

```
~/Downloads/BE623_labsession_2
vim notes.txt
cat notes.txt
Have a nice day
ls
notes.txt sequence1.fasta sequence2.fasta sequence3.fasta sequence4.fasta sequence5.fasta sequence.fasta
```

```
tail -n 4 sequence.fasta
TAACTACTGATAAGTTACAAAACCTGTTTCTATCCTAAAGGGCAATACAGCCCTAGACTCTCCCAGGTAT
TTGACTCCTGCAGCAAAAAGGAAATTGAGGAAATAGAGCAAGCTATTTCTCAGAGGCACTATATCACA
TAGACACCCCG
```

```
grep ">" sequence5.fasta
```

```
>ahr
>clock
>hif1a
>hif2a
>hif3a
>npas1
>npas2
>npas3
>npas4
>sim1
>sim2
>arnt1
>bmal1
```

```
grep "A.G" sequence.fasta
```

```
AGGCGGGAGGATCACTTGAACCCAGGAGTTTGTGACCAGCATGGCCAGCATGGGGAGACCTATCTCTAC
AAAAACATAAAAAATAAATAGCCAGGCATGATGGCACACACTTGTGGTCTCAACTACTTGGGAGACTGAGG
TGCAAGGACTACTTGAGCCCTGGAGGTTGAGGCTGCAGCAAGCTGTGACCATTGCCACTGCCTTCAGCC
TGGGCAACAGAGCAAGAATCTGTCTCAAAAAAAAAAAAAAAAAAAAAATATTCAAGCAACACAAACA
GAGGTGTTTAAATAAAGTTTTCTCCTTTCTCCTTTCAAGATAGCTCCATTATAGTTTGTAGTAA
ATTCTTCTGAATTTATCTAAAACTATAAGACATATAGATCTACTAATTTATTGTATTTATTTATTTTT
TTGAGACAGAGTCGCGCTCTGTTGCCAGGCTGGAGTGCAAGTGGTGAATCTCAGCTCACTGCAAGCTCT
GCCTCCCGGTTCAAGCATTCTCTGCTCAGCCTCTGAGTAGCTGGGACTACAGGCACCCACCA
TGCCCGGCTAATTTTGTATTTTAGTAGAGACAAGTTTTCCACCGTTAGCCAGGTTGGTCTCGATCTC
CTGACCTTGTGATCCACCCGCTTGGCTCCCAAGTGCTGGGATTACAGGCATCAGCCACCGCGCCCG
CCTACTAATTTTATAGACATAAAAAATTTTATTCTACTAATTTTATAGACATACATCTCCAGCTGA
ACGCAGTGGCTCATGCTGTAATCCCAGGACTTTGGGAGGCCAAGACAGGCAATCACCTGAGTCAAGGAG
TTCAAGACCAGCCTGGCCAAACATGGTGAATCCCATCTCTACTAAAAATACAAAAATTAGCTGGGCATGG
TGGGCACCTGTAATCCAGCTACTCGGGAGGTTGAGGCAGGAGAATCGCTTGAACCCAGAGGCGGAGGT
TGCAGTGAGCCAAAGATGGCATATTGGACTCCACCCTGGGCAACAAGAGTGAACTCCATCTCAGAAAAA
AAAAAGACACACATCTCCTAATTATTTAAATGTGCTTTTTAAATGTTTTCTGATCAAACTACTGTTTGTG
TCTTGTCTTGTATCGTATAACAGAAATGTCAAGGCCAGATTTCTATGTCAAGGACATAATACTGTCTTCATT
CTTTTCAATGGCTTTGTCACTTGTGCTGTGACATTGGACTAGTTGTTAACTCTCTGAGACTTGGTGT
CTTAATCTCTAAAATGGGGATTAATAATGTACTGGCCACAGAGAGCTGTTGTGAGGATTAAATGAGTTAA
TAGATGTAAAGCATCTTGTACAGTGTCTGACACATATTAAAGTGCTCAAAAATGTTAGTTCTCATTGCTGT
GAATAGCCCCATGCTGGCTGTACCATAATTTCTTTAACCAAGTTCACGCTACGATTACTTATGTGATA
```

```
AACTAGTGTGGTGGTGTGACTATAGTGCTAGCTACTGGGGAGGCTGGGTGGGAGGATACGTTGAGCCC  
AGGAGTTGGAGGCTGCAGTGAGCTATGATCACATTGCTCTCAGTGAGACCTGGCTGACAGAGTGAGAAC
```

