user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506...

```
Hello

World

Biocomputing

~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
~
:wq!
```

user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB: ~/Downloads/lab3

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ pwd
/home/user_ac/Desktop
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ cd ../Downloads/lab3/
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ ls
clock_gene.fasta  protein.fasta  protein.pdb
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ vi test.txt
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB: ~/Downloads/lab3

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ pwd
/home/user_ac/Desktop
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ cd ../Downloads/lab3/
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ ls
clock_gene.fasta  protein.fasta  protein.pdb
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ vi test.txt
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed '/^$/d' test.txt
Hello
World
Biocomputing
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ pwd
/home/user_ac/Desktop
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ cd ../Downloads/lab3/
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ ls
clock_gene.fasta  protein.fasta  protein.pdb
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ vi test.txt
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed '/^$/d' test.txt
Hello
World
Biocomputing
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '{printf "%d %s\n", NR, $0}' test.txt > test_numbered.txt
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ pwd
/home/user_ac/Desktop
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ cd ../Downloads/lab3/
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ ls
clock_gene.fasta  protein.fasta  protein.pdb
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ vi test.txt
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed '/^$/d' test.txt
Hello
World
Biocomputing
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '{printf "%d %s\n", NR, $0}' test.txt > test_numbered.txt
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ cat test_numbered.txt
1 Hello
2
3 World
4
5 Biocomputing
6
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ pwd
/home/user_ac/Desktop
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ cd ../Downloads/lab3/
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ ls
clock_gene.fasta  protein.fasta  protein.pdb
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ vi test.txt
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed '/^$/d' test.txt
Hello
World
Biocomputing
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '{printf "%d %s\n", NR, $0}' test.txt > test_numbered.txt
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ cat test_numbered.txt
1 Hello
2
3 World
4
5 Biocomputing
6
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed -n '/^>/p' clock_gene.fasta
>NC_000004.12:c55546909-55427903 Homo sapiens chromosome 4, GRCh38.p14 Primary Assembly
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ pwd
/home/user_ac/Desktop
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ cd ../Downloads/lab3/
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ ls
clock_gene.fasta  protein.fasta  protein.pdb
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ vi test.txt
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed '/^$/d' test.txt
Hello
World
Biocomputing
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '{printf "%d %s\n", NR, $0}' test.txt > test_numbered.txt
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ cat test_numbered.txt
1 Hello
2
3 World
4
5 Biocomputing
6
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed -n '/^>/p' clock_gene.fasta
>NC_000004.12:c55546909-55427903 Homo sapiens chromosome 4, GRCh38.p14 Primary Assembly
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed -n '/^>.*CLOCK/p' protein.fasta
>sp|O15516|CLOCK_HUMAN Circadian locomoter output cycles protein kaput OS=Homo sapiens OX=9606 GN=CLOCK PE=1 SV=1
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ pwd
/home/user_ac/Desktop
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ cd ../Downloads/lab3/
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ ls
clock_gene.fasta  protein.fasta  protein.pdb
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ vi test.txt
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed '/^$/d' test.txt
Hello
World
Biocomputing
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '{printf "%d %s\n", NR, $0}' test.txt > test_numbered.txt
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ cat test_numbered.txt
1 Hello
2
3 World
4
5 Biocomputing
6
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed -n '/^>/p' clock_gene.fasta
>NC_000004.12:c55546909-55427903 Homo sapiens chromosome 4, GRCh38.p14 Primary Assembly
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed -n '/^>.*CLOCK/p' protein.fasta
>sp|O15516|CLOCK_HUMAN Circadian locomoter output cycles protein kaput OS=Homo sapiens OX=9606 GN=CLOCK PE=1 SV=1
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed -n '/CC/p' protein.fasta
TPEYLKSKNQLEFCCHMLRGTIDPKEPSTYEYVKFIGNFKSLNSVSSSAHNGFEGTIQRT
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ pwd
/home/user_ac/Desktop
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Desktop$ cd ../Downloads/lab3/
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ ls
clock_gene.fasta  protein.fasta  protein.pdb
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ vi test.txt
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed '/^$/d' test.txt
Hello
World
Biocomputing
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '{printf "%d %s\n", NR, $0}' test.txt > test_numbered.txt
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ cat test_numbered.txt
1 Hello
2
3 World
4
5 Biocomputing
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user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed -n '/^>/p' clock_gene.fasta
>NC_000004.12:c55546909-55427903 Homo sapiens chromosome 4, GRCh38.p14 Primary Assembly
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed -n '/^>.*CLOCK/p' protein.fasta
>sp|O15516|CLOCK_HUMAN Circadian locomoter output cycles protein kaput OS=Homo sapiens OX=9606 GN=CLOCK PE=1 SV=1
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed -n '/CC/p' protein.fasta
TPEYLKSKNQLEFCCHMLRGTIDPKEPSTYEYVKFIGNFKSLNSVSSSAHNGFEGTIQRT
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '!/^>/ {g+=gsub(/G/,"")} END {print g}' clock_gene.fasta
23471
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '!/^>/ {g+=gsub(/G/,"")} END {print g}' clock_gene.fasta
23471
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed -n '5,28p' clock_gene.fasta
GTGGAGGAGGGGAAGGGAAGGGAGGGGGAGGAGGAGCTGGCCACAGGAGCGGCGAATTTTTGGGGGGGTG
GGTGGGGGGCGCCACTCACAGCCCCAGGTGCTGCTGGAGGTGGGAGCCGCGGCGCCTCCTGGACACAGGC
GGGGTAGTGGTTCCGAGTCACCGCAGCGGGAGACCTGGGTGGGGGAGGGAAGAAGCCGGAGCCGCCGCAA
GCCACACGGTGAGGGCGCGGGGAAGGGGAGGGAGCGGGGGGCGGCGTGTGTGGGGCCGGGGGGCGGCGGC
CAAGGGTGGGGAAGGCGGGAGCTGAAGCCCAAGTTTGGCGTGTCGTTCTAGTGTGTCTTTTCCCGGGACT
TCGGGCCGAGGCCCGCCCTGCCTGAGAGGCCCTCTGGGGCAGCTGGGGTTACCTGCGGGGCAGGGGCGGG
AGTGGGGTGCACGGCGGGGCCGGGCGGCTTGAGGGCGCCCGGAGCTGCGGCCGATTCCAGCAGCTGGGAG
GCGGGGAAAGACGGGGACCGGGTGCCGAGAGAGCTTTCGCTGGGGACCCGCTAGGCCTTGTGACCCACTT
TATTCCTGTCACCACTCGGGCACGTTTGGAGCAGCGCCCAATGGGGCGCCGGGGCGGCCAGCTCCTCCGG
GGAACCCCCGCCCTCCCGGCGCCCGGCCCGCGTGCCGCAGTCCGCAGTCCGAACGGCCGCCGTTGCCGGC
CGCGGGCTGGTTCCGTTAGTGGTGGTGGTTCCGGGGTTCCGTTCCTAGGCAGCGCGCGGCTATTAGCGTC
TGACTCCAGCGACCGCGCGCGGGTTCGAGGGTTGGCGGCGAGGCGCTCGGTTTCTCTTCTTCCGTCCACC
CGCGCTTCCCGTTCCCCGTCACCGCCGCTGGCGTTTGTAGATTTCTTTCCGCCAGTGAAGCTGGGTTTTC
TGGAGTTGGCTCTGGCGCTCTGGCCCCTGGAGTGTAATTTCCTACACGCAGCGCCGCAGAGTTTATATTC
TTTGAAAGTGTTTGTAGCTTTGTAGAGGTCCTCTTGTTGATGGTAGGTGAGCCTAATTCTGCAAGATAAA
AGCCTAGTCTCTGACCTGGCAGATGAAAGATCAAATCAGATTGTGGTTTCCTGCTATTAGAATGCCGTGC
TATTAGACTTTAAGGCTTTTTAGCCTTCTTTAAAAAATAAAAAAATTTTTACAGTGGAAGAAAAGCACAA
GAAGTAAACTTTTACAGTCGTTGATTTGACTATAACGCTGATCCCCCCAAATCAAAGGTAATTTCACTTT
GAAGATTGCGTTCTGATTTGTAGCTTTAAGCGATTAGAGAAAATTGTGCAATATTCCCCTCTACCTGTTT
GAAAATAAACATTCTTAAAAGGATGTAATTTAGATAATGAATTGCTTTCTCTGAAACTTATCCCTTGGGA
CACCTCAAATCTGATTGGTTTTCAAAGCTTGGGGGAAGGAAATTAATTCCTGTGATAAGTGGTTGGCTGA
ACAGAATGTCTTGAAAGGTTAGCCTGTAGCATTAGGAGAAATACCTAATGTAAACGACGAGTTAATGGGT
GCAGCACACCAGCGTGGCACATTTATACATATGTGACAAACCTGCACGTTGTGCACATGTACCCTAGAAC
TTAAAGTATAATAATAAAAAAAGTAAAAAAAAAAAAAGTTAGCCTGAAGAAAGCAGACTGAAAATGTTCT
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed -n '5,28p' clock_gene.fasta
GTGGAGGAGGGGAAGGGAAGGGAGGGGGAGGAGGAGCTGGCCACAGGAGCGGCGAATTTTTGGGGGGGTG
GGTGGGGGGCGCCACTCACAGCCCCAGGTGCTGCTGGAGGTGGGAGCCGCGGCGCCTCCTGGACACAGGC
GGGGTAGTGGTTCCGAGTCACCGCAGCGGGAGACCTGGGTGGGGGAGGGAAGAAGCCGGAGCCGCCGCAA
GCCACACGGTGAGGGCGCGGGGAAGGGGAGGGAGCGGGGGGCGGCGTGTGTGGGGCCGGGGGGCGGCGGC
CAAGGGTGGGGAAGGCGGGAGCTGAAGCCCAAGTTTGGCGTGTCGTTCTAGTGTGTCTTTTCCCGGGACT
TCGGGCCGAGGCCCGCCCTGCCTGAGAGGCCCTCTGGGGCAGCTGGGGTTACCTGCGGGGCAGGGGCGGG
AGTGGGGTGCACGGCGGGGCCGGGCGGCTTGAGGGCGCCCGGAGCTGCGGCCGATTCCAGCAGCTGGGAG
GCGGGGAAAGACGGGGACCGGGTGCCGAGAGAGCTTTCGCTGGGGACCCGCTAGGCCTTGTGACCCACTT
TATTCCTGTCACCACTCGGGCACGTTTGGAGCAGCGCCCAATGGGGCGCCGGGGCGGCCAGCTCCTCCGG
GGAACCCCCGCCCTCCCGGCGCCCGGCCCGCGTGCCGCAGTCCGCAGTCCGAACGGCCGCCGTTGCCGGC
CGCGGGCTGGTTCCGTTAGTGGTGGTGGTTCCGGGGTTCCGTTCCTAGGCAGCGCGCGGCTATTAGCGTC
TGACTCCAGCGACCGCGCGCGGGTTCGAGGGTTGGCGGCGAGGCGCTCGGTTTCTCTTCTTCCGTCCACC
CGCGCTTCCCGTTCCCCGTCACCGCCGCTGGCGTTTGTAGATTTCTTTCCGCCAGTGAAGCTGGGTTTTC
TGGAGTTGGCTCTGGCGCTCTGGCCCCTGGAGTGTAATTTCCTACACGCAGCGCCGCAGAGTTTATATTC
TTTGAAAGTGTTTGTAGCTTTGTAGAGGTCCTCTTGTTGATGGTAGGTGAGCCTAATTCTGCAAGATAAA
AGCCTAGTCTCTGACCTGGCAGATGAAAGATCAAATCAGATTGTGGTTTCCTGCTATTAGAATGCCGTGC
TATTAGACTTTAAGGCTTTTTAGCCTTCTTTAAAAAATAAAAAAATTTTTACAGTGGAAGAAAAGCACAA
GAAGTAAACTTTTACAGTCGTTGATTTGACTATAACGCTGATCCCCCCAAATCAAAGGTAATTTCACTTT
GAAGATTGCGTTCTGATTTGTAGCTTTAAGCGATTAGAGAAAATTGTGCAATATTCCCCTCTACCTGTTT
GAAAATAAACATTCTTAAAAGGATGTAATTTAGATAATGAATTGCTTTCTCTGAAACTTATCCCTTGGGA
CACCTCAAATCTGATTGGTTTTCAAAGCTTGGGGGAAGGAAATTAATTCCTGTGATAAGTGGTTGGCTGA
ACAGAATGTCTTGAAAGGTTAGCCTGTAGCATTAGGAGAAATACCTAATGTAAACGACGAGTTAATGGGT
GCAGCACACCAGCGTGGCACATTTATACATATGTGACAAACCTGCACGTTGTGCACATGTACCCTAGAAC
TTAAAGTATAATAATAAAAAAAGTAAAAAAAAAAAAAGTTAGCCTGAAGAAAGCAGACTGAAAATGTTCT
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed -n 's/^>\([^ ]*\).*/\1/p' protein.fasta
sp|O15516|CLOCK_HUMAN
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
GGTGGGGGGCGCCACTCACAGCCCCAGGTGCTGCTGGAGGTGGGAGCCGCGGCGCCTCCTGGACACAGGC
GGGGTAGTGGTTCCGAGTCACCGCAGCGGGAGACCTGGGTGGGGGAGGGAAGAAGCCGGAGCCGCCGCAA
GCCACACGGTGAGGGCGCGGGGAAGGGGAGGGAGCGGGGGGCGGCGTGTGTGGGGCCGGGGGGCGGCGGC
CAAGGGTGGGGAAGGCGGGAGCTGAAGCCCAAGTTTGGCGTGTCGTTCTAGTGTGTCTTTTCCCGGGACT
TCGGGCCGAGGCCCGCCCTGCCTGAGAGGCCCTCTGGGGCAGCTGGGGTTACCTGCGGGGCAGGGGCGGG
AGTGGGGTGCACGGCGGGGCCGGGCGGCTTGAGGGCGCCCGGAGCTGCGGCCGATTCCAGCAGCTGGGAG
GCGGGGAAAGACGGGGACCGGGTGCCGAGAGAGCTTTCGCTGGGGACCCGCTAGGCCTTGTGACCCACTT
TATTCCTGTCACCACTCGGGCACGTTTGGAGCAGCGCCCAATGGGGCGCCGGGGCGGCCAGCTCCTCCGG
GGAACCCCCGCCCTCCCGGCGCCCGGCCCGCGTGCCGCAGTCCGCAGTCCGAACGGCCGCCGTTGCCGGC
CGCGGGCTGGTTCCGTTAGTGGTGGTGGTTCCGGGGTTCCGTTCCTAGGCAGCGCGCGGCTATTAGCGTC
TGACTCCAGCGACCGCGCGCGGGTTCGAGGGTTGGCGGCGAGGCGCTCGGTTTCTCTTCTTCCGTCCACC
CGCGCTTCCCGTTCCCCGTCACCGCCGCTGGCGTTTGTAGATTTCTTTCCGCCAGTGAAGCTGGGTTTTC
TGGAGTTGGCTCTGGCGCTCTGGCCCCTGGAGTGTAATTTCCTACACGCAGCGCCGCAGAGTTTATATTC
TTTGAAAGTGTTTGTAGCTTTGTAGAGGTCCTCTTGTTGATGGTAGGTGAGCCTAATTCTGCAAGATAAA
AGCCTAGTCTCTGACCTGGCAGATGAAAGATCAAATCAGATTGTGGTTTCCTGCTATTAGAATGCCGTGC
TATTAGACTTTAAGGCTTTTTAGCCTTCTTTAAAAAATAAAAAAATTTTTACAGTGGAAGAAAAGCACAA
GAAGTAAACTTTTACAGTCGTTGATTTGACTATAACGCTGATCCCCCCAAATCAAAGGTAATTTCACTTT
GAAGATTGCGTTCTGATTTGTAGCTTTAAGCGATTAGAGAAAATTGTGCAATATTCCCCTCTACCTGTTT
GAAAATAAACATTCTTAAAAGGATGTAATTTAGATAATGAATTGCTTTCTCTGAAACTTATCCCTTGGGA
CACCTCAAATCTGATTGGTTTTCAAAGCTTGGGGGAAGGAAATTAATTCCTGTGATAAGTGGTTGGCTGA
ACAGAATGTCTTGAAAGGTTAGCCTGTAGCATTAGGAGAAATACCTAATGTAAACGACGAGTTAATGGGT
GCAGCACACCAGCGTGGCACATTTATACATATGTGACAAACCTGCACGTTGTGCACATGTACCCTAGAAC
TTAAAGTATAATAATAAAAAAAGTAAAAAAAAAAAAAGTTAGCCTGAAGAAAGCAGACTGAAAATGTTCT
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed -n 's/^>\([^ ]*\).*/\1/p' protein.fasta
sp|O15516|CLOCK_HUMAN
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed -n '/^M.*Q$/p' protein.fasta
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '!/^>/ && /^M/ && /Q$/ {print}' protein.fasta
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ Did not get any such sequence starting with M and Ending with Q (checked using both sed and awk)
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^ATOM/ && $5=="A"' protein.pdb
ATOM      1  N   TRP A 172     -39.136 -21.997  24.415  1.00 34.43           N
ATOM      2  CA  TRP A 172     -40.108 -20.907  24.729  1.00 34.28           C
ATOM      3  C   TRP A 172     -41.403 -21.065  23.944  1.00 33.46           C
ATOM      4  O   TRP A 172     -41.385 -21.496  22.789  1.00 33.48           O
ATOM      5  CB  TRP A 172     -39.506 -19.534  24.418  1.00 35.12           C
ATOM      6  CG  TRP A 172     -38.161 -19.292  25.025  1.00 36.34           C
ATOM      7  CD1 TRP A 172     -37.773 -19.568  26.306  1.00 37.69           C
ATOM      8  CD2 TRP A 172     -37.032 -18.693  24.384  1.00 37.47           C
ATOM      9  NE1 TRP A 172     -36.465 -19.190  26.497  1.00 37.97           N
ATOM     10  CE2 TRP A 172     -35.985 -18.650  25.334  1.00 37.83           C
ATOM     11  CE3 TRP A 172     -36.799 -18.192  23.097  1.00 37.57           C
ATOM     12  CZ2 TRP A 172     -34.725 -18.128  25.037  1.00 37.51           C
ATOM     13  CZ3 TRP A 172     -35.545 -17.671  22.802  1.00 37.85           C
ATOM     14  CH2 TRP A 172     -34.523 -17.646  23.769  1.00 37.43           C
ATOM     15  N   LYS A 173     -42.516 -20.697  24.576  1.00 32.18           N
ATOM     16  CA  LYS A 173     -43.842 -20.728  23.949  1.00 31.37           C
ATOM     17  C   LYS A 173     -44.028 -19.604  22.914  1.00 29.85           C
ATOM     18  O   LYS A 173     -44.831 -19.725  21.976  1.00 30.15           O
ATOM     19  CB  LYS A 173     -44.935 -20.645  25.024  1.00 31.31           C
ATOM     20  CG  LYS A 173     -46.343 -20.964  24.519  1.00 32.53           C
