

## ACST 890- ONLINE QUIZ 2 SOLUTIONS:

45535531-ROHAN MARCUS DEANS

**GITHUB Username:** 45535531

**Repository Name:** Quiz1 (<https://github.com/45535531/Quiz1.git>)

**File Name:** 45535531DeansRohanMarcusOLQ2.pdf

**Other Attached files on GITHUB:** example.txt, code.txt, jabberwocky.txt, structure.pdb

### NOTE:

For all examples, the same file example.txt has been used. It has been uploaded using the scp command: `scp -i 45535531.pem structure.pdb ubuntu@ec2-13-239-12-50.ap-southeast-2.compute.amazonaws.com:`

```
HP LAPTOP@HP MINGW64 ~
$ scp -i 45535531.pem example.txt ubuntu@ec2-13-239-12-50.ap-southeast-2.compute.amazonaws.com:
example.txt                                     100% 319   10.2KB/s  00:00
```

### 12.1.

Download the program from <http://www.staff.hs-mittweida.de/~wuenschi/data/media/compbiolbook/chapter-11-regex--structure.pdb>.

We use the syntax `curl -s http://www.staff.hs-mittweida.de/~wuenschi/data/media/compbiolbook/chapter-11-regex--structure.pdb` to download the program from the website.

```
HP LAPTOP@HP MINGW64 ~
$ curl -s http://www.staff.hs-mittweida.de/~wuenschi/data/media/compbiolbook/chapter-11-regex--structure.pdb
```

This can be verified by using `ls` command to see if the file has been successfully downloaded.

```
HP LAPTOP@HP MINGW64 ~
$ ls
45535531.pem      Documents/      'Local Settings'@  ntuser.dat.LOG2      Pictures/      Searches/
AppData/          Downloads/      Music/             NTUSER.DAT{bbd3e3b-0b41-11e3-8249-d6927d06400b}.TM.b1f  PrintHood@    SendTo@
'Application Data'@  Example.txt     'My Documents'@   NTUSER.DAT{bbd3e3b-0b41-11e3-8249-d6927d06400b}.TM.Container00000000000000000001.regtrans-ms  Recent@       'Start Menu'@
Contacts/         Favorites/      NetHood@          NTUSER.DAT{bbd3e3b-0b41-11e3-8249-d6927d06400b}.TM.Container00000000000000000002.regtrans-ms  RStudio/      structure.pdb
```

OR

We can also download the file directly and upload it using the scp command:

`$ scp -i 45535531.pem structure.pdb ubuntu@ec2-13-239-12-50.ap-southeast-2.compute.amazonaws.com:`

To change Beisel's name to Weisel in the file structure.pdb, we use the following sed command:

sed 's/Beisel/Weisel/' structure.pdb

```
ubuntu@ip-172-31-18-161:~$ sed 's/Beisel/Weisel/' structure.pdb
HEADER   Hydrogenase                               23-Mar-99   1CFZ
COMPND   Hydrogenase Maturing Endopeptidase Hybd From
SOURCE   ORGANISM_SCIENTIFIC: Escherichia coli
AUTHOR   Fritsche, Paschos, Weisel, 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
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  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  CB  MET A 1  49.248  23.457  49.877  1.00 62.37 C
ATOM      4  CE  MET A 1  51.349  24.403  47.765  1.00 71.39 C
ATOM      5  CG  MET A 1  48.708  24.106  48.629  1.00 66.70 C
ATOM      6  N   MET A 1  50.347  23.578  52.116  1.00 62.03 N
ATOM      7  O   MET A 1  47.875  25.011  52.020  1.00 54.99 O
ATOM      8  SD  MET A 1  49.731  23.948  47.163  1.00 77.15 S
```

### Example:

To change Tom's name to Dom in the file example.txt, we use the following sed command:

sed 's/Tom/Dom/' example.txt

```
ubuntu@ip-172-31-18-161:~$ sed 's/Tom/Dom/' example.txt
Hello Dom
Hello Jane
How are you Dom?

Good Day
Hope all is well
Tell me the time

Everyday is amazing
Need some water
Tell her she can leave at any time

Ate the cake yesterday
Dom is the best dog ever
It was good

His work was truly amazing
Jane will be back on Monday
She is leaving tonight
```