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➤ ~/Downloads/BE623_labsession_2
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```
grep "PI^A|L" sequence5.fasta
```

```
QLHWQIPPENSPLMERCFCIRLRLCLLDNSSGFLAMNFQGLKYLPPQALFAIATPLQPPSILEIRTKNF  
MRMKCTVTNRGRVTNLSKATWKLHCTGQVKVYEPPLSLIIMCEPIQHPSHMDIPLDSKTFLSRHSMDM  
LTSRGRTLNLKAATWKLNCSGHMRAYEPPLQCLVLICEAIPHPGSLPPLGRGAFLSRHSMDMKFTYCD  
FTQLMLEALDGFIIAVTTDGSIIYVSDSITPLLGHLPDVMQNLNLFPEQEHSEVYKILSSEYKSDS  
ELKHLILEAADGFLFIVSCETGRVVYVSDSVTPVLNQPSQSEWFGSTLYDQVHPDDVDKLRQLSTSRMCM
```

```
➤ ~/Downloads/BE623_labsession_2
```

```
grep "VV" sequence5.fasta
```

```
AANFREGLNLQEGEFLLQALNGFVLVVTDDALVFYASSTIQDYLGQQSDVIHQSVYELIHTEDRAEFOR  
IWLQTHYYITYHQWNSRPEFIVCTHTVVSAYEVRAE  
TVIYNTKNSQPQCIVCVNYVVSIGIHDH  
QMDNLYLKALEGFIADVTDQGMIFLSENISKFMGLTQVELTGHSIFDFTHPDHEEIRENLSSTERDFF  
KFTYCDRITELIGYHPEELLGRSAYEFYHALDSENNTKSHQNLCTKGQVVSQYRMLAKHGGYVWLETQ  
DRIAEVAGYSPDDLIGCSAYEYIHALDSDAVSKSIHTLLSKGQAVTGQYRFLARSGGYLWTQTQATVVS  
QTHYYITYHQWNSKPEFIVCTHSVVSADVRVE  
DYVHPGDHVENAEQGMTERSFIRMKSTLTKRGVHIKSSGYKVIHITGRRLRMGLVVAHALPPPTI  
ISESVLIYLGFERSELLCKSWYGLHPEDLAHASAQHYRLLAESGDIQAEVVRLOAKTGGWAWIYCLLY  
EKSNAARTREKENSEFYELAKLLPLPSAITSQDKASIIRLTTSYLMKRVVPEGLGEAWGHSSRTSP  
LDNVGRELGSLLQTLQDGFIFVAPDGKIMYISETASVHLGLSQVELTGNSIYEIHPADHDENTAVLTA  
LDGVAKELGSLLQTLQDGFIFVASDGKIMYISETASVHLGLSQVELTGNSIYEIHPADHDENTAVLTA  
SVATVHNSRSSRPHCIVSVNVVLTEIEYKEL  
ELKHLILEAADGFLFIVSCETGRVVVSDSVTPVLNQPSQSEWFGSTLYDQVHPDDVDKLRQLSTSRMCM  
GSSRSFICRMRCGSEPHFVVHCTGYIKAKFCLVAIGRLQVTSPPNCTDMSNVCOPTEFISRHNIEGIF  
TFVDHRCVATVGYPQQLGKNIVEFCHPEDQQLLRDSFQQVVKLGQVLSVMFRFRSKNQEWLWMRTSS  
DELKHLILRAADGFLFVVGCDRGKILFVSESVFKILNYSQNDLIGQSLFDYLHPKDIKVKELSSSRLC  
SGARRSFFCRMKNRPRKSFCTIHSTGYLKSNSCLVAIGRLHSHVVPQPVNGEIRVKSMEYVSRHAIDG  
RWFSFMNPWTKEVEYIVSTNTVVL
```