ATOM     21  CD  LYS A 173     -47.425 -20.459  25.479  1.00 32.89           C
ATOM     22  CE  LYS A 173     -48.818 -20.684  24.901  1.00 33.96           C
ATOM     23  NZ  LYS A 173     -49.893 -20.189  25.806  1.00 34.66           N
ATOM     24  N   GLU A 174     -43.280 -18.518  23.090  1.00 27.67           N
ATOM     25  CA  GLU A 174     -43.337 -17.366  22.191  1.00 25.77           C
ATOM     26  C   GLU A 174     -41.922 -17.014  21.728  1.00 23.54           C
ATOM     27  O   GLU A 174     -41.381 -15.977  22.138  1.00 23.23           O
ATOM     28  CB  GLU A 174     -43.933 -16.148  22.913  1.00 25.76           C
ATOM     29  CG  GLU A 174     -45.376 -16.258  23.359  1.00 26.89           C
ATOM     30  CD  GLU A 174     -45.777 -15.061  24.206  1.00 27.42           C
ATOM     31  OE1 GLU A 174     -46.102 -14.001  23.639  1.00 29.42           O
ATOM     32  OE2 GLU A 174     -45.756 -15.182  25.445  1.00 30.63           O
ATOM     33  N   PRO A 175     -41.313 -17.867  20.872  1.00 21.55           N
ATOM     34  CA  PRO A 175     -39.891 -17.705  20.564  1.00 20.10           C
ATOM     35  C   PRO A 175     -39.565 -16.385  19.866  1.00 18.58           C
ATOM     36  O   PRO A 175     -38.520 -15.781  20.142  1.00 18.18           O
ATOM     37  CB  PRO A 175     -39.594 -18.893  19.632  1.00 20.52           C
ATOM     38  CG  PRO A 175     -40.909 -19.247  19.043  1.00 19.77           C
ATOM     39  CD  PRO A 175     -41.896 -19.015  20.148  1.00 21.28           C
ATOM     40  N   CYS A 176     -40.455 -15.942  18.986  1.00 16.73           N
ATOM     41  CA  CYS A 176     -40.212 -14.710  18.226  1.00 16.80           C
ATOM     42  C   CYS A 176     -40.222 -13.501  19.159  1.00 16.78           C
ATOM     43  O   CYS A 176     -39.363 -12.626  19.053  1.00 16.20           O
ATOM     44  CB  CYS A 176     -41.244 -14.528  17.116  1.00 16.50           C
ATOM     45  SG  CYS A 176     -40.885 -13.084  16.044  1.00 15.20           S
ATOM     46  N   ARG A 177     -41.200 -13.469  20.062  1.00 17.53           N
ATOM     47  CA  ARG A 177     -41.351 -12.338  20.984  1.00 18.15           C
ATOM     48  C   ARG A 177     -40.135 -12.196  21.880  1.00 18.13           C
ATOM     49  O   ARG A 177     -39.608 -11.088  22.053  1.00 17.51           O
ATOM     50  CB  ARG A 177     -42.634 -12.450  21.807  1.00 18.62           C
ATOM     51  CG  ARG A 177     -42.872 -11.237  22.713  1.00 20.72           C
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ATOM     52  CD  ARG A 177     -44.227 -11.292  23.368  1.00 22.66           C
ATOM     53  NE  ARG A 177     -44.366 -10.263  24.391  1.00 24.94           N
ATOM     54  CZ  ARG A 177     -43.848 -10.348  25.616  1.00 25.91           C
ATOM     55  NH1 ARG A 177     -43.147 -11.413  25.983  1.00 25.04           N
ATOM     56  NH2 ARG A 177     -44.030  -9.360  26.477  1.00 26.28           N
ATOM     57  N   ILE A 178     -39.676 -13.324  22.435  1.00 18.26           N
ATOM     58  CA  ILE A 178     -38.446 -13.332  23.221  1.00 18.88           C
ATOM     59  C   ILE A 178     -37.252 -12.846  22.394  1.00 18.95           C
ATOM     60  O   ILE A 178     -36.503 -11.962  22.843  1.00 19.62           O
ATOM     61  CB  ILE A 178     -38.154 -14.721  23.862  1.00 18.59           C
ATOM     62  CG1 ILE A 178     -39.319 -15.180  24.759  1.00 18.73           C
ATOM     63  CG2 ILE A 178     -36.838 -14.687  24.621  1.00 19.59           C
ATOM     64  CD1 ILE A 178     -39.754 -14.186  25.865  1.00 20.15           C
ATOM     65  N   GLU A 179     -37.088 -13.386  21.187  1.00 19.21           N
ATOM     66  CA  GLU A 179     -35.993 -12.950  20.327  1.00 19.54           C
ATOM     67  C   GLU A 179     -36.080 -11.449  20.043  1.00 19.29           C
ATOM     68  O   GLU A 179     -35.075 -10.745  20.146  1.00 19.32           O
ATOM     69  CB  GLU A 179     -35.948 -13.726  19.020  1.00 19.69           C
ATOM     70  CG  GLU A 179     -34.670 -13.469  18.245  1.00 21.79           C
ATOM     71  CD  GLU A 179     -34.657 -14.096  16.879  1.00 24.88           C
ATOM     72  OE1 GLU A 179     -33.547 -14.390  16.389  1.00 26.52           O
ATOM     73  OE2 GLU A 179     -35.742 -14.303  16.292  1.00 27.10           O
ATOM     74  N   LEU A 180     -37.277 -10.979  19.702  1.00 19.29           N
ATOM     75  CA  LEU A 180     -37.497  -9.560  19.389  1.00 19.26           C
ATOM     76  C   LEU A 180     -36.979  -8.650  20.508  1.00 19.08           C
ATOM     77  O   LEU A 180     -36.226  -7.704  20.241  1.00 18.14           O
ATOM     78  CB  LEU A 180     -38.974  -9.273  19.106  1.00 19.11           C
ATOM     79  CG  LEU A 180     -39.319  -7.798  18.847  1.00 19.07           C
ATOM     80  CD1 LEU A 180     -38.510  -7.233  17.675  1.00 21.29           C
ATOM     81  CD2 LEU A 180     -40.830  -7.649  18.614  1.00 19.74           C
ATOM     82  N   TYR A 181     -37.358  -8.954  21.751  1.00 19.10           N
ATOM     83  CA  TYR A 181     -36.842  -8.229  22.914  1.00 19.73           C
ATOM     84  C   TYR A 181     -35.318  -8.230  22.972  1.00 19.86           C
ATOM     85  O   TYR A 181     -34.698  -7.175  23.148  1.00 19.98           O
ATOM     86  CB  TYR A 181     -37.467  -8.751  24.227  1.00 20.16           C
ATOM     87  CG  TYR A 181     -38.814  -8.123  24.527  1.00 20.84           C
ATOM     88  CD1 TYR A 181     -38.915  -7.004  25.358  1.00 21.48           C
ATOM     89  CD2 TYR A 181     -39.990  -8.645  23.977  1.00 20.81           C
ATOM     90  CE1 TYR A 181     -40.147  -6.422  25.633  1.00 22.34           C
ATOM     91  CE2 TYR A 181     -41.230  -8.068  24.244  1.00 21.91           C
ATOM     92  CZ  TYR A 181     -41.300  -6.959  25.082  1.00 22.24           C
ATOM     93  OH  TYR A 181     -42.516  -6.373  25.347  1.00 22.89           O
ATOM     94  N   ARG A 182     -34.717  -9.406  22.797  1.00 19.68           N
ATOM     95  CA  ARG A 182     -33.268  -9.544  22.849  1.00 20.05           C
ATOM     96  C   ARG A 182     -32.593  -8.739  21.743  1.00 19.42           C
ATOM     97  O   ARG A 182     -31.576  -8.072  21.990  1.00 19.22           O
ATOM     98  CB  ARG A 182     -32.874 -11.019  22.769  1.00 20.66           C
ATOM     99  CG  ARG A 182     -33.592 -11.864  23.806  1.00 23.33           C
ATOM    100  CD  ARG A 182     -32.691 -12.324  24.917  1.00 31.08           C
ATOM    101  NE  ARG A 182     -32.238 -13.693  24.676  1.00 34.53           N
ATOM    102  CZ  ARG A 182     -32.720 -14.777  25.285  1.00 36.34           C
ATOM    103  NH1 ARG A 182     -33.684 -14.685  26.205  1.00 37.09           N
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ATOM    103  NH1 ARG A 182      -33.684 -14.685  26.205  1.00 37.09           N
ATOM    104  NH2 ARG A 182      -32.223 -15.966  24.975  1.00 37.59           N
ATOM    105  N   VAL A 183      -33.164  -8.795  20.537  1.00 18.69           N
ATOM    106  CA  VAL A 183      -32.586  -8.101  19.374  1.00 18.83           C
ATOM    107  C   VAL A 183      -32.670  -6.583  19.560  1.00 18.48           C
ATOM    108  O   VAL A 183      -31.693  -5.875  19.310  1.00 18.13           O
ATOM    109  CB  VAL A 183      -33.244  -8.550  18.037  1.00 18.63           C
ATOM    110  CG1 VAL A 183      -32.873  -7.606  16.895  1.00 19.70           C
ATOM    111  CG2 VAL A 183      -32.804  -9.975  17.689  1.00 18.64           C
ATOM    112  N   VAL A 184      -33.822  -6.106  20.034  1.00 18.63           N
ATOM    113  CA  VAL A 184      -34.017  -4.667  20.304  1.00 19.03           C
ATOM    114  C   VAL A 184      -32.987  -4.148  21.330  1.00 19.24           C
ATOM    115  O   VAL A 184      -32.377  -3.081  21.136  1.00 18.61           O
ATOM    116  CB  VAL A 184      -35.483  -4.352  20.725  1.00 19.12           C
ATOM    117  CG1 VAL A 184      -35.606  -2.937  21.314  1.00 20.37           C
ATOM    118  CG2 VAL A 184      -36.407  -4.486  19.532  1.00 18.87           C
ATOM    119  N   GLU A 185      -32.767  -4.919  22.395  1.00 19.25           N
ATOM    120  CA  GLU A 185      -31.793  -4.545  23.423  1.00 20.57           C
ATOM    121  C   GLU A 185      -30.359  -4.498  22.870  1.00 20.10           C
ATOM    122  O   GLU A 185      -29.614  -3.546  23.140  1.00 19.76           O
ATOM    123  CB  GLU A 185      -31.888  -5.488  24.630  1.00 20.14           C
ATOM    124  CG  GLU A 185      -30.953  -5.110  25.786  1.00 22.36           C
ATOM    125  CD  GLU A 185      -31.034  -6.061  26.975  1.00 22.80           C
ATOM    126  OE1 GLU A 185      -31.853  -7.002  26.951  1.00 27.18           O
ATOM    127  OE2 GLU A 185      -30.273  -5.858  27.948  1.00 27.24           O
ATOM    128  N   SER A 186      -29.973  -5.517  22.106  1.00 19.89           N
ATOM    129  CA  SER A 186      -28.627  -5.563  21.508  1.00 20.02           C
ATOM    130  C   SER A 186      -28.397  -4.432  20.505  1.00 19.66           C
ATOM    131  O   SER A 186      -27.329  -3.816  20.487  1.00 18.81           O
ATOM    132  CB  SER A 186      -28.373  -6.909  20.830  1.00 20.39           C
ATOM    133  OG  SER A 186      -28.358  -7.942  21.792  1.00 23.17           O
ATOM    134  N   LEU A 187      -29.406  -4.171  19.676  1.00 19.21           N
ATOM    135  CA  LEU A 187      -29.344  -3.070  18.706  1.00 19.74           C
ATOM    136  C   LEU A 187      -29.183  -1.718  19.393  1.00 19.37           C
ATOM    137  O   LEU A 187      -28.362  -0.905  18.973  1.00 19.34           O
ATOM    138  CB  LEU A 187      -30.593  -3.047  17.833  1.00 19.81           C
ATOM    139  CG  LEU A 187      -30.623  -3.969  16.619  1.00 21.86           C
ATOM    140  CD1 LEU A 187      -32.032  -3.991  16.073  1.00 24.65           C
ATOM    141  CD2 LEU A 187      -29.626  -3.520  15.538  1.00 24.78           C
ATOM    142  N   ALA A 188      -29.985  -1.490  20.431  1.00 19.16           N
ATOM    143  CA  ALA A 188      -29.906  -0.273  21.249  1.00 19.62           C
ATOM    144  C   ALA A 188      -28.484  -0.122  21.790  1.00 19.76           C
ATOM    145  O   ALA A 188      -27.877   0.958  21.708  1.00 19.78           O
ATOM    146  CB  ALA A 188      -30.914  -0.334  22.398  1.00 19.86           C
ATOM    147  N   LYS A 189      -27.943  -1.219  22.313  1.00 19.72           N
ATOM    148  CA  LYS A 189      -26.592  -1.220  22.859  1.00 19.83           C
ATOM    149  C   LYS A 189      -25.535  -0.931  21.783  1.00 19.51           C
ATOM    150  O   LYS A 189      -24.637  -0.121  22.008  1.00 19.20           O
ATOM    151  CB  LYS A 189      -26.300  -2.544  23.584  1.00 19.67           C
ATOM    152  CG  LYS A 189      -24.980  -2.573  24.353  1.00 21.18           C
ATOM    153  CD  LYS A 189      -24.991  -1.568  25.500  1.00 23.97           C
ATOM    154  CE  LYS A 189      -23.703  -1.601  26.298  1.00 25.23           C
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ATOM    154  CE  LYS A 189     -23.703  -1.601  26.298  1.00 25.23           C
ATOM    155  NZ  LYS A 189     -23.673  -0.401  27.204  1.00 25.98           N
ATOM    156  N   ALA A 190     -25.651  -1.581  20.618  1.00 19.73           N
ATOM    157  CA  ALA A 190     -24.689  -1.402  19.528  1.00 20.13           C
ATOM    158  C   ALA A 190     -24.697   0.033  19.011  1.00 20.31           C
ATOM    159  O   ALA A 190     -23.654   0.575  18.652  1.00 20.46           O
ATOM    160  CB  ALA A 190     -24.972  -2.370  18.386  1.00 20.01           C
ATOM    161  N   GLN A 191     -25.879   0.633  18.973  1.00 20.86           N
ATOM    162  CA  GLN A 191     -26.024   2.004  18.459  1.00 22.02           C
ATOM    163  C   GLN A 191     -25.233   3.028  19.288  1.00 21.64           C
ATOM    164  O   GLN A 191     -24.787   4.046  18.754  1.00 21.77           O
ATOM    165  CB  GLN A 191     -27.500   2.393  18.374  1.00 22.25           C
ATOM    166  CG  GLN A 191     -28.199   1.933  17.086  1.00 25.97           C
ATOM    167  CD  GLN A 191     -27.735   2.695  15.851  1.00 30.74           C
ATOM    168  OE1 GLN A 191     -28.111   3.853  15.635  1.00 33.63           O
ATOM    169  NE2 GLN A 191     -26.910   2.047  15.035  1.00 32.02           N
ATOM    170  N   GLU A 192     -25.051   2.742  20.577  1.00 21.46           N
ATOM    171  CA  GLU A 192     -24.277   3.615  21.482  1.00 21.62           C
ATOM    172  C   GLU A 192     -22.849   3.877  20.973  1.00 21.84           C
ATOM    173  O   GLU A 192     -22.341   5.002  21.037  1.00 20.87           O
ATOM    174  CB  GLU A 192     -24.256   3.024  22.902  1.00 21.24           C
ATOM    175  CG  GLU A 192     -25.645   2.977  23.531  1.00 21.99           C
ATOM    176  CD  GLU A 192     -25.689   2.475  24.965  1.00 22.37           C
ATOM    177  OE1 GLU A 192     -24.668   1.990  25.496  1.00 22.90           O
ATOM    178  OE2 GLU A 192     -26.783   2.565  25.568  1.00 25.93           O
ATOM    179  N   THR A 193     -22.217   2.832  20.450  1.00 22.20           N
ATOM    180  CA  THR A 193     -20.820   2.910  20.040  1.00 23.10           C
ATOM    181  C   THR A 193     -20.673   2.774  18.526  1.00 24.43           C
ATOM    182  O   THR A 193     -19.560   2.654  18.023  1.00 23.91           O
ATOM    183  CB  THR A 193     -20.006   1.791  20.694  1.00 23.11           C
ATOM    184  OG1 THR A 193     -20.622   0.538  20.378  1.00 22.12           O
ATOM    185  CG2 THR A 193     -19.949   1.957  22.207  1.00 22.37           C
ATOM    186  N   SER A 194     -21.792   2.789  17.806  1.00 26.17           N
ATOM    187  CA  SER A 194     -21.785   2.502  16.374  1.00 28.66           C
ATOM    188  C   SER A 194     -20.976   3.535  15.607  1.00 30.43           C
ATOM    189  O   SER A 194     -21.196   4.739  15.764  1.00 30.63           O
ATOM    190  CB  SER A 194     -23.206   2.411  15.808  1.00 28.78           C
ATOM    191  OG  SER A 194     -23.179   2.059  14.427  1.00 29.52           O
ATOM    192  N   GLY A 195     -20.043   3.045  14.791  1.00 32.35           N
ATOM    193  CA  GLY A 195     -19.179   3.890  13.965  1.00 34.45           C
ATOM    194  C   GLY A 195     -19.806   4.280  12.636  1.00 36.12           C
ATOM    195  O   GLY A 195     -19.172   4.964  11.819  1.00 36.57           O
ATOM    196  N   GLU A 196     -21.044   3.837  12.413  1.00 37.26           N
