Username: 44373082

name of the public repository: ACST s1 2019

File name: ACST890 quiz2

12.1

Downloading 44373082.pem via students email
Opening git bash
Using cd ~/desktop/ACST890 to change the path

```
yoga@Lenovo-PC MINGW64 ~/Desktop
$ cd ~/desktop/ACST890quiz2
```

Using ssh -i 44373082.pem

https://www.staff.hs-mittweida.de/~wuenschi/data/media/compbiolbook/chapter-11-regex--structure.pdb > structure.pdb to download structure.pdb to AWS account and named structure.pdb

```
/oga@Lenovo-PC MINGW64 ~/desktop/ACST890quiz2
$ ssh -i 44373082.pem ubuntu@ec2-13-54-157-132.ap-southeast-2.compute.amazonaws.
com
Welcome to Ubuntu 18.04.2 LTS (GNU/Linux 4.15.0-1032-aws x86_64)
 * Documentation: https://help.ubuntu.com
 * Management:
                     https://landscape.canonical.com
https://ubuntu.com/advantage
 * Support:
  System information as of Thu May 2 01:06:09 UTC 2019
  System load: 0.0
Usage of /: 27.0% of 7.69GB
                                       Processes:
                                                                88
                                       Users logged in:
                                                               0
  Memory usage: 23%
                                       IP address for eth0: 172.31.24.136
  Swap usage:
 * Ubuntu's Kubernetes 1.14 distributions can bypass Docker and use containerd
   directly, see https://bit.ly/ubuntu-containerd or try it now with
      snap install microk8s --classic
  Get cloud support with Ubuntu Advantage Cloud Guest:
    http://www.ubuntu.com/business/services/cloud
 * Canonical Livepatch is available for installation.

    Reduce system reboots and improve kernel security. Activate at:
https://ubuntu.com/livepatch

73 packages can be updated.
O updates are security updates.
 *** System restart required ***
Last login: Thu Apr 4 11:01:10 2019 from 58.173.144.119
To run a command as administrator (user "root"), use "sudo <command>".
See "man sudo_root" for details.
```

```
ubuntu@ip-172-31-24-136:~$ curl https://www.staff.hs-mittweida.de/~wuenschi/data
/media/compbio)book/chapter-11-regex--structure.pdb
HEADER Hydrogenase
COMPND Hydrogenase Maturating Endopeptidase Hybd From
SOURCE ORGANISM_SCIENTIFIC: Escherichia coli
AUTHOR Fritsche, Paschos, Beisel, Boeck & Huber
REMARK NCBI PDB FORMAT VERSION 5.0
SEQRES 1 A 162 MET ARG ILE LEU VAL LEU GLY VAL GLY ASN
SEQRES 2 A 162 THR ASP GLU ALA ILE GLY VAL ARG ILE VAL
SEQRES 3 A 162 GLU GLN ARG TYR ILE LEU PRO ASP TYR VAL
SEQRES 3 A 162 ASP GLY GLY THR ALA GLY MET GLU LEU LEU
HELIX 1 hel ILE A 18 GLN A 28
HELIX 2 hel PRO A 92 THR A 107
HELIX 3 hel ILE A 138 SER A 152
SHEET 1 Str ARG A 2 ASN A 10
SHEET 2 Str ARG A 29 LEU A 32
SHEET 3 Str TYR A 35 THR A 43
ATOM 1 C MET A 1 49.879 24.359 50.932 1.00 54.58 C
ATOM 2 CA MET A 1 49.879 24.359 50.932 1.00 59.61 C
ATOM 4 CE MET A 1 51.349 24.403 47.765 1.00 71.39 C
ATOM 5 CG MET A 1 48.75 25.011 52.020 1.00 62.03 N
ATOM 7 O MET A 1 47.875 25.011 52.020 1.00 54.99 0
ATOM 8 SD MET A 1 49.731 23.948 47.163 1.00 77.15 S
```

```
ubuntu@ip-172-31-24-136:~$ curl https://www.staff.hs-mittweida.de/~wuenschi/data
/media/compbiolbook/chapter-11-regex--structure.pdb > structure.pdb
 % Total
            % Received % Xferd Average Speed
                                               Time
                                                       Time
                                                                Time Current
                                                                Left
                                Dload Upload
                                               Total
                                                       Spent
                                                                      Speed
                                  825
100 1140 100 1140
                             0
                                          0 0:00:01 0:00:01 --:--
                                                                         825
```