```
➤ ~/Downloads/BE623_labsession_2
```

```
grep -E "AA|DD" sequence5.fasta
```

```
AANFREGLNLQEGEFLLQALNGFVLVVTDDALVFYASSTIQDYLGQQSDVIHQSVYELIHTEDRAEFOR  
IFRTKHKLDFTPIGCDAGRIVLGYTEAELCTRGSGYQFIHADMLYCAESHIRMIKTGESGMIVFRLLT  
RHSLEWKFLFLDHRAPPIIGYLPFEVLGTSGDYHYHVDLENLAKCHEHLNQYGGKSCYYRFLTKGQW  
KEKSRDAARSRRSKESEFYELAHQLPLPHNVSSHLDKASVMRLTISYLRVRKLLDAGDLIDEDMKAQM  
NCFYKALDGFVMVLTDDGDMIIYSDNVNKMGLTQFELTGHSVDFTHPCDHEEMREMLTHNTQRSFFL  
KEKSRDAARCRRSKETEVFYELAHQLPLPHSVSSHLDKASIMRLAISFLRTHKLSSVCSENESEAEADQ  
KFTYCDRITELIGYHPEELLGRSAYEFYHALDSENNTKSHQNLCTKGQVVSQYRMLAKHGGYVWLETQ  
DAARSRRSQTEVLYQLAHTLPFARGVSAHLDKASIMRLTISYLRMHRLCAAGEWNVQVAGGGEPLDACYL  
LTSRGRTLNLKAATWKLNCSGHMRAYEPPLQCLVLICEAIPHPGSLPPLGRGAFLSRHSMDMKFTYCD  
DRIAEVAGYSPDDLIGCSAYEYIHALDSDAVSKSIHTLLSKGQAVTGQYRFLARSGGYLWTQTQATVVS  
KEKSRDAARSRRKENLEFFELAKLLPLPGAITSQDKASIIRLTTSYLMKRVVPEGLGEAWGHSSRTSP  
AGLAPGRGPAAALVSEVFEQHLGGHILQSLDGFVFNQEGKFLYISETSVIYLGLSQVEMTGSSVFDYI  
LEWKFLFLDHRAPPIIGYLPFEVLGTSGDYHYHIDLELLARCHQHLMQFGKGSCCYRFLTKGQWQIWL  
SRDAARSRRKENFEFYELAKLLPLPAAITSQDKASIIRLTTSYLMKRVVPEGLGEAWGHSSRTSP  
IVAAALPGFLVFTAEGKLYLSVESVSEHLGSMVDLVAQGDSDYDIIDPADHLTVRQQLTLDRFLFRCRF  
EKSNAARTREKENSEFYELAKLLPLPSAITSQDKASIIRLTTSYLMKRVVPEGLGEAWGHSSRTSP  
EKSNAARTREKENSEFYELAKLLPLPSAITSQDKASIIRLTTSYLMKRVVPEGLGEAWGHSSRTSP  
ELKHLILEAADGFLFIVSCETGRVVYVSDSVTPVLNQPSQSEWFGSTLYDQVHPDDVDKLRQLSTSRMCM  
DELKHLILRAADGFLFVVGCDRGKILFVSESVFKILNYSQNDLIGQSLFDYLHPKDIKVKELSSSRLC  
KFVFDQQRATAILAYLPQELLGTSCYEFHQDDIGHLAECHRQVLQTREKITTNCYKFKIKDGSFITLRS
```