ATOM    197  CA  GLU A 196     -21.822   4.225  11.232  1.00 38.38           C
ATOM    198  C   GLU A 196     -23.273   4.535  11.614  1.00 38.59           C
ATOM    199  O   GLU A 196     -23.676   4.309  12.751  1.00 38.87           O
ATOM    200  CB  GLU A 196     -21.760   3.138  10.144  1.00 38.61           C
ATOM    201  CG  GLU A 196     -22.511   1.843  10.474  1.00 40.20           C
ATOM    202  CD  GLU A 196     -21.760   0.951  11.457  1.00 42.45           C
ATOM    203  OE1 GLU A 196     -22.418   0.352  12.338  0.50 42.52           O
ATOM    204  OE2 GLU A 196     -20.513   0.856  11.354  1.00 43.56           O
ATOM    205  N   GLU A 197     -24.042   5.069  10.667  1.00 38.83           N
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ATOM    204  OE2 GLU A 196      -20.513   0.856  11.354  1.00 43.56           O
ATOM    205  N   GLU A 197      -24.042   5.069  10.667  1.00 38.83           N
ATOM    206  CA  GLU A 197      -25.464   5.336  10.878  1.00 38.88           C
ATOM    207  C   GLU A 197      -26.270   4.317  10.074  1.00 38.33           C
ATOM    208  O   GLU A 197      -26.494   4.507   8.877  1.00 38.98           O
ATOM    209  CB  GLU A 197      -25.821   6.766  10.445  1.00 39.07           C
ATOM    210  CG  GLU A 197      -27.249   7.230  10.822  1.00 40.48           C
ATOM    211  CD  GLU A 197      -27.277   8.390  11.820  1.00 42.86           C
ATOM    212  OE1 GLU A 197      -26.348   9.232  11.792  1.00 43.40           O
ATOM    213  OE2 GLU A 197      -28.241   8.474  12.621  1.00 43.51           O
ATOM    214  N   ILE A 198      -26.691   3.231  10.722  1.00 37.57           N
ATOM    215  CA  ILE A 198      -27.447   2.184  10.020  1.00 36.57           C
ATOM    216  C   ILE A 198      -28.889   2.619   9.745  1.00 35.29           C
ATOM    217  O   ILE A 198      -29.574   3.164  10.616  1.00 36.01           O
ATOM    218  CB  ILE A 198      -27.389   0.782  10.718  1.00 36.84           C
ATOM    219  CG1 ILE A 198      -28.057   0.812  12.097  1.00 37.53           C
ATOM    220  CG2 ILE A 198      -25.941   0.265  10.792  1.00 36.74           C
ATOM    221  CD1 ILE A 198      -28.621  -0.537  12.539  1.00 38.43           C
ATOM    222  N   SER A 199      -29.326   2.382   8.516  1.00 33.45           N
ATOM    223  CA  SER A 199      -30.640   2.811   8.054  1.00 31.29           C
ATOM    224  C   SER A 199      -31.578   1.620   7.892  1.00 29.24           C
ATOM    225  O   SER A 199      -32.790   1.798   7.759  1.00 28.70           O
ATOM    226  CB  SER A 199      -30.505   3.555   6.726  1.00 31.53           C
ATOM    227  OG  SER A 199      -29.665   2.841   5.830  1.00 33.46           O
ATOM    228  N   LYS A 200      -30.993   0.420   7.874  1.00 26.73           N
ATOM    229  CA  LYS A 200      -31.745  -0.835   7.833  1.00 24.20           C
ATOM    230  C   LYS A 200      -31.208  -1.820   8.880  1.00 23.56           C
ATOM    231  O   LYS A 200      -30.014  -1.861   9.160  1.00 23.03           O
ATOM    232  CB  LYS A 200      -31.682  -1.479   6.440  1.00 24.17           C
ATOM    233  CG  LYS A 200      -32.216  -0.609   5.294  1.00 23.41           C
ATOM    234  CD  LYS A 200      -32.263  -1.375   3.981  1.00 22.93           C
ATOM    235  CE  LYS A 200      -32.479  -0.443   2.786  1.00 21.93           C
ATOM    236  NZ  LYS A 200      -31.331   0.512   2.647  1.00 19.78           N
ATOM    237  N   PHE A 201      -32.102  -2.617   9.451  1.00 22.85           N
ATOM    238  CA  PHE A 201      -31.709  -3.640  10.421  1.00 22.70           C
ATOM    239  C   PHE A 201      -32.776  -4.707  10.497  1.00 22.14           C
ATOM    240  O   PHE A 201      -33.918  -4.481  10.100  1.00 21.35           O
ATOM    241  CB  PHE A 201      -31.465  -3.033  11.816  1.00 23.03           C
ATOM    242  CG  PHE A 201      -32.527  -2.059  12.254  1.00 24.17           C
ATOM    243  CD1 PHE A 201      -32.345  -0.689  12.083  1.00 25.93           C
ATOM    244  CD2 PHE A 201      -33.708  -2.505  12.838  1.00 24.45           C
ATOM    245  CE1 PHE A 201      -33.325   0.217  12.483  1.00 26.21           C
ATOM    246  CE2 PHE A 201      -34.694  -1.603  13.243  1.00 24.70           C
ATOM    247  CZ  PHE A 201      -34.501  -0.237  13.057  1.00 25.38           C
ATOM    248  N   TYR A 202      -32.410  -5.870  11.024  1.00 22.49           N
ATOM    249  CA  TYR A 202      -33.382  -6.937  11.146  1.00 22.70           C
ATOM    250  C   TYR A 202      -33.967  -7.006  12.549  1.00 22.40           C
ATOM    251  O   TYR A 202      -33.256  -7.283  13.524  1.00 22.87           O
ATOM    252  CB  TYR A 202      -32.802  -8.292  10.713  1.00 23.34           C
ATOM    253  CG  TYR A 202      -33.761  -9.446  10.948  1.00 23.98           C
ATOM    254  CD1 TYR A 202      -33.433 -10.488  11.816  1.00 24.52           C
ATOM    255  CD2 TYR A 202      -35.011  -9.476  10.324  1.00 23.91           C
ATOM    256  CE1 TYR A 202      -34.317 -11.546  12.043  1.00 24.21           C
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ATOM    254  CD1 TYR A 202      -33.433 -10.488  11.816  1.00 24.52           C
ATOM    255  CD2 TYR A 202      -35.011  -9.476  10.324  1.00 23.91           C
ATOM    256  CE1 TYR A 202      -34.317 -11.546  12.043  1.00 24.21           C
ATOM    257  CE2 TYR A 202      -35.907 -10.524  10.551  1.00 23.70           C
ATOM    258  CZ  TYR A 202      -35.546 -11.561  11.403  1.00 24.61           C
ATOM    259  OH  TYR A 202      -36.433 -12.599  11.626  1.00 24.07           O
ATOM    260  N   LEU A 203      -35.259  -6.706  12.635  1.00 21.56           N
ATOM    261  CA  LEU A 203      -36.079  -6.988  13.807  1.00 21.32           C
ATOM    262  C   LEU A 203      -36.996  -8.155  13.453  1.00 20.36           C
ATOM    263  O   LEU A 203      -37.763  -8.042  12.499  1.00 19.87           O
ATOM    264  CB  LEU A 203      -36.957  -5.782  14.148  1.00 21.26           C
ATOM    265  CG  LEU A 203      -36.545  -4.765  15.215  1.00 23.82           C
ATOM    266  CD1 LEU A 203      -35.059  -4.627  15.328  1.00 23.04           C
ATOM    267  CD2 LEU A 203      -37.210  -3.428  14.951  1.00 22.01           C
ATOM    268  N   PRO A 204      -36.946  -9.257  14.232  1.00 19.91           N
ATOM    269  CA  PRO A 204      -37.883 -10.360  14.000  1.00 19.27           C
ATOM    270  C   PRO A 204      -39.312  -9.861  13.831  1.00 18.61           C
ATOM    271  O   PRO A 204      -39.777  -9.035  14.618  1.00 18.10           O
ATOM    272  CB  PRO A 204      -37.765 -11.194  15.284  1.00 19.29           C
ATOM    273  CG  PRO A 204      -36.357 -10.992  15.708  1.00 19.73           C
ATOM    274  CD  PRO A 204      -36.032  -9.548  15.352  1.00 19.59           C
ATOM    275  N   ASN A 205      -39.969 -10.324  12.769  1.00 17.90           N
ATOM    276  CA  ASN A 205      -41.355  -9.968  12.495  1.00 18.10           C
ATOM    277  C   ASN A 205      -42.247 -11.006  13.181  1.00 18.05           C
ATOM    278  O   ASN A 205      -42.411 -12.113  12.655  1.00 17.42           O
ATOM    279  CB  ASN A 205      -41.669  -9.983  10.987  1.00 18.39           C
ATOM    280  CG  ASN A 205      -40.668  -9.188  10.107  1.00 18.94           C
ATOM    281  OD1 ASN A 205      -40.832  -9.161   8.884  1.00 22.20           O
ATOM    282  ND2 ASN A 205      -39.657  -8.569  10.698  1.00 19.63           N
ATOM    283  N   CYS A 206      -42.818 -10.663  14.336  1.00 17.84           N
ATOM    284  CA  CYS A 206      -43.625 -11.622  15.106  1.00 17.83           C
ATOM    285  C   CYS A 206      -45.118 -11.479  14.845  1.00 18.36           C
ATOM    286  O   CYS A 206      -45.623 -10.361  14.652  1.00 18.35           O
ATOM    287  CB  CYS A 206      -43.376 -11.456  16.612  1.00 17.73           C
ATOM    288  SG  CYS A 206      -41.654 -11.522  17.121  1.00 17.34           S
ATOM    289  N   ASN A 207      -45.824 -12.610  14.844  1.00 18.54           N
ATOM    290  CA  ASN A 207      -47.282 -12.593  14.923  1.00 18.73           C
ATOM    291  C   ASN A 207      -47.713 -12.386  16.381  1.00 19.14           C
ATOM    292  O   ASN A 207      -46.874 -12.401  17.293  1.00 19.85           O
ATOM    293  CB  ASN A 207      -47.916 -13.848  14.274  1.00 18.43           C
ATOM    294  CG  ASN A 207      -47.609 -15.147  15.029  1.00 18.66           C
ATOM    295  OD1 ASN A 207      -47.546 -15.180  16.254  1.00 18.06           O
ATOM    296  ND2 ASN A 207      -47.442 -16.236  14.278  1.00 19.03           N
ATOM    297  N   LYS A 208      -49.012 -12.189  16.590  1.00 19.70           N
ATOM    298  CA  LYS A 208      -49.580 -11.893  17.916  1.00 20.21           C
ATOM    299  C   LYS A 208      -49.491 -13.063  18.913  1.00 20.08           C
ATOM    300  O   LYS A 208      -49.635 -12.860  20.118  1.00 20.32           O
ATOM    301  CB  LYS A 208      -51.043 -11.459  17.773  1.00 20.47           C
ATOM    302  CG  LYS A 208      -51.935 -12.512  17.115  1.00 20.38           C
ATOM    303  CD  LYS A 208      -53.396 -12.222  17.359  1.00 22.10           C
ATOM    304  CE  LYS A 208      -54.291 -13.221  16.642  1.00 20.94           C
ATOM    305  NZ  LYS A 208      -54.187 -14.607  17.174  1.00 20.34           N
ATOM    306  N   ASN A 209      -49.280 -14.275  18.399  1.00 19.57           N
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ATOM    305  NZ  LYS A 208      -54.187 -14.607  17.174  1.00 20.34           N
ATOM    306  N   ASN A 209      -49.280 -14.275  18.399  1.00 19.57           N
ATOM    307  CA  ASN A 209      -49.083 -15.465  19.242  1.00 19.88           C
ATOM    308  C   ASN A 209      -47.633 -15.638  19.679  1.00 19.32           C
ATOM    309  O   ASN A 209      -47.304 -16.579  20.421  1.00 19.64           O
ATOM    310  CB  ASN A 209      -49.550 -16.730  18.508  1.00 19.75           C
ATOM    311  CG  ASN A 209      -50.776 -16.486  17.661  1.00 21.13           C
ATOM    312  OD1 ASN A 209      -50.811 -16.838  16.468  1.00 23.95           O
ATOM    313  ND2 ASN A 209      -51.778 -15.856  18.251  1.00 17.82           N
ATOM    314  N   GLY A 210      -46.771 -14.739  19.205  1.00 19.30           N
ATOM    315  CA  GLY A 210      -45.353 -14.753  19.536  1.00 18.56           C
ATOM    316  C   GLY A 210      -44.513 -15.719  18.713  1.00 18.50           C
ATOM    317  O   GLY A 210      -43.364 -15.993  19.062  1.00 17.75           O
ATOM    318  N   PHE A 211      -45.091 -16.250  17.638  1.00 18.35           N
ATOM    319  CA  PHE A 211      -44.325 -16.984  16.632  1.00 18.84           C
ATOM    320  C   PHE A 211      -43.945 -16.063  15.478  1.00 18.62           C
ATOM    321  O   PHE A 211      -44.212 -14.856  15.535  1.00 19.06           O
ATOM    322  CB  PHE A 211      -45.076 -18.238  16.160  1.00 19.06           C
ATOM    323  CG  PHE A 211      -44.992 -19.373  17.138  1.00 19.94           C
ATOM    324  CD1 PHE A 211      -43.859 -20.175  17.187  1.00 20.48           C
ATOM    325  CD2 PHE A 211      -46.021 -19.604  18.044  1.00 22.97           C
ATOM    326  CE1 PHE A 211      -43.759 -21.224  18.112  1.00 20.71           C
ATOM    327  CE2 PHE A 211      -45.933 -20.643  18.976  1.00 21.29           C
ATOM    328  CZ  PHE A 211      -44.800 -21.450  19.005  1.00 20.87           C
ATOM    329  N   TYR A 212      -43.285 -16.622  14.463  1.00 18.56           N
ATOM    330  CA  TYR A 212      -42.776 -15.843  13.332  1.00 18.09           C
ATOM    331  C   TYR A 212      -43.769 -15.774  12.184  1.00 18.14           C
ATOM    332  O   TYR A 212      -44.280 -16.800  11.744  1.00 18.14           O
ATOM    333  CB  TYR A 212      -41.449 -16.441  12.834  1.00 18.04           C
ATOM    334  CG  TYR A 212      -40.365 -16.422  13.885  1.00 17.57           C
ATOM    335  CD1 TYR A 212      -40.225 -17.467  14.801  1.00 17.30           C
ATOM    336  CD2 TYR A 212      -39.485 -15.344  13.975  1.00 17.57           C
ATOM    337  CE1 TYR A 212      -39.221 -17.434  15.777  1.00 18.28           C
ATOM    338  CE2 TYR A 212      -38.501 -15.298  14.936  1.00 14.95           C
ATOM    339  CZ  TYR A 212      -38.363 -16.344  15.829  1.00 16.70           C
ATOM    340  OH  TYR A 212      -37.375 -16.282  16.786  1.00 18.15           O
ATOM    341  N   HIS A 213      -44.028 -14.572  11.673  1.00 17.97           N
ATOM    342  CA  HIS A 213      -44.678 -14.469  10.366  1.00 18.14           C
ATOM    343  C   HIS A 213      -43.859 -15.264   9.348  1.00 17.86           C
ATOM    344  O   HIS A 213      -42.635 -15.316   9.449  1.00 17.33           O
ATOM    345  CB  HIS A 213      -44.804 -13.005   9.931  1.00 18.71           C
ATOM    346  CG  HIS A 213      -45.862 -12.251  10.673  1.00 19.72           C
ATOM    347  ND1 HIS A 213      -47.197 -12.594  10.619  1.00 20.89           N
ATOM    348  CD2 HIS A 213      -45.784 -11.167  11.480  1.00 20.60           C
ATOM    349  CE1 HIS A 213      -47.894 -11.761  11.371  1.00 21.53           C
ATOM    350  NE2 HIS A 213      -47.060 -10.888  11.907  1.00 21.26           N
ATOM    351  N   SER A 214      -44.533 -15.922   8.401  1.00 17.92           N
ATOM    352  CA  SER A 214      -43.835 -16.637   7.317  1.00 19.10           C
ATOM    353  C   SER A 214      -42.890 -15.727   6.548  1.00 18.52           C
ATOM    354  O   SER A 214      -41.765 -16.093   6.253  1.00 18.58           O
ATOM    355  CB  SER A 214      -44.830 -17.290   6.356  1.00 19.46           C
ATOM    356  OG  SER A 214      -45.258 -18.530   6.890  1.00 23.83           O
ATOM    357  N   ARG A 215      -43.344 -14.515   6.254  1.00 18.42           N
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ATOM    356  OG  SER A 214      -45.258 -18.530   6.890  1.00 23.83           O
ATOM    357  N   ARG A 215      -43.344 -14.515   6.254  1.00 18.42           N
ATOM    358  CA  ARG A 215      -42.464 -13.537   5.651  1.00 18.42           C
ATOM    359  C   ARG A 215      -41.666 -12.820   6.745  1.00 17.97           C
ATOM    360  O   ARG A 215      -42.240 -12.338   7.726  1.00 19.04           O
ATOM    361  CB  ARG A 215      -43.275 -12.525   4.835  1.00 18.99           C
ATOM    362  CG  ARG A 215      -42.421 -11.489   4.100  1.00 19.30           C