Using sed 's/Beisel/Weisel/g' structure.pdb change Beisel to Weisel

```
ubuntu@ip-172-31-24-136:~$ sed 's/Beisel/Weisel/g' structure.pdb
HEADER Hydrogenase 23-Mar-99 1CFZ
COMPND Hydrogenase Maturating Endopeptidase Hybd From
SOURCE ORGANISM_SCIENTIFIC: Escherichia coli
AUTHOR Fritsche, Paschos, Weisel, Boeck & Huber
REMARK NCBI PDB FORMAT VERSION 5.0
```

12 2

Using sed '1,3d' structure.pdb to delete the first three lines

```
ubuntu@ip-172-31-24-136:~$ sed '1,3d' structure.pdb
AUTHOR Fritsche, Paschos, Beisel, Boeck & Huber
REMARK NCBI PDB FORMAT VERSION 5.0
SEQRES 1 A 162 MET ARG ILE LEU VAL LEU GLY VAL GLY ASN
SEQRES 2 A 162 THR ASP GLU ALA ILE GLY VAL ARG ILE VAL
SEQRES 3 A 162 GLU GLN ARG TYR ILE LEU PRO ASP TYR VAL
SEQRES 4 A 162 ASP GLY GLY THR ALA GLY MET GLU LEU LEU
        1 hel ILE A
HELIX
                         18
                              GLN A
                                        28
        2 hel PRO A
HELIX
                         92
                              THR A
                                      107
        3 hel ILE A
                              SER A
                        138
HELIX
SHEET
        1 str ARG A
                         2
                              ASN A
                                      10
        2 str ARG A
                              LEU A
SHEET
              TYR A 35 THR A 43
MET A 1 48.865 25.394
        3 str TYR A
SHEET
ATOM 1
                                                     1.00 54.58 C
        C
                                            51.393
ATOM 2
        CA
              MET A 1 49.879
                                 24.359
                                           50.932
                                                     1.00 59.61 C
              MET A 1 49.248
                                 23.457
ATOM 3
         CB
                                           49.877
                                                     1.00 62.37 C
              MET A 1 51.349
ATOM 4
         CE
                                  24.403
                                           47.765
                                                     1.00 71.39
                                                                  C
ATOM 5
              MET A 1 48.708
                                  24.106
         CG
                                           48.629
                                                     1.00 66.70 C
              MET
                   A 1 50.347
                                  23.578
                                            52.116
                                                     1.00
ATOM
                                                           62.03
ATOM
              MET A 1 47.875
         0
                                  25.011
                                            52.020
                                                     1.00 54.99 0
         SD MET A 1 49.731
ATOM 8
                                  23.948
                                           47.163
                                                     1.00 77.15 S
```

12.3

Using sed -n '5,10p' structure.pdb to print only lines 5 through 10

```
ubuntu@ip-172-31-24-136:~$ sed -n '5,10p' structure.pdb
REMARK NCBI PDB FORMAT VERSION 5.0
SEQRES 1 A 162 MET ARG ILE LEU VAL LEU GLY VAL GLY ASN
SEQRES 2 A 162 THR ASP GLU ALA ILE GLY VAL ARG ILE VAL
SEQRES 3 A 162 GLU GLN ARG TYR ILE LEU PRO ASP TYR VAL
SEQRES 4 A 162 ASP GLY GLY THR ALA GLY MET GLU LEU LEU
HELIX 1 hel ILE A 18 GLN A 28
```

Using sed '/MET/d' structure.pdb to delete lines containing the word MET

```
ubuntu@ip-172-31-24-136:~$ sed '/MET/d'
                                         structure.pdb
HEADER
       Hydrogenase
                                         23-Mar-99
                                                     1CFZ
COMPND
       Hydrogenase Maturating Endopeptidase Hybd From
SOURCE
        ORGANISM_SCIENTIFIC: Escherichia coli
AUTHOR
       Fritsche, Paschos, Beisel, Boeck & Huber
REMARK NCBI PDB FORMAT VERSION 5.0
SEQRES
            162
                 THR ASP GLU ALA ILE GLY VAL ARG ILE VAL
            162 GLU GLN ARG TYR ILE LEU PRO ASP TYR VAL
SEQRES 3 A
       1 hel ILE A
                     18
                         GLN A
                                  28
HELIX
HELIX
                                107
         hel PRO A
                     92
                          THR A
HELIX
       3 hel ILE
                     138
                         SER A
                                152
       1 str ARG A
                         ASN
                                 10
SHEET
                      2
       2 str ARG A
                     29
                         LEU A
SHEET
                                 32
SHEET
       3 str TYR A
                          THR
                              А
                                 43
```