```
~/Downloads/BE623_labsession_2
```

```
grep -v ">" sequence5.fasta | grep "P"
```

```
SNPSKRHRDRINTELDRLASLLPFPQDVINKLDKLSVLRLSVSYLRAKSFFDVALKSSPTERNGGQDNCR
QLHWQIPPPENSPLMERCFCIRLRLCLLDNSSGFLAMNFQGLKYLPPQALFAIATPQPPSILEIRTKNF
IFRTKHKLDFTPIGCDAGRIVLGYTEAELCTRGSGYQFIHAADMLYCAESHIRMIKTGESGMIVFRLLT
KNNRWTWQSNARLLVKNGRPDYIIVTQRPPLTDEEGTEHLR
VSRNKSEKKRRDQFNVLIKEGSMPLGNARKMDKSTVLQKSIDFLRKHKETAQSDASEIRQDWKPTFLS
NEEFTQLMLEALDGFLLAIMTDGSIYVSESVTSLEHLPSDLVDQSFNFPIEGEHSEVYKILSTEYK
SKNQLEFCCHMLRGTDPKPESTYEVVKFIGNFKSLYEDRVCFVATVRLATPQFIKEMCTVEEPNEEFTS
RHSLEWKFLFLDHRAPPIIGYLPFEVLGTSGDYHYHVDLENLAKCHEHLMQYGGKSCYYRFLTKGQQW
IWLOTHYYITYHWNRSRPEFIVCTHTVVSVAEVRAE
KEKSRDAARSRRSKESEVFYELAHQLPLPHNVSSHLDKASVMRLTISYLRVRKLLDAGDLIEDDMKAQM
NCFYALKALDGFVMVLTDDGDMYISDNVNKVMGLTQFELTGHVSFDFTHPCDHEEMREMLTHNTQRSFFL
RMKCTLTSRGRMTMIKSATWKVLHCTGHIHVYKPPMTCLVLICEPIPHPSNIEIPLDSKTFLSRHSLDMK
FSYCDERITELMGYEP EELLGRSIYEHYHALDSHDLTKTHHDMFTKGQVTTGQYRMLAKRGGYVWVETQA
TVIYNTKNSQPQCIVCVNYVVSIGIQHDL
KEKSRDAARCRRSKETEVYELAHQLPLPHSVSSHLDKASIMRLAISFLRTHKLSSVCSENESEAEADQ
QMDNLYLKALEGFIADVTDGDMIFLSENISKFMGLTQVELTGHISFDFTHPCDHEEIRENLSTERDF
MRMKCTVTNRGRVTNLSKATWVHLCTGQVKVYEP LLSCLIMCEPIQHPSHMDIPLDSKTFLSRHSDM
KFTYCDDRITELIGYHPEELLGRSAYEFYHALDENNTKSHQNLCTKGQVVSQYRMLAKHGGYVWLETQ
GTVIYNPRNLQPPQIMCVNYVLSIEIEKNDV
DAARSRRSQETEVLYQALHTLPFARGVSAHLDKASIMRLTISYLRMRHLCAAGWNQVGAGGEP LDACYL
KALEGFVMVLTAEQDMAYLSENVSKHLGLSQLELIGHSIFDFIHPDQEELQDALTPPTERCFLRMKST
LTSRGRTLNLKAATWVKVLCNSGHHMAYEPPLQLCLVLICEAIPHPGSLPPPLGRGAFLSRHSMDMKFTYCD
DRIAEGVAGYSPDDLIGCSAYEYIHALDSAVSKSTHTLSKGGQAVTGQYRFLARSGGYLWTQATVVS
GRGPQSESIVCVHFLISQVEETGV
KEKSRNAARSRRGKENLEFFELAKLLPLPGAISSQLDKASIVRLSVTYLRRLRFAALGAPPWGLRAAGPP