ATOM    363  CD  ARG A 215      -43.301 -10.359   3.594  1.00 20.84           C
ATOM    364  NE  ARG A 215      -43.854  -9.573   4.697  1.00 20.02           N
ATOM    365  CZ  ARG A 215      -44.864  -8.706   4.586  1.00 22.74           C
ATOM    366  NH1 ARG A 215      -45.467  -8.510   3.418  1.00 23.51           N
ATOM    367  NH2 ARG A 215      -45.282  -8.040   5.656  1.00 23.60           N
ATOM    368  N   GLN A 216      -40.348 -12.761   6.573  1.00 17.58           N
ATOM    369  CA  GLN A 216      -39.487 -11.936   7.424  1.00 16.83           C
ATOM    370  C   GLN A 216      -38.810 -10.882   6.577  1.00 16.91           C
ATOM    371  O   GLN A 216      -38.184 -11.199   5.561  1.00 16.53           O
ATOM    372  CB  GLN A 216      -38.417 -12.769   8.150  1.00 16.94           C
ATOM    373  CG  GLN A 216      -38.974 -13.769   9.161  1.00 16.52           C
ATOM    374  CD  GLN A 216      -39.640 -13.095  10.339  1.00 16.09           C
ATOM    375  OE1 GLN A 216      -39.027 -12.252  11.022  1.00 15.64           O
ATOM    376  NE2 GLN A 216      -40.893 -13.457  10.589  1.00 14.49           N
ATOM    377  N   CYS A 217      -38.912  -9.625   7.014  1.00 16.94           N
ATOM    378  CA  CYS A 217      -38.270  -8.525   6.294  1.00 16.91           C
ATOM    379  C   CYS A 217      -37.384  -7.678   7.198  1.00 16.97           C
ATOM    380  O   CYS A 217      -37.647  -7.538   8.411  1.00 16.75           O
ATOM    381  CB  CYS A 217      -39.320  -7.622   5.639  1.00 17.22           C
ATOM    382  SG  CYS A 217      -40.478  -8.464   4.537  1.00 18.26           S
ATOM    383  N   GLU A 218      -36.340  -7.121   6.592  1.00 16.79           N
ATOM    384  CA  GLU A 218      -35.546  -6.069   7.216  1.00 18.15           C
ATOM    385  C   GLU A 218      -36.422  -4.859   7.451  1.00 17.77           C
ATOM    386  O   GLU A 218      -37.338  -4.577   6.663  1.00 17.55           O
ATOM    387  CB  GLU A 218      -34.398  -5.636   6.313  1.00 18.22           C
ATOM    388  CG  GLU A 218      -33.270  -6.626   6.156  1.00 21.61           C
ATOM    389  CD  GLU A 218      -32.200  -6.090   5.225  1.00 24.73           C
ATOM    390  OE1 GLU A 218      -31.004  -6.339   5.502  1.00 27.34           O
ATOM    391  OE2 GLU A 218      -32.550  -5.418   4.222  1.00 24.10           O
ATOM    392  N   THR A 219      -36.117  -4.151   8.538  1.00 17.82           N
ATOM    393  CA  THR A 219      -36.720  -2.866   8.838  1.00 17.58           C
ATOM    394  C   THR A 219      -35.901  -1.783   8.146  1.00 17.52           C
ATOM    395  O   THR A 219      -34.672  -1.758   8.234  1.00 17.92           O
ATOM    396  CB  THR A 219      -36.804  -2.634  10.359  1.00 17.50           C
ATOM    397  OG1 THR A 219      -37.707  -3.591  10.934  1.00 17.69           O
ATOM    398  CG2 THR A 219      -37.329  -1.232  10.673  1.00 16.71           C
ATOM    399  N   SER A 220      -36.592  -0.905   7.431  1.00 18.10           N
ATOM    400  CA  SER A 220      -35.936   0.177   6.727  1.00 18.76           C
ATOM    401  C   SER A 220      -36.502   1.537   7.156  1.00 18.01           C
ATOM    402  O   SER A 220      -37.695   1.670   7.389  1.00 17.11           O
ATOM    403  CB  SER A 220      -36.107  -0.010   5.226  1.00 19.04           C
ATOM    404  OG  SER A 220      -35.857   1.208   4.553  1.00 22.71           O
ATOM    405  N   MET A 221      -35.635   2.537   7.222  1.00 18.98           N
ATOM    406  CA  MET A 221      -36.036   3.903   7.580  1.00 21.13           C
ATOM    407  C   MET A 221      -35.385   4.915   6.636  1.00 20.38           C
ATOM    408  O   MET A 221      -35.168   6.072   7.002  1.00 19.76           O
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ATOM    408  O   MET A 221     -35.168   6.072   7.002  1.00 19.76           O
ATOM    409  CB  MET A 221     -35.626   4.216   9.027  1.00 20.63           C
ATOM    410  CG  MET A 221     -36.286   3.349  10.096  1.00 22.82           C
ATOM    411  SD  MET A 221     -35.787   3.830  11.765  1.00 26.61           S
ATOM    412  CE  MET A 221     -36.444   5.490  11.874  1.00 25.56           C
ATOM    413  N   ASP A 222     -35.073   4.478   5.418  1.00 20.40           N
ATOM    414  CA  ASP A 222     -34.270   5.298   4.508  1.00 20.45           C
ATOM    415  C   ASP A 222     -34.877   5.473   3.121  1.00 20.58           C
ATOM    416  O   ASP A 222     -34.208   5.977   2.228  1.00 20.57           O
ATOM    417  CB  ASP A 222     -32.856   4.725   4.386  1.00 20.76           C
ATOM    418  CG  ASP A 222     -32.849   3.279   3.882  1.00 20.03           C
ATOM    419  OD1 ASP A 222     -31.774   2.660   3.934  1.00 22.26           O
ATOM    420  OD2 ASP A 222     -33.911   2.768   3.445  1.00 21.53           O
ATOM    421  N   GLY A 223     -36.125   5.041   2.943  1.00 20.55           N
ATOM    422  CA  GLY A 223     -36.815   5.170   1.658  1.00 21.58           C
ATOM    423  C   GLY A 223     -36.480   4.069   0.668  1.00 21.57           C
ATOM    424  O   GLY A 223     -36.861   4.134  -0.498  1.00 21.96           O
ATOM    425  N   GLU A 224     -35.766   3.053   1.141  1.00 21.38           N
ATOM    426  CA  GLU A 224     -35.450   1.891   0.324  1.00 21.72           C
ATOM    427  C   GLU A 224     -36.126   0.661   0.914  1.00 21.14           C
ATOM    428  O   GLU A 224     -36.255   0.536   2.135  1.00 20.93           O
ATOM    429  CB  GLU A 224     -33.948   1.673   0.260  1.00 22.09           C
ATOM    430  CG  GLU A 224     -33.177   2.741  -0.500  1.00 24.47           C
ATOM    431  CD  GLU A 224     -31.682   2.620  -0.299  1.00 28.43           C
ATOM    432  OE1 GLU A 224     -31.207   1.510   0.038  1.00 30.43           O
ATOM    433  OE2 GLU A 224     -30.980   3.638  -0.483  1.00 31.11           O
ATOM    434  N   ALA A 225     -36.575  -0.234   0.039  1.00 20.59           N
ATOM    435  CA  ALA A 225     -37.186  -1.492   0.463  1.00 20.30           C
ATOM    436  C   ALA A 225     -36.151  -2.361   1.188  1.00 19.93           C
ATOM    437  O   ALA A 225     -35.013  -2.494   0.724  1.00 19.69           O
ATOM    438  CB  ALA A 225     -37.732  -2.226  -0.750  1.00 20.55           C
ATOM    439  N   GLY A 226     -36.537  -2.937   2.327  1.00 19.20           N
ATOM    440  CA  GLY A 226     -35.705  -3.955   2.980  1.00 18.85           C
ATOM    441  C   GLY A 226     -35.821  -5.315   2.294  1.00 18.42           C
ATOM    442  O   GLY A 226     -36.804  -5.578   1.596  1.00 18.31           O
ATOM    443  N   LEU A 227     -34.808  -6.166   2.487  1.00 18.11           N
ATOM    444  CA  LEU A 227     -34.812  -7.532   1.968  1.00 17.92           C
ATOM    445  C   LEU A 227     -35.853  -8.348   2.738  1.00 17.33           C
ATOM    446  O   LEU A 227     -36.002  -8.161   3.945  1.00 16.48           O
ATOM    447  CB  LEU A 227     -33.431  -8.175   2.139  1.00 18.26           C
ATOM    448  CG  LEU A 227     -32.270  -7.657   1.283  1.00 20.78           C
ATOM    449  CD1 LEU A 227     -30.917  -8.132   1.816  1.00 23.35           C
ATOM    450  CD2 LEU A 227     -32.451  -8.046  -0.194  1.00 21.98           C
ATOM    451  N   CYS A 228     -36.584  -9.216   2.037  1.00 16.71           N
ATOM    452  CA  CYS A 228     -37.472 -10.166   2.703  1.00 17.38           C
ATOM    453  C   CYS A 228     -37.100 -11.586   2.299  1.00 17.41           C
ATOM    454  O   CYS A 228     -36.573 -11.806   1.216  1.00 17.14           O
ATOM    455  CB  CYS A 228     -38.947  -9.920   2.362  1.00 17.03           C
ATOM    456  SG  CYS A 228     -39.619  -8.273   2.708  1.00 18.75           S
ATOM    457  N   TRP A 229     -37.406 -12.535   3.178  1.00 17.59           N
ATOM    458  CA  TRP A 229     -37.214 -13.963   2.910  1.00 18.64           C
ATOM    459  C   TRP A 229     -38.313 -14.754   3.622  1.00 18.91           C
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ATOM    458  CA  TRP A 229      -37.214 -13.963   2.910  1.00 18.64           C
ATOM    459  C   TRP A 229      -38.313 -14.754   3.622  1.00 18.91           C
ATOM    460  O   TRP A 229      -39.155 -14.171   4.325  1.00 18.74           O
ATOM    461  CB  TRP A 229      -35.820 -14.414   3.366  1.00 19.05           C
ATOM    462  CG  TRP A 229      -35.545 -14.189   4.825  1.00 19.34           C
ATOM    463  CD1 TRP A 229      -35.685 -15.100   5.834  1.00 19.36           C
ATOM    464  CD2 TRP A 229      -35.086 -12.975   5.440  1.00 19.75           C
ATOM    465  NE1 TRP A 229      -35.345 -14.530   7.042  1.00 19.95           N
ATOM    466  CE2 TRP A 229      -34.964 -13.230   6.829  1.00 19.97           C
ATOM    467  CE3 TRP A 229      -34.763 -11.698   4.953  1.00 19.95           C
ATOM    468  CZ2 TRP A 229      -34.541 -12.251   7.739  1.00 20.31           C
ATOM    469  CZ3 TRP A 229      -34.324 -10.728   5.858  1.00 19.00           C
ATOM    470  CH2 TRP A 229      -34.228 -11.008   7.234  1.00 19.70           C
ATOM    471  N   CYS A 230      -38.301 -16.079   3.450  1.00 18.85           N
ATOM    472  CA  CYS A 230      -39.332 -16.931   4.016  1.00 18.94           C
ATOM    473  C   CYS A 230      -38.794 -17.854   5.106  1.00 18.50           C
ATOM    474  O   CYS A 230      -37.736 -18.464   4.946  1.00 18.93           O
ATOM    475  CB  CYS A 230      -40.004 -17.763   2.915  1.00 19.33           C
ATOM    476  SG  CYS A 230      -40.630 -16.761   1.539  1.00 21.95           S
ATOM    477  N   VAL A 231      -39.537 -17.962   6.205  1.00 18.37           N
ATOM    478  CA  VAL A 231      -39.114 -18.795   7.338  1.00 17.92           C
ATOM    479  C   VAL A 231      -40.202 -19.788   7.737  1.00 17.70           C
ATOM    480  O   VAL A 231      -41.346 -19.646   7.344  1.00 17.73           O
ATOM    481  CB  VAL A 231      -38.723 -17.944   8.571  1.00 18.29           C
ATOM    482  CG1 VAL A 231      -37.542 -17.009   8.238  1.00 18.20           C
ATOM    483  CG2 VAL A 231      -39.946 -17.177   9.121  1.00 18.39           C
ATOM    484  N   TYR A 232      -39.826 -20.793   8.525  1.00 18.07           N
ATOM    485  CA  TYR A 232      -40.801 -21.624   9.208  1.00 18.02           C
ATOM    486  C   TYR A 232      -41.359 -20.832  10.407  1.00 17.80           C
ATOM    487  O   TYR A 232      -40.593 -20.347  11.239  1.00 17.24           O
ATOM    488  CB  TYR A 232      -40.142 -22.912   9.681  1.00 18.50           C
ATOM    489  CG  TYR A 232      -39.552 -23.774   8.570  1.00 18.40           C
ATOM    490  CD1 TYR A 232      -40.379 -24.437   7.660  1.00 20.13           C
ATOM    491  CD2 TYR A 232      -38.167 -23.966   8.470  1.00 18.40           C
ATOM    492  CE1 TYR A 232      -39.841 -25.241   6.655  1.00 19.48           C
ATOM    493  CE2 TYR A 232      -37.617 -24.774   7.465  1.00 18.57           C
ATOM    494  CZ  TYR A 232      -38.465 -25.404   6.570  1.00 19.11           C
ATOM    495  OH  TYR A 232      -37.938 -26.204   5.592  1.00 18.92           O
ATOM    496  N   PRO A 233      -42.695 -20.681  10.497  1.00 18.03           N
ATOM    497  CA  PRO A 233      -43.253 -19.870  11.598  1.00 17.74           C
ATOM    498  C   PRO A 233      -42.902 -20.308  13.024  1.00 17.82           C
ATOM    499  O   PRO A 233      -42.882 -19.469  13.932  1.00 17.24           O
ATOM    500  CB  PRO A 233      -44.765 -19.946  11.362  1.00 17.97           C
ATOM    501  CG  PRO A 233      -44.897 -20.256   9.893  1.00 18.42           C
ATOM    502  CD  PRO A 233      -43.756 -21.183   9.606  1.00 18.27           C
ATOM    503  N   TRP A 234      -42.624 -21.598  13.224  1.00 17.63           N
ATOM    504  CA  TRP A 234      -42.345 -22.098  14.563  1.00 17.85           C
ATOM    505  C   TRP A 234      -40.928 -21.831  15.057  1.00 17.77           C
ATOM    506  O   TRP A 234      -40.704 -21.864  16.260  1.00 18.60           O
ATOM    507  CB  TRP A 234      -42.687 -23.593  14.706  1.00 17.64           C
ATOM    508  CG  TRP A 234      -41.958 -24.497  13.754  1.00 16.96           C
ATOM    509  CD1 TRP A 234      -40.786 -25.170  13.983  1.00 17.91           C
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ATOM    509  CD1 TRP A 234     -40.780 -25.170  13.985  1.00 17.91           C
ATOM    510  CD2 TRP A 234     -42.363 -24.836  12.425  1.00 17.13           C
ATOM    511  NE1 TRP A 234     -40.439 -25.906  12.866  1.00 16.95           N
ATOM    512  CE2 TRP A 234     -41.387 -25.721  11.899  1.00 17.40           C
ATOM    513  CE3 TRP A 234     -43.459 -24.480  11.625  1.00 17.41           C
ATOM    514  CZ2 TRP A 234     -41.478 -26.259  10.606  1.00 17.51           C
ATOM    515  CZ3 TRP A 234     -43.546 -25.004  10.342  1.00 17.72           C
ATOM    516  CH2 TRP A 234     -42.555 -25.887   9.843  1.00 17.50           C
ATOM    517  N   ASN A 235     -39.983 -21.554  14.152  1.00 17.27           N
ATOM    518  CA  ASN A 235     -38.590 -21.315  14.560  1.00 17.29           C
ATOM    519  C   ASN A 235     -37.885 -20.097  13.941  1.00 17.16           C
ATOM    520  O   ASN A 235     -36.793 -19.751  14.367  1.00 16.87           O
ATOM    521  CB  ASN A 235     -37.726 -22.587  14.409  1.00 17.29           C
ATOM    522  CG  ASN A 235     -37.407 -22.934  12.950  1.00 17.80           C
ATOM    523  OD1 ASN A 235     -37.834 -22.248  12.018  1.00 17.44           O
ATOM    524  ND2 ASN A 235     -36.651 -24.020  12.754  1.00 18.23           N
ATOM    525  N   GLY A 236     -38.506 -19.473  12.940  1.00 17.50           N
ATOM    526  CA  GLY A 236     -37.957 -18.276  12.295  1.00 18.22           C
ATOM    527  C   GLY A 236     -36.688 -18.500  11.480  1.00 19.13           C
ATOM    528  O   GLY A 236     -35.952 -17.548  11.210  1.00 18.66           O
ATOM    529  N   LYS A 237     -36.427 -19.755  11.099  1.00 18.90           N
ATOM    530  CA  LYS A 237     -35.253 -20.079  10.303  1.00 20.07           C
ATOM    531  C   LYS A 237     -35.652 -20.086   8.836  1.00 20.62           C
ATOM    532  O   LYS A 237     -36.709 -20.607   8.487  1.00 20.15           O
ATOM    533  CB  LYS A 237     -34.658 -21.438  10.712  1.00 20.03           C
ATOM    534  CG  LYS A 237     -34.152 -21.504  12.151  1.00 19.85           C
ATOM    535  CD  LYS A 237     -33.395 -22.819  12.393  1.00 20.64           C