12.5

Using -n '/HELIX/{/ILE/p}' structure.pdb to print all lines where the HELIX line contains the word ILE

```
ubuntu@ip-172-31-24-136:~$ sed -n '/HELIX/{/ILE/p}' structure.pdb
HELIX 1 hel ILE A 18 GLN A 28
HELIX 3 hel ILE A 138 SER A 152
```

12.6

Using sed '/^H/s/\$/***/' structure.pdb to append three stars to the end of lines starting with "H"

```
ubuntu@ip-172-31-24-136:~$ sed '/^H/s/$/***/'
                                             structure.pdb
                                        23-Mar-99
                                                    1CFZ ***
HEADER Hydrogenase
COMPND
       Hydrogenase Maturating Endopeptidase Hybd From
       ORGANISM_SCIENTIFIC: Escherichia coli
SOURCE
       Fritsche, Paschos, Beisel, Boeck & Huber
REMARK NCBI PDB FORMAT VERSION 5.0
SEQRES 1 A 162 MET ARG ILE LEU VAL LEU GLY VAL GLY ASN
SEQRES 2 A
           162
                THR ASP GLU ALA ILE GLY VAL ARG ILE VAL
SEQRES
                GLU GLN ARG TYR ILE LEU PRO ASP
      3 A
            162
SEQRES 4 A
                ASP GLY GLY THR ALA GLY MET GLU LEU LEU
            162
      1 hel ILE A
                         GLN A
HELIX
                     18
                                 28***
                               107***
HELIX 2 hel PRO A
                     92
                         THR A
      3 hel ILE A
HELIX
                                152***
                    138
                         SER A
        str
             ARG A
                         ASN A
      2 str ARG A
                     29
SHEET
                        LEU A
                               32
SHEET
      3 str TYR A
                        THR A 43
ATOM 1 C
           MET A 1 48.865
                           25.394
                                    51.393
                                            1.00 54.58 C
ATOM 2
       CA
            MET A 1 49.879
                            24.359
                                    50.932
                                            1.00 59.61 C
ATOM 3
           MET A 1 49.248
                                            1.00 62.37 C
       CB
                            23.457
                                    49.877
ATOM 4
       CE
            MET A 1 51.349
                            24.403
                                    47.765
                                            1.00 71.39 C
ATOM 5
                            24.106
           MET A 1 48.708
                                    48.629
       CG
                                            1.00 66.70 C
ATOM 6
       Ν
            MET A 1 50.347
                            23.578
                                    52.116
                                            1.00 62.03 N
ATOM
       0
            MET A 1 47.875
                                            1.00 54.99 0
                            25.011
                                    52.020
ATOM 8
                                            1.00 77.15 S
       SD MET A 1 49.731
                            23.948
                                    47.163
```