AGLAPGRRGP AALVSEVFEQHLGGHILQSLDGFVFNQEGKFLYISETVSIYLGLSQVEMTGSSVFDYI
HPGDHSEVLEQLGLVQERSFFVRMKSTLTRKGLHVKASGYKVIHVTGRLRALGLVALGHTLPPAPLAELP
LHGHMIVFRLSLGLTLACESRVSDHMDLGPSELVGRSCYQFVHGQDATRIRQSHVLDLKGQVMTGYR
WLQRAGGFVWLQSVATVAGSGKSPGEHHVLWVSHVLSQAEGGQT
NKSEKKRRDQFNVLIKESSMLPGNTRKMDKTTVLEKVIQKQHNVEVSAQTEICDQDQDWKPSFLSNEE
FTQLMLEALDGFIIAVTTDGSIIYVSDSITPLLGHLPSDVMQNLNLFPEQEHSEVYKILSSEYKSDS
DLEFYCHLLRGSLNPKFPTYEYIKFVGNFRSYLGKEVCFIATVRLATPQFLKENCIVDEPLEEFTSRHS
LEWKFLFLDHRAPPIIGYLPFEVLGTSGDYHYHIDLELLARCHQHLMQFGKGKSCCYRFLTKGQQWIWL
QTHYYITYHWNRSRPEFIVCTHSVVSADVRVE
SRDAARSRRGKENFEFELAKLLPLPAITSQLDKASIIRLTISYLMKRDFAHQGDPPWNLRMGPPPPNT
SVKVIQAQRRRSPSALAIEVFEAHLGSHILQSLDGFVFNQEGKFLYISETVSIYLGLSQVELTGSSVF
DYVHPGDHVEAEQLGMLTLEFFIRMKSTLTRGVHIKSSGYKVIHITGRRLRLMGLVVVAHALPPPITI
NEVRIDCHMFVTRVNMDLNIIYCENRISDYMDLTPVDIVGKRCYHFIHAEDVEGIRHSHLDLNNKGQCVT
KYRRWMQKNGGYINIQSSATIAINAKNANEKNIWVNYLLSNPEYKDT
GASKARRDQINAEIRNLKELLPLAEADKVRLSYLHMSLACIYTRKGVFFAGGTPLAGPTGLLSAQELED
IVAALPGFLVFTAEGLLYLSESVSEHLGHSMDVLVAQGDSDIYDIPADHLTVRQQLTLDRLFRCRF
NTSKSLRRQSAGNKLVLIRGRFAHNPVFTAFCAPLEPRPRPGPGPGPASPFLAMFQSRHAKDLALLD
ISESVLIYLGFERSELLCKSWYGLLHPEDLAHASAQHYRLLAESGDIQAEVNRVRLQAKTGGWAWIYCLLY
SEGPEGPITANNYPISDMEAWSLRQQL
EKSNAARTRREKENSEFELAKLLPLPSAITSQLDKASIIRLTTSYLMKRVVFP EGLGEAWGHSSRTSP
LDNVGRELGSLLQTLDGFIFFVAPDGKIMYISETASVHLGLSQVELTGNSIYEHIPADHDEMTAVLTA
EIERSSFFLRMKCVLAKRNAGLTCGGYKVIHCSGYLKIRNVGLVAVGHSLPPSAVTEIKLHSNMFMFRASL
DMKLIFLDSRVAELTGYPEQDLTEKTYHHVHGCDTFHLRCAHHLLLVKGQVTTKYRFLAKHGGVWVWQ
SYATIVHNSRSSRPHCIVSVNYVLTDTYKGL
EKSNAAKTRREKENGEFELAKLLPLPSAITSQLDKASIIRLTTSYLMKRAVFP EGLGDWAGQPSRAGP
```

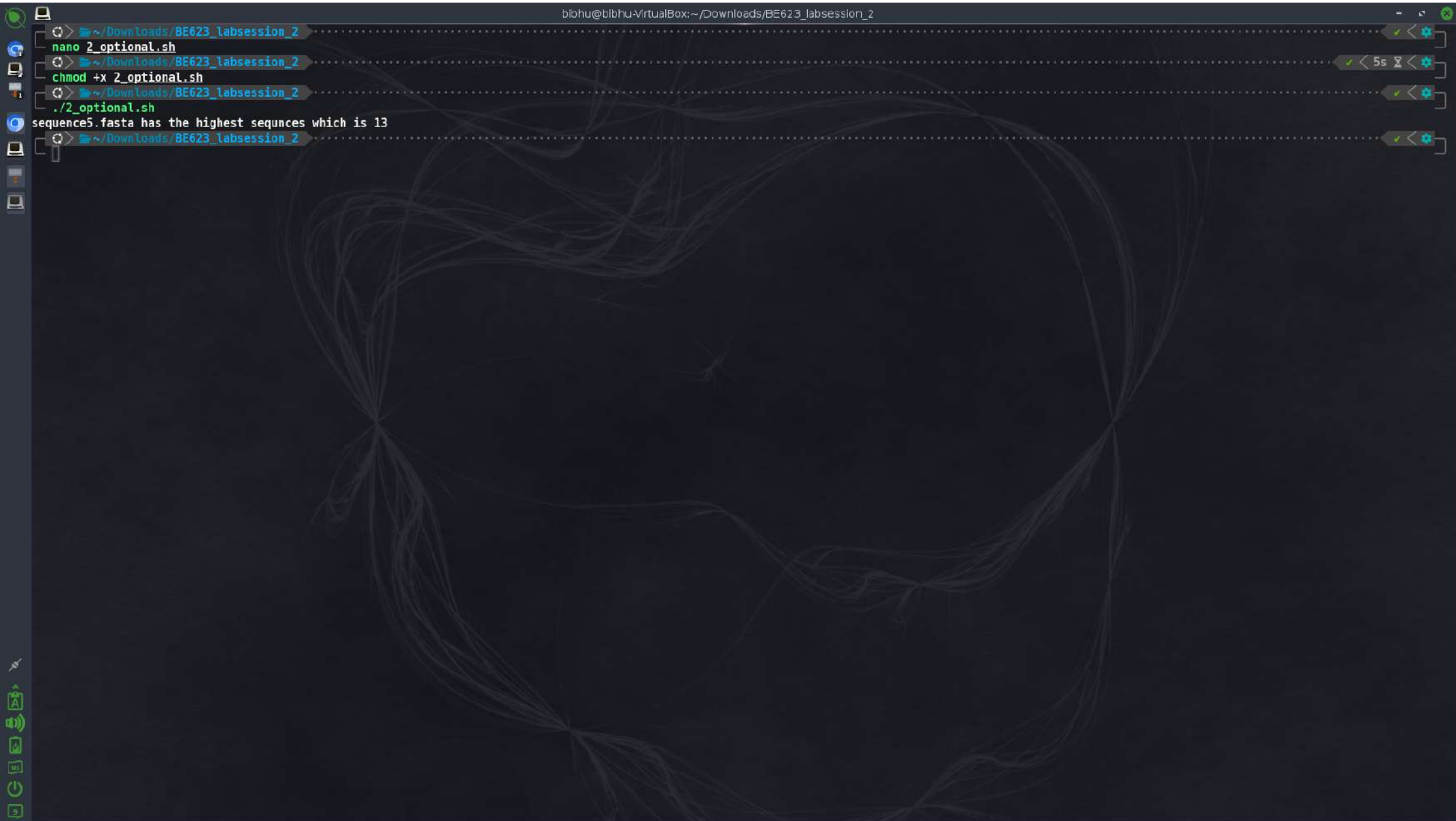
```
LDGVAKELGSHLLQTL DGFV FVVASD GIMYISETASVHLGLSQVELTGNSIYEYIHP SDH DENTAVLTA