ATOM    536  CE  LYS A 237     -32.887 -22.927  13.828  1.00 20.64           C
ATOM    537  NZ  LYS A 237     -32.303 -24.281  14.128  1.00 19.43           N
ATOM    538  N   ARG A 238     -34.811 -19.483   7.993  1.00 21.63           N
ATOM    539  CA  ARG A 238     -35.054 -19.421   6.556  1.00 22.74           C
ATOM    540  C   ARG A 238     -35.290 -20.815   5.978  1.00 23.18           C
ATOM    541  O   ARG A 238     -34.580 -21.765   6.321  1.00 23.36           O
ATOM    542  CB  ARG A 238     -33.882 -18.738   5.842  1.00 23.15           C
ATOM    543  CG  ARG A 238     -34.126 -18.455   4.367  1.00 24.78           C
ATOM    544  CD  ARG A 238     -32.909 -17.817   3.729  1.00 29.07           C
ATOM    545  NE  ARG A 238     -33.127 -17.584   2.305  1.00 32.71           N
ATOM    546  CZ  ARG A 238     -32.328 -16.860   1.525  1.00 33.80           C
ATOM    547  NH1 ARG A 238     -31.254 -16.265   2.028  1.00 35.30           N
ATOM    548  NH2 ARG A 238     -32.617 -16.721   0.240  1.00 34.89           N
ATOM    549  N   ILE A 239     -36.322 -20.928   5.150  1.00 23.39           N
ATOM    550  CA  ILE A 239     -36.608 -22.157   4.423  1.00 24.14           C
ATOM    551  C   ILE A 239     -35.552 -22.319   3.324  1.00 25.20           C
ATOM    552  O   ILE A 239     -35.352 -21.409   2.518  1.00 25.16           O
ATOM    553  CB  ILE A 239     -38.055 -22.159   3.856  1.00 23.81           C
ATOM    554  CG1 ILE A 239     -39.067 -21.960   4.997  1.00 24.06           C
ATOM    555  CG2 ILE A 239     -38.335 -23.450   3.074  1.00 23.17           C
ATOM    556  CD1 ILE A 239     -40.505 -21.711   4.571  1.00 23.96           C
ATOM    557  N   PRO A 240     -34.847 -23.471   3.301  1.00 26.03           N
ATOM    558  CA  PRO A 240     -33.817 -23.658   2.275  1.00 26.67           C
ATOM    559  C   PRO A 240     -34.410 -23.482   0.877  1.00 26.91           C
ATOM    560  O   PRO A 240     -35.524 -23.932   0.615  1.00 27.37           O
ATOM    561  CB  PRO A 240     -33.340 -25.096   2.513  1.00 26.80           C
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ATOM    561  CB  PRO A 240      -33.340 -25.096   2.513  1.00 26.80           C
ATOM    562  CG  PRO A 240      -33.660 -25.369   3.954  1.00 26.50           C
ATOM    563  CD  PRO A 240      -34.952 -24.638   4.200  1.00 26.11           C
ATOM    564  N   GLY A 241      -33.693 -22.777   0.010  1.00 27.81           N
ATOM    565  CA  GLY A 241      -34.199 -22.463  -1.334  1.00 28.67           C
ATOM    566  C   GLY A 241      -35.099 -21.232  -1.404  1.00 29.09           C
ATOM    567  O   GLY A 241      -35.506 -20.821  -2.500  1.00 29.78           O
ATOM    568  N   SER A 242      -35.406 -20.646  -0.245  1.00 29.22           N
ATOM    569  CA  SER A 242      -36.237 -19.436  -0.167  1.00 28.62           C
ATOM    570  C   SER A 242      -35.646 -18.301  -0.992  1.00 28.58           C
ATOM    571  O   SER A 242      -34.427 -18.089  -0.985  1.00 28.71           O
ATOM    572  CB  SER A 242      -36.433 -18.977   1.290  1.00 28.97           C
ATOM    573  OG  SER A 242      -36.756 -17.583   1.376  1.00 27.17           O
ATOM    574  N   PRO A 243      -36.506 -17.572  -1.722  1.00 28.39           N
ATOM    575  CA  PRO A 243      -36.007 -16.356  -2.349  1.00 28.39           C
ATOM    576  C   PRO A 243      -35.683 -15.295  -1.290  1.00 28.20           C
ATOM    577  O   PRO A 243      -36.259 -15.313  -0.194  1.00 27.71           O
ATOM    578  CB  PRO A 243      -37.167 -15.904  -3.244  1.00 28.46           C
ATOM    579  CG  PRO A 243      -38.367 -16.600  -2.761  1.00 28.86           C
ATOM    580  CD  PRO A 243      -37.933 -17.820  -2.003  1.00 28.47           C
ATOM    581  N   GLU A 244      -34.736 -14.419  -1.613  1.00 27.80           N
ATOM    582  CA  GLU A 244      -34.478 -13.212  -0.837  1.00 28.29           C
ATOM    583  C   GLU A 244      -34.515 -12.022  -1.795  1.00 27.43           C
ATOM    584  O   GLU A 244      -33.620 -11.854  -2.622  1.00 27.85           O
ATOM    585  CB  GLU A 244      -33.138 -13.293  -0.100  1.00 28.06           C
ATOM    586  CG  GLU A 244      -32.866 -12.110   0.845  1.00 29.84           C
ATOM    587  CD  GLU A 244      -31.803 -12.400   1.897  1.00 30.20           C
ATOM    588  OE1 GLU A 244      -31.390 -13.572   2.032  1.00 33.67           O
ATOM    589  OE2 GLU A 244      -31.387 -11.453   2.609  1.00 34.03           O
ATOM    590  N   ILE A 245      -35.563 -11.214  -1.682  1.00 26.43           N
ATOM    591  CA  ILE A 245      -35.780 -10.075  -2.583  1.00 25.65           C
ATOM    592  C   ILE A 245      -36.217  -8.832  -1.801  1.00 25.29           C
ATOM    593  O   ILE A 245      -36.768  -8.951  -0.700  1.00 25.02           O
ATOM    594  CB  ILE A 245      -36.850 -10.402  -3.671  1.00 25.53           C
ATOM    595  CG1 ILE A 245      -38.173 -10.846  -3.033  1.00 25.35           C
ATOM    596  CG2 ILE A 245      -36.325 -11.466  -4.663  1.00 24.89           C
ATOM    597  CD1 ILE A 245      -39.407 -10.707  -3.934  1.00 26.20           C
ATOM    598  N   ARG A 246      -36.004  -7.648  -2.381  1.00 24.57           N
ATOM    599  CA  ARG A 246      -36.526  -6.407  -1.793  1.00 24.09           C
ATOM    600  C   ARG A 246      -37.988  -6.209  -2.186  1.00 23.73           C
ATOM    601  O   ARG A 246      -38.334  -5.370  -3.019  1.00 22.92           O
ATOM    602  CB  ARG A 246      -35.657  -5.200  -2.156  1.00 24.34           C
ATOM    603  CG  ARG A 246      -34.232  -5.365  -1.662  1.00 25.49           C
ATOM    604  CD  ARG A 246      -33.359  -4.136  -1.804  1.00 25.90           C
ATOM    605  NE  ARG A 246      -32.020  -4.466  -1.317  1.00 27.00           N
ATOM    606  CZ  ARG A 246      -31.617  -4.321  -0.057  1.00 28.42           C
ATOM    607  NH1 ARG A 246      -32.447  -3.835   0.870  1.00 27.71           N
ATOM    608  NH2 ARG A 246      -30.378  -4.676   0.281  1.00 29.27           N
ATOM    609  N   GLY A 247      -38.835  -7.026  -1.580  1.00 23.42           N
ATOM    610  CA  GLY A 247      -40.259  -7.039  -1.851  1.00 24.01           C
ATOM    611  C   GLY A 247      -40.829  -8.273  -1.197  1.00 24.50           C
ATOM    612  O   GLY A 247      -40.080  -9.077  -0.649  1.00 24.29           O
ATOM    613  N   ASP A 248      -42.149  -8.408   1.235  1.00 25.16           N
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ATOM    591  CA  ILE A 245      -35.780 -10.075  -2.583  1.00 25.65           C
ATOM    592  C   ILE A 245      -36.217  -8.832  -1.801  1.00 25.29           C
ATOM    593  O   ILE A 245      -36.768  -8.951  -0.700  1.00 25.02           O
ATOM    594  CB  ILE A 245      -36.850 -10.402  -3.671  1.00 25.53           C
ATOM    595  CG1 ILE A 245      -38.173 -10.846  -3.033  1.00 25.35           C
ATOM    596  CG2 ILE A 245      -36.325 -11.466  -4.663  1.00 24.89           C
ATOM    597  CD1 ILE A 245      -39.407 -10.707  -3.934  1.00 26.20           C
ATOM    598  N   ARG A 246      -36.004  -7.648  -2.381  1.00 24.57           N
ATOM    599  CA  ARG A 246      -36.526  -6.407  -1.793  1.00 24.09           C
ATOM    600  C   ARG A 246      -37.988  -6.209  -2.186  1.00 23.73           C
ATOM    601  O   ARG A 246      -38.334  -5.370  -3.019  1.00 22.92           O
ATOM    602  CB  ARG A 246      -35.657  -5.200  -2.156  1.00 24.34           C
ATOM    603  CG  ARG A 246      -34.232  -5.365  -1.662  1.00 25.49           C
ATOM    604  CD  ARG A 246      -33.359  -4.136  -1.804  1.00 25.90           C
ATOM    605  NE  ARG A 246      -32.020  -4.466  -1.317  1.00 27.00           N
ATOM    606  CZ  ARG A 246      -31.617  -4.321  -0.057  1.00 28.42           C
ATOM    607  NH1 ARG A 246      -32.447  -3.835   0.870  1.00 27.71           N
ATOM    608  NH2 ARG A 246      -30.378  -4.676   0.281  1.00 29.27           N
ATOM    609  N   GLY A 247      -38.835  -7.026  -1.580  1.00 23.42           N
ATOM    610  CA  GLY A 247      -40.259  -7.039  -1.851  1.00 24.01           C
ATOM    611  C   GLY A 247      -40.829  -8.273  -1.197  1.00 24.50           C
ATOM    612  O   GLY A 247      -40.080  -9.077  -0.649  1.00 24.29           O
ATOM    613  N   ASP A 248      -42.149  -8.408  -1.235  1.00 25.16           N
ATOM    614  CA  ASP A 248      -42.824  -9.555  -0.633  1.00 26.30           C
ATOM    615  C   ASP A 248      -42.603 -10.798  -1.502  1.00 26.46           C
ATOM    616  O   ASP A 248      -43.038 -10.830  -2.651  1.00 26.50           O
ATOM    617  CB  ASP A 248      -44.319  -9.255  -0.467  1.00 26.46           C
ATOM    618  CG  ASP A 248      -45.036 -10.274   0.400  1.00 27.46           C
ATOM    619  OD1 ASP A 248      -45.923  -9.862   1.176  1.00 29.63           O
ATOM    620  OD2 ASP A 248      -44.724 -11.481   0.312  1.00 29.49           O
ATOM    621  N   PRO A 249      -41.919 -11.825  -0.954  1.00 27.01           N
ATOM    622  CA  PRO A 249      -41.616 -13.040  -1.719  1.00 27.12           C
ATOM    623  C   PRO A 249      -42.839 -13.935  -1.935  1.00 27.58           C
ATOM    624  O   PRO A 249      -42.747 -14.917  -2.670  1.00 27.69           O
ATOM    625  CB  PRO A 249      -40.575 -13.763  -0.842  1.00 27.25           C
ATOM    626  CG  PRO A 249      -40.172 -12.767   0.229  1.00 26.22           C
ATOM    627  CD  PRO A 249      -41.376 -11.906   0.415  1.00 26.82           C
ATOM    628  N   ASN A 250      -43.965 -13.578  -1.315  1.00 28.06           N
ATOM    629  CA  ASN A 250      -45.188 -14.384  -1.319  1.00 28.66           C
ATOM    630  C   ASN A 250      -44.915 -15.766  -0.728  1.00 28.70           C
ATOM    631  O   ASN A 250      -44.998 -16.798  -1.417  1.00 29.19           O
ATOM    632  CB  ASN A 250      -45.827 -14.456  -2.721  1.00 29.27           C
ATOM    633  CG  ASN A 250      -46.426 -13.126  -3.167  1.00 31.00           C
ATOM    634  OD1 ASN A 250      -46.227 -12.687  -4.308  1.00 34.38           O
ATOM    635  ND2 ASN A 250      -47.167 -12.478  -2.272  1.00 31.93           N
ATOM    636  N   CYS A 251      -44.571 -15.756   0.557  1.00 28.18           N
ATOM    637  CA  CYS A 251      -44.118 -16.941   1.273  1.00 27.85           C
ATOM    638  C   CYS A 251      -45.248 -17.940   1.495  1.00 28.66           C
ATOM    639  O   CYS A 251      -46.370 -17.574   1.840  1.00 29.40           O
ATOM    640  CB  CYS A 251      -43.484 -16.541   2.607  1.00 27.05           C
ATOM    641  SG  CYS A 251      -41.988 -15.536   2.435  1.00 22.88           S
ATOM    642  OXT CYS A 251      -45.044 -19.143   1.329  1.00 29.75           O
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
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user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^ATOM/ && ($4=="LYS" || $4=="ARG")' protein.pdb
ATOM     15  N   LYS A 173     -42.516 -20.697  24.576  1.00 32.18           N
ATOM     16  CA  LYS A 173     -43.842 -20.728  23.949  1.00 31.37           C
ATOM     17  C   LYS A 173     -44.028 -19.604  22.914  1.00 29.85           C
ATOM     18  O   LYS A 173     -44.831 -19.725  21.976  1.00 30.15           O
ATOM     19  CB  LYS A 173     -44.935 -20.645  25.024  1.00 31.31           C
ATOM     20  CG  LYS A 173     -46.343 -20.964  24.519  1.00 32.53           C
ATOM     21  CD  LYS A 173     -47.425 -20.459  25.479  1.00 32.89           C
ATOM     22  CE  LYS A 173     -48.818 -20.684  24.901  1.00 33.96           C
ATOM     23  NZ  LYS A 173     -49.893 -20.189  25.806  1.00 34.66           N
ATOM     46  N   ARG A 177     -41.200 -13.469  20.062  1.00 17.53           N
ATOM     47  CA  ARG A 177     -41.351 -12.338  20.984  1.00 18.15           C
ATOM     48  C   ARG A 177     -40.135 -12.196  21.880  1.00 18.13           C
ATOM     49  O   ARG A 177     -39.608 -11.088  22.053  1.00 17.51           O
ATOM     50  CB  ARG A 177     -42.634 -12.450  21.807  1.00 18.62           C
ATOM     51  CG  ARG A 177     -42.872 -11.237  22.713  1.00 20.72           C
ATOM     52  CD  ARG A 177     -44.227 -11.292  23.368  1.00 22.66           C
ATOM     53  NE  ARG A 177     -44.366 -10.263  24.391  1.00 24.94           N
ATOM     54  CZ  ARG A 177     -43.848 -10.348  25.616  1.00 25.91           C
ATOM     55  NH1 ARG A 177     -43.147 -11.413  25.983  1.00 25.04           N
ATOM     56  NH2 ARG A 177     -44.030  -9.360  26.477  1.00 26.28           N
ATOM     94  N   ARG A 182     -34.717  -9.406  22.797  1.00 19.68           N
ATOM     95  CA  ARG A 182     -33.268  -9.544  22.849  1.00 20.05           C
ATOM     96  C   ARG A 182     -32.593  -8.739  21.743  1.00 19.42           C
ATOM     97  O   ARG A 182     -31.576  -8.072  21.990  1.00 19.22           O
ATOM     98  CB  ARG A 182     -32.874 -11.019  22.769  1.00 20.66           C
ATOM     99  CG  ARG A 182     -33.592 -11.864  23.806  1.00 23.33           C
ATOM    100  CD  ARG A 182     -32.691 -12.324  24.917  1.00 31.08           C
ATOM    101  NE  ARG A 182     -32.238 -13.693  24.676  1.00 34.53           N
ATOM    102  CZ  ARG A 182     -32.720 -14.777  25.285  1.00 36.34           C
ATOM    103  NH1 ARG A 182     -33.684 -14.685  26.205  1.00 37.09           N
ATOM    104  NH2 ARG A 182     -32.223 -15.966  24.975  1.00 37.59           N
ATOM    147  N   LYS A 189     -27.943  -1.219  22.313  1.00 19.72           N
ATOM    148  CA  LYS A 189     -26.592  -1.220  22.859  1.00 19.83           C
ATOM    149  C   LYS A 189     -25.535  -0.931  21.783  1.00 19.51           C
ATOM    150  O   LYS A 189     -24.637  -0.121  22.008  1.00 19.20           O
ATOM    151  CB  LYS A 189     -26.300  -2.544  23.584  1.00 19.67           C
ATOM    152  CG  LYS A 189     -24.980  -2.573  24.353  1.00 21.18           C
ATOM    153  CD  LYS A 189     -24.991  -1.568  25.500  1.00 23.97           C
ATOM    154  CE  LYS A 189     -23.703  -1.601  26.298  1.00 25.23           C
ATOM    155  NZ  LYS A 189     -23.673  -0.401  27.204  1.00 25.98           N
ATOM    228  N   LYS A 200     -30.993   0.420   7.874  1.00 26.73           N
ATOM    229  CA  LYS A 200     -31.745  -0.835   7.833  1.00 24.20           C
ATOM    230  C   LYS A 200     -31.208  -1.820   8.880  1.00 23.56           C
ATOM    231  O   LYS A 200     -30.014  -1.861   9.160  1.00 23.03           O
