002-03-27T00:00:00.000 "General US" "Man-machine Integration Design And Analysis System (MIDAS)"
     3=ARC-14297-1 ARC 2003-11-06T00:00:00.000 "General US" "Automated Domain Decomposition Software, PEGASUS Version 5.0"
     2=ARC-14293-1 ARC 2005-09-19T00:00:00.000 "Open Source" "Genetic Graphs (JavaGenes)"
     1=ARC-14136-1 ARC 2001-10-19T00:00:00.000 "Academic Worldwide" "Adaptive Relevance-Learning Software Component (ARNIE)"
```



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# 管线练习

- 找出NASA-logs-1995.txt中有NASA的前10行

  grep -m 10 'NASA' NASA-logs-1995.txt

```
@Azure:~/data$ grep -m 10 'NASA' NASA-logs-1995.txt
***.novo.dk 805465054 GET /images/NASA-logosmall.gif 200 786
***.novo.dk 805465157 GET /images/NASA-logosmall.gif 200 786
***.novo.dk 807951864 GET /images/NASA-logosmall.gif 200 786
007.thegap.com 805065766 GET /images/NASA-logosmall.gif 200 786
007.thegap.com 805072932 GET /images/NASA-logosmall.gif 200 786
007.thegap.com 806532057 GET /images/NASA-logosmall.gif 200 786
007.thegap.com 807996997 GET /images/NASA-logosmall.gif 200 786
01-dynamic-c.wokingham.luna.net 805378672 GET /images/NASA-logosmall.gif 200 786
01-dynamic-c.wokingham.luna.net 806878949 GET /images/NASA-logosmall.gif 304 0
01-dynamic-c.wokingham.luna.net 809570230 GET /images/NASA-logosmall.gif 304 0
```



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# 管线练习

- 找出NASA-logs-1995.txt中有NASA的前10行，照数字排序

grep -m 10 'NASA' NASA-logs-1995.txt | sort -n

```
@Azure:~/data$ grep -m 10 'NASA' NASA-logs-1995.txt | sort –n
***.novo.dk 805465054 GET /images/NASA-logosmall.gif 200 786
***.novo.dk 805465157 GET /images/NASA-logosmall.gif 200 786
***.novo.dk 807951864 GET /images/NASA-logosmall.gif 200 786
01-dynamic-c.wokingham.luna.net 805378672 GET /images/NASA-logosmall.gif 200 786
01-dynamic-c.wokingham.luna.net 806878949 GET /images/NASA-logosmall.gif 304 0
01-dynamic-c.wokingham.luna.net 809570230 GET /images/NASA-logosmall.gif 304 0
007.thegap.com 805065766 GET /images/NASA-logosmall.gif 200 786
007.thegap.com 805072932 GET /images/NASA-logosmall.gif 200 786
007.thegap.com 806532057 GET /images/NASA-logosmall.gif 200 786
007.thegap.com 807996997 GET /images/NASA-logosmall.gif 200 786
```



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# 管线练习

- 找出NASA-logs-1995.txt中有NASA的前10行，照数字反向排序

```
grep -m 10 'NASA' NASA-logs-1995.txt | sort -n -r
```

```
@Azure:~/data$ grep -m 10 'NASA' NASA-logs-1995.txt | sort -n –r
007.thegap.com 807996997 GET /images/NASA-logosmall.gif 200 786
007.thegap.com 806532057 GET /images/NASA-logosmall.gif 200 786
007.thegap.com 805072932 GET /images/NASA-logosmall.gif 200 786
007.thegap.com 805065766 GET /images/NASA-logosmall.gif 200 786
01-dynamic-c.wokingham.luna.net 809570230 GET /images/NASA-logosmall.gif 304 0
01-dynamic-c.wokingham.luna.net 806878949 GET /images/NASA-logosmall.gif 304 0
01-dynamic-c.wokingham.luna.net 805378672 GET /images/NASA-logosmall.gif 200 786
***.novo.dk 807951864 GET /images/NASA-logosmall.gif 200 786
***.novo.dk 805465157 GET /images/NASA-logosmall.gif 200 786
***.novo.dk 805465054 GET /images/NASA-logosmall.gif 200 786
```



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# 管线练习

- 找出NASA-logs-1995.txt中有NASA的前10行，照数字反向排序，再把NASA都换成全名