E IERSFFLRMKCVLAKRNAGLTCSGYKVIHCSGYLKIRIVGLVAVGQSLPPSAITEIKLYSNMFMFRASL
DLKLIFLDSRVTEVTGYEPDOLIEKTLYHHVHGCDVFLRYAHLLLVKGQVTTKYVRLLSKRGGWVWVQ
SYATVVHNSRSSRPHCIVSVNYVLTEIEYKEL
NHSEIERRRRNKMTAYITELSDMVP TCSALARKPKDILTMMAVSHMKSRLGTGMTSTDGSYKPSFLT DQ
ELKHLILEAADGFLFIVSCETGRVVYVSDSVTPVLNQ PQSEWFGSTLYDQVHPDDVDKLRQLSTSRMCM
GSRRSFICMRRCGSSEPHFVVVHCTGYIKAKFCLVAIGRLQVTSSP NCTDMSNVCP TEFISRHNIEGIF
TFVDHRCVATVGYPQELLGKNIVEFCHPEDQQLLRDSFQQVVKLGQVLSVMFRFRSKNQEWLWMRTSS
FTFQNPYSDEIEYICTNTNVK
EAHSQIEKRRRDKMNSFIDELASLVPTCNAMSRKLDKLTVLRMAVQHMKTLRGATNPYTEANYKPTFLSD
DELKHLILRAADGFLFVVGCDRGKILFVSESVFKILNYSQNDLIGQSLFDYLHPKDIAKVKEQLSSSRLC
SGARRSFFCRMKCNRP RKSFCTIHSTGYLKSNSCLVAIGRLHSHVVPQPVNGEIRVKSMEYVSRHAIDG
KFVFDQRATAILAYLPQELLGTS CYEYFHQDDIGHLAECRQVLQ TREKITTNCYKFKIKDGSFITLRS
RWFSEFMNPWTKVEYIVSTNTVVL
>~/Downloads/BE623_labsession_2
seq5="sequence5.fasta"
>~/Downloads/BE623_labsession_2
grep "^>" "$seq5"
>ahr
>clock
>hif1a
>hif2a
>hif3a
>npas1
>npas2
>npas3
>npas4
>sim1
>sim2
>arnt1
>bmal1
>~/Downloads/BE623_labsession_2
pattern="G{2,\\}"
>~/Downloads/BE623_labsession_2
cp ../protein.fasta .
>~/Downloads/BE623_labsession_2
ls
notes.txt protein.fasta sequence1.fasta sequence2.fasta sequence3.fasta sequence4.fasta sequence5.fasta sequence.fasta
>~/Downloads/BE623_labsession_2
grep "pattern" protein.fasta
KPVKKKKIKREIKILENLRGGPNIITLADIVKDPVSRTPALVEHYVNTDFKQLYQTLTDYDIRFMYEI
WERFVHSENQHLVSPEALDFLDKLLRYDHQSRLTAREAMEHPYFYT VVKDQARMGSSMPGGSTPVSSAN
>~/Downloads/BE623_labsession_2
BI0=biocomputing
>~/Downloads/BE623_labsession_2
export BI0
>~/Downloads/BE623_labsession_2
bash -c "echo $BI0"
biocomputing
>~/Downloads/BE623_labsession_2
seq3="sequence3.fasta"
>~/Downloads/BE623_labsession_2
```