ATOM    232  CB  LYS A 200     -31.682  -1.479   6.440  1.00 24.17           C
ATOM    233  CG  LYS A 200     -32.216  -0.609   5.294  1.00 23.41           C
ATOM    234  CD  LYS A 200     -32.263  -1.375   3.981  1.00 22.93           C
ATOM    235  CE  LYS A 200     -32.479  -0.443   2.786  1.00 21.93           C
ATOM    236  NZ  LYS A 200     -31.331   0.512   2.647  1.00 19.78           N
ATOM    297  N   LYS A 208     -49.012 -12.189  16.590  1.00 19.70           N
ATOM    298  CA  LYS A 208     -49.580 -11.893  17.916  1.00 20.21           C
ATOM    299  C   LYS A 208     -49.491 -13.063  18.913  1.00 20.08           C
```

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ATOM    236  NZ  LYS A 200      -31.331   0.512   2.647  1.00 19.78           N
ATOM    297  N   LYS A 208      -49.012 -12.189  16.590  1.00 19.70           N
ATOM    298  CA  LYS A 208      -49.580 -11.893  17.916  1.00 20.21           C
ATOM    299  C   LYS A 208      -49.491 -13.063  18.913  1.00 20.08           C
ATOM    300  O   LYS A 208      -49.635 -12.860  20.118  1.00 20.32           O
ATOM    301  CB  LYS A 208      -51.043 -11.459  17.773  1.00 20.47           C
ATOM    302  CG  LYS A 208      -51.935 -12.512  17.115  1.00 20.38           C
ATOM    303  CD  LYS A 208      -53.396 -12.222  17.359  1.00 22.10           C
ATOM    304  CE  LYS A 208      -54.291 -13.221  16.642  1.00 20.94           C
ATOM    305  NZ  LYS A 208      -54.187 -14.607  17.174  1.00 20.34           N
ATOM    357  N   ARG A 215      -43.344 -14.515   6.254  1.00 18.42           N
ATOM    358  CA  ARG A 215      -42.464 -13.537   5.651  1.00 18.42           C
ATOM    359  C   ARG A 215      -41.666 -12.820   6.745  1.00 17.97           C
ATOM    360  O   ARG A 215      -42.240 -12.338   7.726  1.00 19.04           O
ATOM    361  CB  ARG A 215      -43.275 -12.525   4.835  1.00 18.99           C
ATOM    362  CG  ARG A 215      -42.421 -11.489   4.100  1.00 19.30           C
ATOM    363  CD  ARG A 215      -43.301 -10.359   3.594  1.00 20.84           C
ATOM    364  NE  ARG A 215      -43.854  -9.573   4.697  1.00 20.02           N
ATOM    365  CZ  ARG A 215      -44.864  -8.706   4.586  1.00 22.74           C
ATOM    366  NH1 ARG A 215      -45.467  -8.510   3.418  1.00 23.51           N
ATOM    367  NH2 ARG A 215      -45.282  -8.040   5.656  1.00 23.60           N
ATOM    529  N   LYS A 237      -36.427 -19.755  11.099  1.00 18.90           N
ATOM    530  CA  LYS A 237      -35.253 -20.079  10.303  1.00 20.07           C
ATOM    531  C   LYS A 237      -35.652 -20.086   8.836  1.00 20.62           C
ATOM    532  O   LYS A 237      -36.709 -20.607   8.487  1.00 20.15           O
ATOM    533  CB  LYS A 237      -34.658 -21.438  10.712  1.00 20.03           C
ATOM    534  CG  LYS A 237      -34.152 -21.504  12.151  1.00 19.85           C
ATOM    535  CD  LYS A 237      -33.395 -22.819  12.393  1.00 20.64           C
ATOM    536  CE  LYS A 237      -32.887 -22.927  13.828  1.00 20.64           C
ATOM    537  NZ  LYS A 237      -32.303 -24.281  14.128  1.00 19.43           N
ATOM    538  N   ARG A 238      -34.811 -19.483   7.993  1.00 21.63           N
ATOM    539  CA  ARG A 238      -35.054 -19.421   6.556  1.00 22.74           C
ATOM    540  C   ARG A 238      -35.290 -20.815   5.978  1.00 23.18           C
ATOM    541  O   ARG A 238      -34.580 -21.765   6.321  1.00 23.36           O
ATOM    542  CB  ARG A 238      -33.882 -18.738   5.842  1.00 23.15           C
ATOM    543  CG  ARG A 238      -34.126 -18.455   4.367  1.00 24.78           C
ATOM    544  CD  ARG A 238      -32.909 -17.817   3.729  1.00 29.07           C
ATOM    545  NE  ARG A 238      -33.127 -17.584   2.305  1.00 32.71           N
ATOM    546  CZ  ARG A 238      -32.328 -16.860   1.525  1.00 33.80           C
ATOM    547  NH1 ARG A 238      -31.254 -16.265   2.028  1.00 35.30           N
ATOM    548  NH2 ARG A 238      -32.617 -16.721   0.240  1.00 34.89           N
ATOM    598  N   ARG A 246      -36.004  -7.648  -2.381  1.00 24.57           N
ATOM    599  CA  ARG A 246      -36.526  -6.407  -1.793  1.00 24.09           C
ATOM    600  C   ARG A 246      -37.988  -6.209  -2.186  1.00 23.73           C
ATOM    601  O   ARG A 246      -38.334  -5.370  -3.019  1.00 22.92           O
ATOM    602  CB  ARG A 246      -35.657  -5.200  -2.156  1.00 24.34           C
ATOM    603  CG  ARG A 246      -34.232  -5.365  -1.662  1.00 25.49           C
ATOM    604  CD  ARG A 246      -33.359  -4.136  -1.804  1.00 25.90           C
ATOM    605  NE  ARG A 246      -32.020  -4.466  -1.317  1.00 27.00           N
ATOM    606  CZ  ARG A 246      -31.617  -4.321  -0.057  1.00 28.42           C
ATOM    607  NH1 ARG A 246      -32.447  -3.835   0.870  1.00 27.71           N
ATOM    608  NH2 ARG A 246      -30.378  -4.676   0.281  1.00 29.27           N
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed 's/LYS/ARG/g' protein.pdb > protein_lys_to_arg.pdb
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ cat protein_lys_to_arg.pdb
HEADER    PEPTIDE BINDING PROTEIN                 26-MAY-05   1ZT3
TITLE     C-TERMINAL DOMAIN OF INSULIN-LIKE GROWTH FACTOR BINDING PROTEIN-1
TITLE    2 ISOLATED FROM HUMAN AMNIOTIC FLUID
COMPND    MOL_ID: 1;
COMPND   2 MOLECULE: INSULIN-LIKE GROWTH FACTOR BINDING PROTEIN 1;
COMPND   3 CHAIN: A;
COMPND   4 FRAGMENT: C-TERMINAL DOMAIN;
COMPND   5 SYNONYM: IGFBP-1, IBP- 1, IGF-BINDING PROTEIN 1, PLACENTAL PROTEIN
COMPND   6 12, PP12
SOURCE    MOL_ID: 1;
SOURCE   2 ORGANISM_SCIENTIFIC: HOMO SAPIENS;
SOURCE   3 ORGANISM_COMMON: HUMAN;
SOURCE   4 ORGANISM_TAXID: 9606;
SOURCE   5 OTHER_DETAILS: AMNIOTIC FLUID
KEYWDS    INSULIN-LIKE GROWTH FACTOR BINDING PROTEIN-1, IGFBP-1, AMNIOTIC
KEYWDS   2 FLUID, C-TERMINAL DOMAIN, METAL-BINDING, PEPTIDE BINDING PROTEIN
EXPDTA    X-RAY DIFFRACTION
AUTHOR    A.SALA,S.CAPALDI,M.CAMPAGNOLI,B.FAGGION,S.LABO,M.PERDUCA,A.ROMANO,
AUTHOR   2 M.E.CARRIZO,M.VALLI,L.VISAI,L.MINCHIOTTI,M.GALLIANO,H.L.MONACO
REVDAT   5   16-OCT-24 1ZT3    1       REMARK
REVDAT   4   11-OCT-17 1ZT3    1       REMARK
REVDAT   3   24-FEB-09 1ZT3    1       VERSN
REVDAT   2   30-AUG-05 1ZT3    1       JRNL
REVDAT   1   28-JUN-05 1ZT3    0
JRNL        AUTH   A.SALA,S.CAPALDI,M.CAMPAGNOLI,B.FAGGION,S.LABO,M.PERDUCA,
JRNL        AUTH 2 A.ROMANO,M.E.CARRIZO,M.VALLI,L.VISAI,L.MINCHIOTTI,
JRNL        AUTH 3 M.GALLIANO,H.L.MONACO
JRNL        TITL   STRUCTURE AND PROPERTIES OF THE C-TERMINAL DOMAIN OF
JRNL        TITL 2 INSULIN-LIKE GROWTH FACTOR-BINDING PROTEIN-1 ISOLATED FROM
JRNL        TITL 3 HUMAN AMNIOTIC FLUID
JRNL        REF    J.BIOL.CHEM.                  V. 280 29812 2005
JRNL        REFN                   ISSN 0021-9258
JRNL        PMID   15972819
JRNL        DOI    10.1074/JBC.M504304200
REMARK   2
REMARK   2 RESOLUTION.    1.80 ANGSTROMS.
REMARK   3
REMARK   3 REFINEMENT.
REMARK   3   PROGRAM     : REFMAC 5.2.0005
REMARK   3   AUTHORS     : MURSHUDOV,SKUBAK,LEBEDEV,PANNU,STEINER,
REMARK   3               : NICHOLLS,WINN,LONG,VAGIN
REMARK   3
REMARK   3    REFINEMENT TARGET : MAXIMUM LIKELIHOOD
REMARK   3
REMARK   3  DATA USED IN REFINEMENT.
REMARK   3   RESOLUTION RANGE HIGH (ANGSTROMS) : 1.80
REMARK   3   RESOLUTION RANGE LOW  (ANGSTROMS) : 18.92
REMARK   3   DATA CUTOFF            (SIGMA(F)) : 0.000
REMARK   3   COMPLETENESS FOR RANGE        (%) : 99.3
```

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ATOM      15  N   ARG A 173      -42.516 -20.697  24.576  1.00 32.18           N
ATOM      16  CA  ARG A 173      -43.842 -20.728  23.949  1.00 31.37           C
ATOM      17  C   ARG A 173      -44.028 -19.604  22.914  1.00 29.85           C
ATOM      18  O   ARG A 173      -44.831 -19.725  21.976  1.00 30.15           O
ATOM      19  CB  ARG A 173      -44.935 -20.645  25.024  1.00 31.31           C
ATOM      20  CG  ARG A 173      -46.343 -20.964  24.519  1.00 32.53           C
ATOM      21  CD  ARG A 173      -47.425 -20.459  25.479  1.00 32.89           C
ATOM      22  CE  ARG A 173      -48.818 -20.684  24.901  1.00 33.96           C
ATOM      23  NZ  ARG A 173      -49.893 -20.189  25.806  1.00 34.66           N
ATOM      24  N   GLU A 174      -43.280 -18.518  23.090  1.00 27.67           N
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TOM      46  N   ARG A 177      -41.200 -13.469  20.062  1.00 17.53           N
TOM      47  CA  ARG A 177      -41.351 -12.338  20.984  1.00 18.15           C
TOM      48  C   ARG A 177      -40.135 -12.196  21.880  1.00 18.13           C
TOM      49  O   ARG A 177      -39.608 -11.088  22.053  1.00 17.51           O
TOM      50  CB  ARG A 177      -42.634 -12.450  21.807  1.00 18.62           C
TOM      51  CG  ARG A 177      -42.872 -11.237  22.713  1.00 20.72           C
TOM      52  CD  ARG A 177      -44.227 -11.292  23.368  1.00 22.66           C
TOM      53  NE  ARG A 177      -44.366 -10.263  24.391  1.00 24.94           N
TOM      54  CZ  ARG A 177      -43.848 -10.348  25.616  1.00 25.91           C
TOM      55  NH1 ARG A 177      -43.147 -11.413  25.983  1.00 25.04           N
TOM      56  NH2 ARG A 177      -44.030  -9.360  26.477  1.00 26.28           N
TOM      57  N   ILE A 178      -39.676 -13.324  22.435  1.00 18.26           N
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TOM     93  OH  TYR A 181     -42.516  -6.373  25.347  1.00 22.89           O
TOM     94  N   ARG A 182     -34.717  -9.406  22.797  1.00 19.68           N
TOM     95  CA  ARG A 182     -33.268  -9.544  22.849  1.00 20.05           C
TOM     96  C   ARG A 182     -32.593  -8.739  21.743  1.00 19.42           C
TOM     97  O   ARG A 182     -31.576  -8.072  21.990  1.00 19.22           O
TOM     98  CB  ARG A 182     -32.874 -11.019  22.769  1.00 20.66           C
TOM     99  CG  ARG A 182     -33.592 -11.864  23.806  1.00 23.33           C
TOM    100  CD  ARG A 182     -32.691 -12.324  24.917  1.00 31.08           C
TOM    101  NE  ARG A 182     -32.238 -13.693  24.676  1.00 34.53           N
TOM    102  CZ  ARG A 182     -32.720 -14.777  25.285  1.00 36.34           C
TOM    103  NH1 ARG A 182     -33.684 -14.685  26.205  1.00 37.09           N
TOM    104  NH2 ARG A 182     -32.223 -15.966  24.975  1.00 37.59           N
```

```
TOM    147  N    ARG A 189      -27.943  -1.219  22.313  1.00 19.72           N
TOM    148  CA   ARG A 189      -26.592  -1.220  22.859  1.00 19.83           C
TOM    149  C    ARG A 189      -25.535  -0.931  21.783  1.00 19.51           C
TOM    150  O    ARG A 189      -24.637  -0.121  22.008  1.00 19.20           O
TOM    151  CB   ARG A 189      -26.300  -2.544  23.584  1.00 19.67           C
TOM    152  CG   ARG A 189      -24.980  -2.573  24.353  1.00 21.18           C
TOM    153  CD   ARG A 189      -24.991  -1.568  25.500  1.00 23.97           C
TOM    154  CE   ARG A 189      -23.703  -1.601  26.298  1.00 25.23           C
TOM    155  NZ   ARG A 189      -23.673  -0.401  27.204  1.00 25.98           N
TOM    156  N    ALA A 190      -25.651  -1.581  20.618  1.00 19.73           N
```

```
TOM    228  N    ARG A 200      -30.993   0.420   7.874  1.00 26.73           N
TOM    229  CA   ARG A 200      -31.745  -0.835   7.833  1.00 24.20           C
TOM    230  C    ARG A 200      -31.208  -1.820   8.880  1.00 23.56           C
TOM    231  O    ARG A 200      -30.014  -1.861   9.160  1.00 23.03           O
TOM    232  CB   ARG A 200      -31.682  -1.479   6.440  1.00 24.17           C
TOM    233  CG   ARG A 200      -32.216  -0.609   5.294  1.00 23.41           C
TOM    234  CD   ARG A 200      -32.263  -1.375   3.981  1.00 22.93           C
TOM    235  CE   ARG A 200      -32.479  -0.443   2.786  1.00 21.93           C
TOM    236  NZ   ARG A 200      -31.331   0.512   2.647  1.00 19.78           N
TOM    237  N    PHE A 201      -32.102  -2.617   9.451  1.00 22.85           N
```

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TOM    305  NZ   ARG A 208      -54.187 -14.607  17.174  1.00 20.34           N
TOM    306  N    ASN A 209      -49.280 -14.275  18.399  1.00 19.57           N
TOM    307  CA   ASN A 209      -49.083 -15.465  19.242  1.00 19.88           C
TOM    308  C    ASN A 209      -47.633 -15.638  19.679  1.00 19.32           C
TOM    309  O    ASN A 209      -47.304 -16.579  20.421  1.00 19.64           O
TOM    310  CB   ASN A 209      -49.550 -16.730  18.508  1.00 19.75           C
TOM    311  CG   ASN A 209      -50.776 -16.486  17.661  1.00 21.13           C
TOM    312  OD1  ASN A 209      -50.811 -16.838  16.468  1.00 23.95           O
TOM    313  ND2  ASN A 209      -51.778 -15.856  18.251  1.00 17.82           N
TOM    314  N    GLY A 210      -46.771 -14.739  19.205  1.00 19.30           N
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TOM    355  CB   SER A 214      -44.830 -17.290   6.356  1.00 19.46           C
TOM    356  OG   SER A 214      -45.258 -18.530   6.890  1.00 23.83           O
TOM    357  N    ARG A 215      -43.344 -14.515   6.254  1.00 18.42           N
TOM    358  CA   ARG A 215      -42.464 -13.537   5.651  1.00 18.42           C
TOM    359  C    ARG A 215      -41.666 -12.820   6.745  1.00 17.97           C
TOM    360  O    ARG A 215      -42.240 -12.338   7.726  1.00 19.04           O
TOM    361  CB   ARG A 215      -43.275 -12.525   4.835  1.00 18.99           C
TOM    362  CG   ARG A 215      -42.421 -11.489   4.100  1.00 19.30           C
TOM    363  CD   ARG A 215      -43.301 -10.359   3.594  1.00 20.84           C
TOM    364  NE   ARG A 215      -43.854  -9.573   4.697  1.00 20.02           N
TOM    365  CZ   ARG A 215      -44.864  -8.706   4.586  1.00 22.74           C
TOM    366  NH1  ARG A 215      -45.467  -8.510   3.418  1.00 23.51           N
TOM    367  NH2  ARG A 215      -45.282  -8.040   5.656  1.00 23.60           N
TOM    368  N    GLN A 216      -40.348 -12.761   6.573  1.00 17.58           N
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OM    528  O   GLY A 236     -35.952 -17.548  11.210  1.00 18.66           O
OM    529  N   ARG A 237     -36.427 -19.755  11.099  1.00 18.90           N
OM    530  CA  ARG A 237     -35.253 -20.079  10.303  1.00 20.07           C
OM    531  C   ARG A 237     -35.652 -20.086   8.836  1.00 20.62           C