12.7

Using sed '/SEQRES/c SEQ' structure.pdb to replace the line containing SEQRES with SEQ

```
ubuntu@ip-172-31-24-136:~$ sed '/SEQRES/c SEQ' structure.p
HEADER Hydrogenase
                                        23-Mar-99
                                                    1CFZ
COMPND
       Hydrogenase Maturating Endopeptidase Hybd From
       ORGANISM_SCIENTIFIC: Escherichia coli
SOURCE
AUTHOR Fritsche, Paschos, Beisel, Boeck & Huber
REMARK NCBI PDB FORMAT VERSION 5.0
SEQ
SEQ
SEQ
HELIX
      1 hel ILE A
                     18
                         GLN A
                                 28
      2 hel PRO A
                     92
                         THR A
                               107
HELIX
      3 hel ILE A
                   138
                         SER A
                               152
HELIX
SHEET
      1 str ARG A
                     2
                         ASN A
                               10
SHEET
      2 str ARG A
                     29
                        LEU A
                               32
                     35 THR A 43
SHEET 3 str TYR A
ATOM 1 C MET A 1 48.865 25.394
                                           1.00 54.58 C
                                    51.393
ATOM 2 CA MET A 1 49.879
                            24.359
                                    50.932
                                            1.00 59.61 C
ATOM 3
       CB
           MET A 1 49.248
                            23.457
                                    49.877
                                            1.00 62.37
ATOM 4
            MET A 1 51.349
       CE
                            24.403
                                    47.765
                                            1.00 71.39
ATOM 5
       CG
           MET A 1 48.708
                                    48.629
                                            1.00 66.70 C
                            24.106
ATOM 6
            MET A 1 50.347
       Ν
                            23.578
                                    52.116
                                            1.00 62.03 N
ATOM 7
       0
            MET A 1 47.875
                            25.011
                                    52.020
                                            1.00 54.99 0
ATOM 8 SD MET A 1 49.731
                            23.948
                                    47.163
                                            1.00 77.15 5
12.8
Downloading jabberwocky.txt via ilearn
Opening git bash
Using cd ~/desktop/ACST890 to change the path
/oga@Lenovo-PC MINGW64 ~/Desktop
$ cd ~/desktop/ACST890quiz2
Using scp -i 44373082.pem jabberwocky.txt
```

ubuntu@ec2-13-54-157-132.ap-southeast-2.compute.amazonaws.com

ubuntu@ec2-13-54-157-132.ap-southeast-2.compute.amazonaws.com to add

ssh -i 44373082.pem

jabberwocky to AWS account.

```
oga@Lenovo-PC MINGW64 ~/desktop/ACST890quiz2
$ scp -i 44373082.pem jabberwocky.txt ubuntu@ec2-13-54-157-132.ap-southeast-2.co
mpute.amazonaws.com:
                                                            87.6KB/s
jabberwocky.txt
                                               100% 1470
                                                                        00:00
oga@Lenovo-PC MINGW64 ~/desktop/ACST890quiz2
$ ssh -i 44373082.pem ubuntu@ec2-13-54-157-132.ap-southeast-2.compute.amazonaws.
Welcome to Ubuntu 18.04.2 LTS (GNU/Linux 4.15.0-1032-aws x86_64)
 * Documentation: https://help.ubuntu.com
 * Management:
                   https://landscape.canonical.com
 * Support:
                   https://ubuntu.com/advantage
 System information as of Thu May 2 10:27:06 UTC 2019
 System load: 0.0
Usage of /: 27.0% of 7.69GB
Memory usage: 23%
                                   Processes:
                                                        92
                                  Users logged in:
                                                        1
                                   IP address for eth0: 172.31.24.136
 Swap usage: 0%
 * Ubuntu's Kubernetes 1.14 distributions can bypass Docker and use containerd
  directly, see https://bit.ly/ubuntu-containerd or try it now with
     snap install microk8s --classic
  Get cloud support with Ubuntu Advantage Cloud Guest:
    http://www.ubuntu.com/business/services/cloud
```

Using sed '/^\s*\$/d' jabberwocky.txt to delete all blank line

```
ubuntu@ip-172-31-24-136:~$ sed '/^\s*$/d' jabberwocky.txt
Twas brillig, and the slithy toves
Did gyre and gimble in the wabe:
All mimsy were the borogoves,
And the mome raths outgrabe.
"Beware the Jabberwock, my son!
The jaws that bite, the claws that catch!
Beware the Jubjub bird, and shun
The frumious Bandersnatch!"
He took his vorpal sword in hand:
Long time the manxome foe he sought
So rested he by the Tumtum tree,
And stood awhile in thought.
And, as in uffish thought he stood,
The Jabberwock, with eyes of flame,
Came whiffling through the tulgey wood,
And burbled as it came!
One, two! One, two! And through and through
The vorpal blade went snicker-snack!
He left it dead, and with its head
He went galumphing back.
"And, has thou slain the Jabberwock?
Come to my arms, my beamish boy!
O frabjous day! Callooh! Callay!'
He chortled in his joy.
Twas brillig, and the slithy toves
Did gyre and gimble in the wabe;
All mimsy were the borogoves,
And the mome raths outgrabe.
ubuntu@ip-172-31-24-136:~$
```