```
1 #!/bin/bash
2
3 for file in *.fasta; do
4     seq_count=$( grep -c "^>" "$file")
5     size=$(stat -c %s "$file")
6     echo "$file : $seq_count sequences, $size size"
7 done
8
```

```
1 #!/bin/bash
2
3 for file in *.fasta; do
4     seq_count=$( grep -c "^>" "$file")
5     if [ "$seq_count" -gt 3 ]; then
6         size=$(stat -c %s "$file")
7         echo "$file : $seq_count sequences, $size size"
8     fi
9 done
10
```

```
biohu@bilibu-VirtualBox: ~/Downloads/BE623_labsession_2
nano if_else.sh
chmod +x if_else.sh
if_else.sh
zsh: command not found: if_else.sh
./if_else.sh
19 sequence3.fasta
nano for_loop.sh
./for_loop.sh
protein.fasta : 1 sequences, 467 size
sequence1.fasta : 1 sequences, 974 size
sequence2.fasta : 4 sequences, 1710 size
sequence3.fasta : 2 sequences, 1000 size
sequence4.fasta : 4 sequences, 2374 size
sequence5.fasta : 13 sequences, 4229 size
sequence.fasta : 1 sequences, 79551 size
nano for_loop.sh
./for_loop.sh
sequence2.fasta : 4 sequences, 1710 size
sequence4.fasta : 4 sequences, 2374 size
sequence5.fasta : 13 sequences, 4229 size
nano for_loop.sh
grep "A{2\}" sequence5.fasta > cys_rich.txt
less cys_rich.txt
rm cys_rich.txt
grep "C{2\}" sequence5.fasta > cys_rich.txt
less cys_rich.txt
rm cys_rich.txt
grep "C{3\}" sequence5.fasta > cys_rich.txt
less cys_rich.txt
```





```
1#!/bin/bash
2
3max_count=0
4max_file=""
5
6for file in *.fasta; do
7    head_count=$(grep -c "^>" "$file")
8    if((head_count > max_count)); then
9        max_count=$head_count
10       max_file=$file
11    fi
12done
13
14echo "$max_file has the highest sequences which is $max_count"
15
```