OM    532  O   ARG A 237     -36.709 -20.607   8.487  1.00 20.15           O
OM    533  CB  ARG A 237     -34.658 -21.438  10.712  1.00 20.03           C
OM    534  CG  ARG A 237     -34.152 -21.504  12.151  1.00 19.85           C
OM    535  CD  ARG A 237     -33.395 -22.819  12.393  1.00 20.64           C
OM    536  CE  ARG A 237     -32.887 -22.927  13.828  1.00 20.64           C
OM    537  NZ  ARG A 237     -32.303 -24.281  14.128  1.00 19.43           N
OM    538  N   ARG A 238     -34.811 -19.483   7.993  1.00 21.63           N
OM    539  CA  ARG A 238     -35.054 -19.421   6.556  1.00 22.74           C
OM    540  C   ARG A 238     -35.290 -20.815   5.978  1.00 23.18           C
OM    541  O   ARG A 238     -34.580 -21.765   6.321  1.00 23.36           O
OM    542  CB  ARG A 238     -33.882 -18.738   5.842  1.00 23.15           C
OM    543  CG  ARG A 238     -34.126 -18.455   4.367  1.00 24.78           C
OM    544  CD  ARG A 238     -32.909 -17.817   3.729  1.00 29.07           C
OM    545  NE  ARG A 238     -33.127 -17.584   2.305  1.00 32.71           N
OM    546  CZ  ARG A 238     -32.328 -16.860   1.525  1.00 33.80           C
OM    547  NH1 ARG A 238     -31.254 -16.265   2.028  1.00 35.30           N
OM    548  NH2 ARG A 238     -32.617 -16.721   0.240  1.00 34.89           N
OM    549  N   ILE A 239     -36.322 -20.928   5.150  1.00 23.39           N
```

```
ATOM    597  CD1 ILE A 245      -39.407 -10.707  -3.934  1.00 26.20           C
ATOM    598  N   ARG A 246      -36.004  -7.648  -2.381  1.00 24.57           N
ATOM    599  CA  ARG A 246      -36.526  -6.407  -1.793  1.00 24.09           C
ATOM    600  C   ARG A 246      -37.988  -6.209  -2.186  1.00 23.73           C
ATOM    601  O   ARG A 246      -38.334  -5.370  -3.019  1.00 22.92           O
ATOM    602  CB  ARG A 246      -35.657  -5.200  -2.156  1.00 24.34           C
ATOM    603  CG  ARG A 246      -34.232  -5.365  -1.662  1.00 25.49           C
ATOM    604  CD  ARG A 246      -33.359  -4.136  -1.804  1.00 25.90           C
ATOM    605  NE  ARG A 246      -32.020  -4.466  -1.317  1.00 27.00           N
ATOM    606  CZ  ARG A 246      -31.617  -4.321  -0.057  1.00 28.42           C
ATOM    607  NH1 ARG A 246      -32.447  -3.835   0.870  1.00 27.71           N
ATOM    608  NH2 ARG A 246      -30.378  -4.676   0.281  1.00 29.27           N
ATOM    609  N   GLY A 247      -38.835  -7.026  -1.580  1.00 23.42           N
```

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user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^ATOM/ {print $9}' protein.pd
24.415
24.729
23.944
22.789
24.418
25.025
26.306
24.384
26.497
25.334
23.097
25.037
22.802
23.769
24.576
23.949
22.914
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25.024
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24.901
25.806
23.090
22.191
21.728
22.138
22.913
23.359
24.206
23.639
25.445
20.872
20.564
19.866
20.142
19.632
19.043
20.148
18.986
18.226
19.159
19.053
17.116
16.044
20.062
20.984
21.880
22.053
21.807
22.713
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-2.583
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-0.700
-3.671
-3.033
-4.663
-3.934
-2.381
-1.793
-2.186
-3.019
-2.156
-1.662
-1.804
-1.317
-0.057
0.870
0.281
-1.580
-1.851
-1.197
-0.649
-1.235
-0.633
-1.502
-2.651
-0.467
0.400
1.176
0.312
-0.954
-1.719
-1.935
-2.670
-0.842
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-1.319
-0.728
-1.417
-2.721
-3.167
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-2.272
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1.273
1.495
1.840
2.607
2.435
1.329
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
0.415
-1.315
-1.319
-0.728
-1.417
-2.721
-3.167
-4.308
-2.272
0.557
1.273
1.495
1.840
2.607
2.435
1.329
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^ATOM/ && $4=="GLY" {count++} END {print count}' protein.pdb
28
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^ATOM/ && $4=="GLY" {count++} END {print count}' protein.pdb
28
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^ATOM/ && $3=="CA" && ($4=="ALA" || $4=="GLY")' protein.pdb
ATOM    143  CA  ALA A 188     -29.906  -0.273  21.249  1.00 19.62           C
ATOM    157  CA  ALA A 190     -24.689  -1.402  19.528  1.00 20.13           C
ATOM    193  CA  GLY A 195     -19.179   3.890  13.965  1.00 34.45           C
ATOM    315  CA  GLY A 210     -45.353 -14.753  19.536  1.00 18.56           C
ATOM    422  CA  GLY A 223     -36.815   5.170   1.658  1.00 21.58           C
ATOM    435  CA  ALA A 225     -37.186  -1.492   0.463  1.00 20.30           C
ATOM    440  CA  GLY A 226     -35.705  -3.955   2.980  1.00 18.85           C
ATOM    526  CA  GLY A 236     -37.957 -18.276  12.295  1.00 18.22           C
ATOM    565  CA  GLY A 241     -34.199 -22.463  -1.334  1.00 28.67           C
ATOM    610  CA  GLY A 247     -40.259  -7.039  -1.851  1.00 24.01           C
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^ATOM/ && $3=="CA" && ($4=="ALA" || $4=="GLY")' protein.pdb
ATOM    143  CA  ALA A 188     -29.906  -0.273  21.249  1.00 19.62           C
ATOM    157  CA  ALA A 190     -24.689  -1.402  19.528  1.00 20.13           C
ATOM    193  CA  GLY A 195     -19.179   3.890  13.965  1.00 34.45           C
ATOM    315  CA  GLY A 210     -45.353 -14.753  19.536  1.00 18.56           C
ATOM    422  CA  GLY A 223     -36.815   5.170   1.658  1.00 21.58           C
ATOM    435  CA  ALA A 225     -37.186  -1.492   0.463  1.00 20.30           C
ATOM    440  CA  GLY A 226     -35.705  -3.955   2.980  1.00 18.85           C
ATOM    526  CA  GLY A 236     -37.957 -18.276  12.295  1.00 18.22           C
ATOM    565  CA  GLY A 241     -34.199 -22.463  -1.334  1.00 28.67           C
ATOM    610  CA  GLY A 247     -40.259  -7.039  -1.851  1.00 24.01           C
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^ATOM/ && $NF=="C" {count++} END {print count}' protein.pdb
401
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

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401
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^HETATM/' protein.pdb
HETATM  644  C1  DIO A 400     -29.064  -6.946  17.132  1.00 36.16           C
HETATM  645  C2  DIO A 400     -28.073  -9.061  16.720  1.00 36.92           C
HETATM  646  C1' DIO A 400     -27.687  -6.281  17.202  1.00 35.99           C
HETATM  647  C2' DIO A 400     -26.684  -8.437  16.825  1.00 36.68           C
HETATM  648  O1  DIO A 400     -28.996  -8.072  16.254  1.00 36.78           O
HETATM  649  O1' DIO A 400     -26.726  -7.251  17.629  1.00 36.28           O
HETATM  650  O   HOH A   1     -37.255  -6.228  10.647  1.00 14.97           O
HETATM  651  O   HOH A   2     -22.012  -0.788  22.336  1.00 20.64           O
HETATM  652  O   HOH A   3     -38.877  -3.391   4.471  1.00 20.33           O
HETATM  653  O   HOH A   4     -34.212 -23.871   7.998  1.00 18.39           O
HETATM  654  O   HOH A   5     -20.730  -0.315  24.894  1.00 20.65           O
HETATM  655  O   HOH A   6     -44.936 -13.438   1.965  1.00 28.30           O
HETATM  656  O   HOH A   7     -48.895 -18.702  15.563  1.00 27.48           O
HETATM  657  O   HOH A   8     -21.393  -0.854  17.811  1.00 24.13           O
HETATM  658  O   HOH A   9     -32.124   5.776   0.506  1.00 29.82           O
HETATM  659  O   HOH A  10     -46.186 -13.792   6.539  1.00 23.52           O
HETATM  660  O   HOH A  11     -29.575  -1.996  25.245  1.00 28.23           O
HETATM  661  O   HOH A  12     -45.642 -11.444  19.694  1.00 25.61           O
HETATM  662  O   HOH A  13     -49.384 -20.064  17.570  1.00 29.28           O
HETATM  663  O   HOH A  14     -30.137  -4.552   3.329  1.00 27.31           O
HETATM  664  O   HOH A  15     -42.693  -7.945  15.244  1.00 19.76           O
HETATM  665  O   HOH A  16     -35.906 -28.174   5.866  1.00 31.98           O
HETATM  666  O   HOH A  17     -44.171  -7.687  17.621  1.00 22.18           O
HETATM  667  O   HOH A  18     -47.265 -12.454  21.564  1.00 29.40           O
HETATM  668  O   HOH A  19     -36.430   3.094  -3.026  1.00 25.02           O
HETATM  669  O   HOH A  20     -29.553  -5.969  12.150  1.00 34.06           O
HETATM  670  O   HOH A  21     -42.686  -4.398  27.240  1.00 25.96           O
HETATM  671  O   HOH A  22     -43.889  -9.382  19.695  1.00 29.00           O
HETATM  672  O   HOH A  23     -43.476  -6.477  -2.563  1.00 30.73           O
HETATM  673  O   HOH A  24     -28.999   3.283  21.951  1.00 26.71           O
HETATM  674  O   HOH A  25     -50.516 -11.430  14.190  1.00 25.35           O
HETATM  675  O   HOH A  26     -27.306   5.304  20.576  1.00 30.44           O
HETATM  676  O   HOH A  27     -48.424 -14.440  -0.286  1.00 61.67           O
HETATM  677  O   HOH A  28     -43.808 -10.099   7.884  1.00 28.89           O
HETATM  678  O   HOH A  29     -35.566  -5.200  24.698  1.00 29.22           O
HETATM  679  O   HOH A  30     -34.679  -7.575  -4.768  1.00 25.20           O
HETATM  680  O   HOH A  31     -41.964 -17.506  25.641  1.00 37.16           O
HETATM  681  O   HOH A  32     -34.312  -2.922  25.191  1.00 31.83           O
HETATM  682  O   HOH A  33     -51.606 -11.651  21.823  1.00 29.90           O
HETATM  683  O   HOH A  34     -32.561 -16.311  28.119  1.00 50.80           O
HETATM  684  O   HOH A  35     -34.469 -16.004   9.163  1.00 24.01           O
HETATM  685  O   HOH A  36     -31.585 -23.210   8.833  1.00 26.89           O
HETATM  686  O   HOH A  37     -49.015 -19.802  20.176  1.00 31.69           O
HETATM  687  O   HOH A  38     -30.973 -14.980   5.105  1.00 43.06           O
HETATM  688  O   HOH A  39     -47.022 -17.146  11.346  1.00 28.11           O
HETATM  689  O   HOH A  40     -30.833  -7.743  14.123  1.00 34.35           O
HETATM  690  O   HOH A  41     -25.168   6.080  14.148  1.00 49.89           O
HETATM  691  O   HOH A  42     -51.167 -14.258  13.359  1.00 47.34           O
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^ATOM/ && $4 ~ /E$/ {print $4}' protein.pdb
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HETATM  652  O   HOH A   3      -38.877  -3.391   4.471  1.00 20.33           O
HETATM  653  O   HOH A   4      -34.212 -23.871   7.998  1.00 18.39           O
HETATM  654  O   HOH A   5      -20.730  -0.315  24.894  1.00 20.65           O
HETATM  655  O   HOH A   6      -44.936 -13.438   1.965  1.00 28.30           O
HETATM  656  O   HOH A   7      -48.895 -18.702  15.563  1.00 27.48           O
HETATM  657  O   HOH A   8      -21.393  -0.854  17.811  1.00 24.13           O
HETATM  658  O   HOH A   9      -32.124   5.776   0.506  1.00 29.82           O
HETATM  659  O   HOH A  10      -46.186 -13.792   6.539  1.00 23.52           O
HETATM  660  O   HOH A  11      -29.575  -1.996  25.245  1.00 28.23           O
HETATM  661  O   HOH A  12      -45.642 -11.444  19.694  1.00 25.61           O
HETATM  662  O   HOH A  13      -49.384 -20.064  17.570  1.00 29.28           O
HETATM  663  O   HOH A  14      -30.137  -4.552   3.329  1.00 27.31           O
HETATM  664  O   HOH A  15      -42.693  -7.945  15.244  1.00 19.76           O
HETATM  665  O   HOH A  16      -35.906 -28.174   5.866  1.00 31.98           O
HETATM  666  O   HOH A  17      -44.171  -7.687  17.621  1.00 22.18           O
HETATM  667  O   HOH A  18      -47.265 -12.454  21.564  1.00 29.40           O
HETATM  668  O   HOH A  19      -36.430   3.094  -3.026  1.00 25.02           O
HETATM  669  O   HOH A  20      -29.553  -5.969  12.150  1.00 34.06           O
HETATM  670  O   HOH A  21      -42.686  -4.398  27.240  1.00 25.96           O
HETATM  671  O   HOH A  22      -43.889  -9.382  19.695  1.00 29.00           O
HETATM  672  O   HOH A  23      -43.476  -6.477  -2.563  1.00 30.73           O
HETATM  673  O   HOH A  24      -28.999   3.283  21.951  1.00 26.71           O
HETATM  674  O   HOH A  25      -50.516 -11.430  14.190  1.00 25.35           O
HETATM  675  O   HOH A  26      -27.306   5.304  20.576  1.00 30.44           O
HETATM  676  O   HOH A  27      -48.424 -14.440  -0.286  1.00 61.67           O
HETATM  677  O   HOH A  28      -43.808 -10.099   7.884  1.00 28.89           O
HETATM  678  O   HOH A  29      -35.566  -5.200  24.698  1.00 29.22           O
HETATM  679  O   HOH A  30      -34.679  -7.575  -4.768  1.00 25.20           O
HETATM  680  O   HOH A  31      -41.964 -17.506  25.641  1.00 37.16           O
HETATM  681  O   HOH A  32      -34.312  -2.922  25.191  1.00 31.83           O
HETATM  682  O   HOH A  33      -51.606 -11.651  21.823  1.00 29.90           O
HETATM  683  O   HOH A  34      -32.561 -16.311  28.119  1.00 50.80           O
HETATM  684  O   HOH A  35      -34.469 -16.004   9.163  1.00 24.01           O
HETATM  685  O   HOH A  36      -31.585 -23.210   8.833  1.00 26.89           O
HETATM  686  O   HOH A  37      -49.015 -19.802  20.176  1.00 31.69           O
HETATM  687  O   HOH A  38      -30.973 -14.980   5.105  1.00 43.06           O
HETATM  688  O   HOH A  39      -47.022 -17.146  11.346  1.00 28.11           O
HETATM  689  O   HOH A  40      -30.833  -7.743  14.123  1.00 34.35           O
HETATM  690  O   HOH A  41      -25.168   6.080  14.148  1.00 49.89           O
HETATM  691  O   HOH A  42      -51.167 -14.258  13.359  1.00 47.34           O
CONECT   45  288
CONECT  288   45
CONECT  382  456
CONECT  456  382
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CONECT  644  646  648
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CONECT  647  645  649
CONECT  648  644  645
CONECT  649  646  647
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ No TER or END
```

```
ATOM    618  CG  ASP A 248      -45.036 -10.274   0.400  1.00 27.46           C
ATOM    619  OD1 ASP A 248      -45.923  -9.862   1.176  1.00 29.63           O
ATOM    620  OD2 ASP A 248      -44.724 -11.481   0.312  1.00 29.49           O
ATOM    621  N   PRO A 249      -41.919 -11.825  -0.954  1.00 27.01           N
ATOM    622  CA  PRO A 249      -41.616 -13.040  -1.719  1.00 27.12           C
ATOM    623  C   PRO A 249      -42.839 -13.935  -1.935  1.00 27.58           C
ATOM    624  O   PRO A 249      -42.747 -14.917  -2.670  1.00 27.69           O
ATOM    625  CB  PRO A 249      -40.575 -13.763  -0.842  1.00 27.25           C