```
grep -m 10 'NASA' NASA-logs-1995.txt | sort -n -r | sed -n 's/NASA/National Aerospace Agency/p'
```

```
@Azure:~/data$ grep -m 10 'NASA' NASA-logs-1995.txt | sort -n -r | sed -n 's/NASA/National Aerospace Agency/p'
007.thegap.com 807996997 GET /images/National Aerospace Agency-logosmall.gif 200 786
007.thegap.com 806532057 GET /images/National Aerospace Agency-logosmall.gif 200 786
007.thegap.com 805072932 GET /images/National Aerospace Agency-logosmall.gif 200 786
007.thegap.com 805065766 GET /images/National Aerospace Agency-logosmall.gif 200 786
01-dynamic-c.wokingham.luna.net 809570230 GET /images/National Aerospace Agency-logosmall.gif 304 0
01-dynamic-c.wokingham.luna.net 806878949 GET /images/National Aerospace Agency-logosmall.gif 304 0
01-dynamic-c.wokingham.luna.net 805378672 GET /images/National Aerospace Agency-logosmall.gif 200 786
***.novo.dk 807951864 GET /images/National Aerospace Agency-logosmall.gif 200 786
***.novo.dk 805465157 GET /images/National Aerospace Agency-logosmall.gif 200 786
***.novo.dk 805465054 GET /images/National Aerospace Agency-logosmall.gif 200 786
```



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# Summary

- cat
  - 显示、串接、添加内容至档案
- pipe(|)
  - 管线输出变成另一指令的输入
- Regular Expression
  - 正规表达式
- grep(**G**lobal **Re**gular **E**xpression **P**rint)
  - 查找档案资讯，常与管线搭配使用
- sed(stream editor)
  - 最常被用来做字串替代

**学习运用以上指令与参数进行资讯筛选、查找**



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# 知识检查

1. 在当前目录中，我们想要查找包含最少行数的三个文件。 可使用此处列出的哪一个命令?

- ○ wc -l * > sort -n > head -n 3
- ○ wc -l * | sort -n | head -n 1-3
- ○ wc -l * | sort -n | head -n 3
- ○ wc -l * | head -n 3 | sort -n

2. 正则表达式 `Fr[ea]nc[eh]` 匹配的内容是什么?

- ○ French, France, Frence, Franch
- ○ Frenche, Franceh, Frenceh, Franche
- ○ France, French
- ○ Freanceh, Fraenche



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# 知识检查

3. Grep 的 -v 选项用于反转模式匹配，以便仅输出不匹配模式的行。 以下哪个命令可查找 /data 中其名称以 s.txt 结尾但不包含字符串 net 的所有文件？ 例如，shuttles.txt 或 software.txt，而不是 planets.txt。

- ○ find data -name *s.txt | grep -v net
- ○ grep -v 'net' $(find data -name '*s.txt')
- ○ find data -name '*s.txt' | grep -v net
- ○ 以上说法都不正确

4. 假设要删除某些已处理的数据文件，并且只保留原始文件和处理脚本来保存存储。 原始文件以 .dat 结尾，处理后的文件以 .txt 结束。 以下哪种解决方案会删除所有已处理的数据文件，且仅删除已处理的数据文件?

- ○ rm ?.txt
- ○ rm *.txt
- ○ rm * .txt
- ○ rm .

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# 议程结束
# 感谢聆听

请记得填写课程回馈问卷 (Event ID : XXXXX)
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