## 12.2.

To delete the first three lines of the file structure.pdb, we use the following sed command:

sed '1,3d' structure.pdb

```
ubuntu@ip-172-31-18-161:~$ 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
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 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  CB  MET A 1 49.248 23.457 49.877 1.00 62.37 C
ATOM    4  CE  MET A 1 51.349 24.403 47.765 1.00 71.39 C
ATOM    5  CG  MET A 1 48.708 24.106 48.629 1.00 66.70 C
ATOM    6  N   MET A 1 50.347 23.578 52.116 1.00 62.03 N
ATOM    7  O   MET A 1 47.875 25.011 52.020 1.00 54.99 O
ATOM    8  SD  MET A 1 49.731 23.948 47.163 1.00 77.15 S
```

### Example:

To delete the first three lines of the file example.txt, we use the following sed command:

sed '1,3d' example.txt

```
ubuntu@ip-172-31-18-161:~$ sed '1,3d' example.txt

Good Day
Hope all is well
Tell me the time

Everyday is amazing
Need some water
Tell her she can leave at any time

Ate the cake yesterday
Tom is the best dog ever
It was good

His work was truly amazing
Jane will be back on Monday
She is leaving tonight
```

### 12.3.

To print only lines 5 through 10 of the file structure.pdb, we use the following sed command:

`sed -n '5,10p' structure.pdb`

```
ubuntu@ip-172-31-18-161:~$ 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
```

#### Example:

To print only lines 5 through 10 of the file example.txt, we use the following sed command:

`sed -n '5,10p' example.txt`

```
ubuntu@ip-172-31-18-161:~$ sed -n '5,10p' example.txt
Good Day
Hope all is well
Tell me the time

Everyday is amazing
Need some water
```

## 12.4.

To delete lines containing MET in the file structure.pdb, we use the following sed command:

sed '/MET/d' structure.pdb

```
ubuntu@ip-172-31-18-161:~$ 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   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
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
```

### Example:

To delete lines containing **amazing** in the file example.txt, we use the following sed command:

sed '/amazing/d' example.txt

```
ubuntu@ip-172-31-18-161:~$ sed '/amazing/d' example.txt
Hello Tom
Hello Jane
How are you Tom?

Good Day
Hope all is well
Tell me the time

Need some water
Tell her she can leave at any time

Ate the cake yesterday
Tom is the best dog ever
It was good

Jane will be back on Monday
She is leaving tonight
```

## 12.5.

To print all lines where the HELIX line contains the word ILE of the file structure.pdb, we use the following sed command:

```
sed -n '/HELIX.*ILE/p' structure.pdb
```

```
ubuntu@ip-172-31-18-161:~$ 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
```

### Example:

To print all lines where the **Tell** line contains the word **time** in the file example.txt, we use the following sed command:

```
sed -n '/Tell.*time/p' example.txt
```

```
ubuntu@ip-172-31-18-161:~$ sed -n '/Tell.*time/p' example.txt
Tell me the time
Tell her she can leave at any time
```

## 12.6.

To append three stars to the end of lines starting with “H” in the file structure.pdb, we use the following sed command:

```
sed '/^H/s/$/****/' structure.pdb
```

```
ubuntu@ip-172-31-18-161:~$ sed '/^H/s/$/****/' 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   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****
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  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  CB  MET A  1  49.248  23.457  49.877  1.00 62.37 C
ATOM      4  CE  MET A  1  51.349  24.403  47.765  1.00 71.39 C
ATOM      5  CG  MET A  1  48.708  24.106  48.629  1.00 66.70 C
ATOM      6  N   MET A  1  50.347  23.578  52.116  1.00 62.03 N
ATOM      7  O   MET A  1  47.875  25.011  52.020  1.00 54.99 O
ATOM      8  SD  MET A  1  49.731  23.948  47.163  1.00 77.15 S
```

### Example:

To append three stars to the end of lines starting with “H” in the file example.txt, we use the following sed command:

```
sed '/^H/s/$/****/' example.txt
```

```
Hello Tom****
Hello Jane****
How are you Tom?****

Good Day
Hope all is well****
Tell me the time

Everyday is amazing
Need some water
Tell her she can leave at any time

Ate the cake yesterday
Tom is the best dog ever
It was good

His work was truly amazing****
Jane will be back on Monday
She is leaving tonight
```

## 12.7.

To replace the line containing SEQRES with SEQ in the file structure.pdb, we use the following sed command:

```
sed '/SEQRES/s/^.*$/SEQ/' structure.pdb
```

```
ubuntu@ip-172-31-18-161:~$ sed '/SEQRES/s/^.*$/SEQ/' structure.pdb
HEADER    Hydrogenase                23-Mar-99   1CFZ
COMPND    Hydrogenase Maturing Endopeptidase Hybd From
SOURCE    ORGANISM_SCIENTIFIC: Escherichia coli
AUTHOR    Fritsche, Paschos, Beisel, Boeck & Huber
REMARK    NCBI PDB FORMAT VERSION 5.0
SEQ
SEQ
SEQ
SEQ
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  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  CB  MET A  1  49.248  23.457  49.877  1.00 62.37 C
ATOM      4  CE  MET A  1  51.349  24.403  47.765  1.00 71.39 C
ATOM      5  CG  MET A  1  48.708  24.106  48.629  1.00 66.70 C
ATOM      6  N   MET A  1  50.347  23.578  52.116  1.00 62.03 N
ATOM      7  O   MET A  1  47.875  25.011  52.020  1.00 54.99 O
ATOM      8  SD  MET A  1  49.731  23.948  47.163  1.00 77.15 S
```

### Example:

To replace the line containing **amazing** with **incredible** in the file example.txt, we use the following sed command:

```
sed '/amazing/s/^.*$/incredible/' example.txt
```

```
ubuntu@ip-172-31-18-161:~$ sed '/amazing/s/^.*$/incredible/' example.txt
Hello Tom
Hello Jane
How are you Tom?

Good Day
Hope all is well
Tell me the time

amazing
Need some water
Tell her she can leave at any time

amazing
Ate the cake yesterday
Tom is the best dog ever
It was good

amazing
Jane will be back on Monday
She is leaving tonight
```



## 12.8.

First we upload the downloaded file jabberwocky.txt using the scp command:

```
scp -i 45535531.pem jabberwocky.txt ubuntu@ec2-13-239-12-50.ap-southeast-2.compute.amazonaws.com:
```

Then we login to the aws account using the ssh command:

```
ssh -i 45535531.pem ubuntu@ec2-13-239-12-50.ap-southeast-2.compute.amazonaws.com
```

```
HP LAPTOP@HP MINGW64 ~
$ scp -i 45535531.pem jabberwocky.txt ubuntu@ec2-13-239-12-50.ap-southeast-2.compute.amazonaws.com:
jabberwocky.txt                                     100% 1470   31.2KB/s   00:00

HP LAPTOP@HP MINGW64 ~
$ ssh -i 45535531.pem ubuntu@ec2-13-239-12-50.ap-southeast-2.compute.amazonaws.com
Welcome to Ubuntu 18.04.2 LTS (GNU/Linux 4.15.0-1032-aws x86_64)
```

To delete all blank lines of the file jabberwocky.txt, use one of the following sed commands:

```
sed '/^\s*$/d' jabberwocky.txt    OR    sed '/^$/d' jabberwocky.txt
```

```
ubuntu@ip-172-31-18-161:~$ 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.
-----
```

### Example:

To delete all blank lines of the file example.txt, we can use any one of the following sed commands:

`sed '/^\s*$/d' example.txt` OR `sed '/^$/d' example.txt`

```
ubuntu@ip-172-31-18-161:~$ sed '/^\s*$/d' example.txt
Hello Tom
Hello Jane
How are you Tom?
Good Day
Hope all is well
Tell me the time
Everyday is amazing
Need some water
Tell her she can leave at any time
Ate the cake yesterday
Tom is the best dog ever
It was good
His work was truly amazing
Jane will be back on Monday
She is leaving tonight
```