ATOM    626  CG  PRO A 249      -40.172 -12.767   0.229  1.00 26.22           C
ATOM    627  CD  PRO A 249      -41.376 -11.906   0.415  1.00 26.82           C
ATOM    628  N   ASN A 250      -43.965 -13.578  -1.315  1.00 28.06           N
ATOM    629  CA  ASN A 250      -45.188 -14.384  -1.319  1.00 28.66           C
ATOM    630  C   ASN A 250      -44.915 -15.766  -0.728  1.00 28.70           C
ATOM    631  O   ASN A 250      -44.998 -16.798  -1.417  1.00 29.19           O
ATOM    632  CB  ASN A 250      -45.827 -14.456  -2.721  1.00 29.27           C
ATOM    633  CG  ASN A 250      -46.426 -13.126  -3.167  1.00 31.00           C
ATOM    634  OD1 ASN A 250      -46.227 -12.687  -4.308  1.00 34.38           O
ATOM    635  ND2 ASN A 250      -47.167 -12.478  -2.272  1.00 31.93           N
ATOM    636  N   CYS A 251      -44.571 -15.756   0.557  1.00 28.18           N
ATOM    637  CA  CYS A 251      -44.118 -16.941   1.273  1.00 27.85           C
ATOM    638  C   CYS A 251      -45.248 -17.940   1.495  1.00 28.66           C
ATOM    639  O   CYS A 251      -46.370 -17.574   1.840  1.00 29.40           O
ATOM    640  CB  CYS A 251      -43.484 -16.541   2.607  1.00 27.05           C
ATOM    641  SG  CYS A 251      -41.988 -15.536   2.435  1.00 22.88           S
ATOM    642  OXT CYS A 251      -45.044 -19.143   1.329  1.00 29.75           O
HETATM  644  C1  DIO A 400      -29.064  -6.946  17.132  1.00 36.16           C
HETATM  645  C2  DIO A 400      -28.073  -9.061  16.720  1.00 36.92           C
HETATM  646  C1' DIO A 400      -27.687  -6.281  17.202  1.00 35.99           C
HETATM  647  C2' DIO A 400      -26.684  -8.437  16.825  1.00 36.68           C
HETATM  648  O1  DIO A 400      -28.996  -8.072  16.254  1.00 36.78           O
HETATM  649  O1' DIO A 400      -26.726  -7.251  17.629  1.00 36.28           O
HETATM  650  O   HOH A   1      -37.255  -6.228  10.647  1.00 14.97           O
HETATM  651  O   HOH A   2      -22.012  -0.788  22.336  1.00 20.64           O
HETATM  652  O   HOH A   3      -38.877  -3.391   4.471  1.00 20.33           O
HETATM  653  O   HOH A   4      -34.212 -23.871   7.998  1.00 18.39           O
HETATM  654  O   HOH A   5      -20.730  -0.315  24.894  1.00 20.65           O
HETATM  655  O   HOH A   6      -44.936 -13.438   1.965  1.00 28.30           O
HETATM  656  O   HOH A   7      -48.895 -18.702  15.563  1.00 27.48           O
HETATM  657  O   HOH A   8      -21.393  -0.854  17.811  1.00 24.13           O
HETATM  658  O   HOH A   9      -32.124   5.776   0.506  1.00 29.82           O
HETATM  659  O   HOH A  10      -46.186 -13.792   6.539  1.00 23.52           O
HETATM  660  O   HOH A  11      -29.575  -1.996  25.245  1.00 28.23           O
HETATM  661  O   HOH A  12      -45.642 -11.444  19.694  1.00 25.61           O
HETATM  662  O   HOH A  13      -49.384 -20.064  17.570  1.00 29.28           O
HETATM  663  O   HOH A  14      -30.137  -4.552   3.329  1.00 27.31           O
HETATM  664  O   HOH A  15      -42.693  -7.945  15.244  1.00 19.76           O
HETATM  665  O   HOH A  16      -35.906 -28.174   5.866  1.00 31.98           O
HETATM  666  O   HOH A  17      -44.171  -7.687  17.621  1.00 22.18           O
HETATM  667  O   HOH A  18      -47.265 -12.454  21.564  1.00 29.40           O
HETATM  668  O   HOH A  19      -36.430   3.094  -3.026  1.00 25.02           O
HETATM  669  O   HOH A  20      -29.553  -5.969  12.150  1.00 34.06           O
HETATM  670  O   HOH A  21      -42.686  -4.398  27.240  1.00 25.96           O
HETATM  671  O   HOH A  22      -43.889  -9.382  19.695  1.00 29.00           O
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^ATOM/ && $4!="ARG"' protein.pdb
ATOM      1  N   TRP A 172      -39.136 -21.997  24.415  1.00 34.43           N
ATOM      2  CA  TRP A 172      -40.108 -20.907  24.729  1.00 34.28           C
ATOM      3  C   TRP A 172      -41.403 -21.065  23.944  1.00 33.46           C
ATOM      4  O   TRP A 172      -41.385 -21.496  22.789  1.00 33.48           O
ATOM      5  CB  TRP A 172      -39.506 -19.534  24.418  1.00 35.12           C
ATOM      6  CG  TRP A 172      -38.161 -19.292  25.025  1.00 36.34           C
ATOM      7  CD1 TRP A 172      -37.773 -19.568  26.306  1.00 37.69           C
ATOM      8  CD2 TRP A 172      -37.032 -18.693  24.384  1.00 37.47           C
ATOM      9  NE1 TRP A 172      -36.465 -19.190  26.497  1.00 37.97           N
ATOM     10  CE2 TRP A 172      -35.985 -18.650  25.334  1.00 37.83           C
ATOM     11  CE3 TRP A 172      -36.799 -18.192  23.097  1.00 37.57           C
ATOM     12  CZ2 TRP A 172      -34.725 -18.128  25.037  1.00 37.51           C
ATOM     13  CZ3 TRP A 172      -35.545 -17.671  22.802  1.00 37.85           C
ATOM     14  CH2 TRP A 172      -34.523 -17.646  23.769  1.00 37.43           C
ATOM     15  N   LYS A 173      -42.516 -20.697  24.576  1.00 32.18           N
ATOM     16  CA  LYS A 173      -43.842 -20.728  23.949  1.00 31.37           C
ATOM     17  C   LYS A 173      -44.028 -19.604  22.914  1.00 29.85           C
ATOM     18  O   LYS A 173      -44.831 -19.725  21.976  1.00 30.15           O
ATOM     19  CB  LYS A 173      -44.935 -20.645  25.024  1.00 31.31           C
ATOM     20  CG  LYS A 173      -46.343 -20.964  24.519  1.00 32.53           C
ATOM     21  CD  LYS A 173      -47.425 -20.459  25.479  1.00 32.89           C
ATOM     22  CE  LYS A 173      -48.818 -20.684  24.901  1.00 33.96           C
ATOM     23  NZ  LYS A 173      -49.893 -20.189  25.806  1.00 34.66           N
ATOM     24  N   GLU A 174      -43.280 -18.518  23.090  1.00 27.67           N
ATOM     25  CA  GLU A 174      -43.337 -17.366  22.191  1.00 25.77           C
ATOM     26  C   GLU A 174      -41.922 -17.014  21.728  1.00 23.54           C
ATOM     27  O   GLU A 174      -41.381 -15.977  22.138  1.00 23.23           O
ATOM     28  CB  GLU A 174      -43.933 -16.148  22.913  1.00 25.76           C
ATOM     29  CG  GLU A 174      -45.376 -16.258  23.359  1.00 26.89           C
ATOM     30  CD  GLU A 174      -45.777 -15.061  24.206  1.00 27.42           C
ATOM     31  OE1 GLU A 174      -46.102 -14.001  23.639  1.00 29.42           O
ATOM     32  OE2 GLU A 174      -45.756 -15.182  25.445  1.00 30.63           O
ATOM     33  N   PRO A 175      -41.313 -17.867  20.872  1.00 21.55           N
ATOM     34  CA  PRO A 175      -39.891 -17.705  20.564  1.00 20.10           C
ATOM     35  C   PRO A 175      -39.565 -16.385  19.866  1.00 18.58           C
ATOM     36  O   PRO A 175      -38.520 -15.781  20.142  1.00 18.18           O
ATOM     37  CB  PRO A 175      -39.594 -18.893  19.632  1.00 20.52           C
ATOM     38  CG  PRO A 175      -40.909 -19.247  19.043  1.00 19.77           C
ATOM     39  CD  PRO A 175      -41.896 -19.015  20.148  1.00 21.28           C
ATOM     40  N   CYS A 176      -40.455 -15.942  18.986  1.00 16.73           N
ATOM     41  CA  CYS A 176      -40.212 -14.710  18.226  1.00 16.80           C
ATOM     42  C   CYS A 176      -40.222 -13.501  19.159  1.00 16.78           C
ATOM     43  O   CYS A 176      -39.363 -12.626  19.053  1.00 16.20           O
ATOM     44  CB  CYS A 176      -41.244 -14.528  17.116  1.00 16.50           C
ATOM     45  SG  CYS A 176      -40.885 -13.084  16.044  1.00 15.20           S
ATOM     57  N   ILE A 178      -39.676 -13.324  22.435  1.00 18.26           N
ATOM     58  CA  ILE A 178      -38.446 -13.332  23.221  1.00 18.88           C
ATOM     59  C   ILE A 178      -37.252 -12.846  22.394  1.00 18.95           C
ATOM     60  O   ILE A 178      -36.503 -11.962  22.843  1.00 19.62           O
ATOM     61  CB  ILE A 178      -38.154 -14.721  23.862  1.00 18.59           C
ATOM     62  CG1 ILE A 178      -39.319 -15.180  24.759  1.00 18.73           C
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ATOM     63  CG2 ILE A 178      -36.838 -14.687  24.621  1.00 19.59           C
ATOM     64  CD1 ILE A 178      -39.754 -14.186  25.865  1.00 20.15           C
ATOM     65  N   GLU A 179      -37.088 -13.386  21.187  1.00 19.21           N
ATOM     66  CA  GLU A 179      -35.993 -12.950  20.327  1.00 19.54           C
ATOM     67  C   GLU A 179      -36.080 -11.449  20.043  1.00 19.29           C
ATOM     68  O   GLU A 179      -35.075 -10.745  20.146  1.00 19.32           O
ATOM     69  CB  GLU A 179      -35.948 -13.726  19.020  1.00 19.69           C
ATOM     70  CG  GLU A 179      -34.670 -13.469  18.245  1.00 21.79           C
ATOM     71  CD  GLU A 179      -34.657 -14.096  16.879  1.00 24.88           C
ATOM     72  OE1 GLU A 179      -33.547 -14.390  16.389  1.00 26.52           O
ATOM     73  OE2 GLU A 179      -35.742 -14.303  16.292  1.00 27.10           O
ATOM     74  N   LEU A 180      -37.277 -10.979  19.702  1.00 19.29           N
ATOM     75  CA  LEU A 180      -37.497  -9.560  19.389  1.00 19.26           C
ATOM     76  C   LEU A 180      -36.979  -8.650  20.508  1.00 19.08           C
ATOM     77  O   LEU A 180      -36.226  -7.704  20.241  1.00 18.14           O
ATOM     78  CB  LEU A 180      -38.974  -9.273  19.106  1.00 19.11           C
ATOM     79  CG  LEU A 180      -39.319  -7.798  18.847  1.00 19.07           C
ATOM     80  CD1 LEU A 180      -38.510  -7.233  17.675  1.00 21.29           C
ATOM     81  CD2 LEU A 180      -40.830  -7.649  18.614  1.00 19.74           C
ATOM     82  N   TYR A 181      -37.358  -8.954  21.751  1.00 19.10           N
ATOM     83  CA  TYR A 181      -36.842  -8.229  22.914  1.00 19.73           C
ATOM     84  C   TYR A 181      -35.318  -8.230  22.972  1.00 19.86           C
ATOM     85  O   TYR A 181      -34.698  -7.175  23.148  1.00 19.98           O
ATOM     86  CB  TYR A 181      -37.467  -8.751  24.227  1.00 20.16           C
ATOM     87  CG  TYR A 181      -38.814  -8.123  24.527  1.00 20.84           C
ATOM     88  CD1 TYR A 181      -38.915  -7.004  25.358  1.00 21.48           C
ATOM     89  CD2 TYR A 181      -39.990  -8.645  23.977  1.00 20.81           C
ATOM     90  CE1 TYR A 181      -40.147  -6.422  25.633  1.00 22.34           C
ATOM     91  CE2 TYR A 181      -41.230  -8.068  24.244  1.00 21.91           C
ATOM     92  CZ  TYR A 181      -41.300  -6.959  25.082  1.00 22.24           C
ATOM     93  OH  TYR A 181      -42.516  -6.373  25.347  1.00 22.89           O
ATOM    105  N   VAL A 183      -33.164  -8.795  20.537  1.00 18.69           N
ATOM    106  CA  VAL A 183      -32.586  -8.101  19.374  1.00 18.83           C
ATOM    107  C   VAL A 183      -32.670  -6.583  19.560  1.00 18.48           C
ATOM    108  O   VAL A 183      -31.693  -5.875  19.310  1.00 18.13           O
ATOM    109  CB  VAL A 183      -33.244  -8.550  18.037  1.00 18.63           C
ATOM    110  CG1 VAL A 183      -32.873  -7.606  16.895  1.00 19.70           C
ATOM    111  CG2 VAL A 183      -32.804  -9.975  17.689  1.00 18.64           C
ATOM    112  N   VAL A 184      -33.822  -6.106  20.034  1.00 18.63           N
ATOM    113  CA  VAL A 184      -34.017  -4.667  20.304  1.00 19.03           C
ATOM    114  C   VAL A 184      -32.987  -4.148  21.330  1.00 19.24           C
ATOM    115  O   VAL A 184      -32.377  -3.081  21.136  1.00 18.61           O
ATOM    116  CB  VAL A 184      -35.483  -4.352  20.725  1.00 19.12           C
ATOM    117  CG1 VAL A 184      -35.606  -2.937  21.314  1.00 20.37           C
ATOM    118  CG2 VAL A 184      -36.407  -4.486  19.532  1.00 18.87           C
ATOM    119  N   GLU A 185      -32.767  -4.919  22.395  1.00 19.25           N
ATOM    120  CA  GLU A 185      -31.793  -4.545  23.423  1.00 20.57           C
ATOM    121  C   GLU A 185      -30.359  -4.498  22.870  1.00 20.10           C
ATOM    122  O   GLU A 185      -29.614  -3.546  23.140  1.00 19.76           O
ATOM    123  CB  GLU A 185      -31.888  -5.488  24.630  1.00 20.14           C
ATOM    124  CG  GLU A 185      -30.953  -5.110  25.786  1.00 22.36           C
ATOM    125  CD  GLU A 185      -31.034  -6.061  26.975  1.00 22.80           C
ATOM    126  OE1 GLU A 185      -31.853  -7.002  26.951  1.00 27.18           O
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ATOM    125  CD  GLU A 185     -31.034  -6.061  26.975  1.00 22.80           C
ATOM    126  OE1 GLU A 185     -31.853  -7.002  26.951  1.00 27.18           O
ATOM    127  OE2 GLU A 185     -30.273  -5.858  27.948  1.00 27.24           O
ATOM    128  N   SER A 186     -29.973  -5.517  22.106  1.00 19.89           N
ATOM    129  CA  SER A 186     -28.627  -5.563  21.508  1.00 20.02           C
ATOM    130  C   SER A 186     -28.397  -4.432  20.505  1.00 19.66           C
ATOM    131  O   SER A 186     -27.329  -3.816  20.487  1.00 18.81           O
ATOM    132  CB  SER A 186     -28.373  -6.909  20.830  1.00 20.39           C
ATOM    133  OG  SER A 186     -28.358  -7.942  21.792  1.00 23.17           O
ATOM    134  N   LEU A 187     -29.406  -4.171  19.676  1.00 19.21           N
ATOM    135  CA  LEU A 187     -29.344  -3.070  18.706  1.00 19.74           C
ATOM    136  C   LEU A 187     -29.183  -1.718  19.393  1.00 19.37           C
ATOM    137  O   LEU A 187     -28.362  -0.905  18.973  1.00 19.34           O
ATOM    138  CB  LEU A 187     -30.593  -3.047  17.833  1.00 19.81           C
ATOM    139  CG  LEU A 187     -30.623  -3.969  16.619  1.00 21.86           C
ATOM    140  CD1 LEU A 187     -32.032  -3.991  16.073  1.00 24.65           C
ATOM    141  CD2 LEU A 187     -29.626  -3.520  15.538  1.00 24.78           C
ATOM    142  N   ALA A 188     -29.985  -1.490  20.431  1.00 19.16           N
ATOM    143  CA  ALA A 188     -29.906  -0.273  21.249  1.00 19.62           C
ATOM    144  C   ALA A 188     -28.484  -0.122  21.790  1.00 19.76           C
ATOM    145  O   ALA A 188     -27.877   0.958  21.708  1.00 19.78           O
ATOM    146  CB  ALA A 188     -30.914  -0.334  22.398  1.00 19.86           C
ATOM    147  N   LYS A 189     -27.943  -1.219  22.313  1.00 19.72           N
ATOM    148  CA  LYS A 189     -26.592  -1.220  22.859  1.00 19.83           C
ATOM    149  C   LYS A 189     -25.535  -0.931  21.783  1.00 19.51           C
ATOM    150  O   LYS A 189     -24.637  -0.121  22.008  1.00 19.20           O
ATOM    151  CB  LYS A 189     -26.300  -2.544  23.584  1.00 19.67           C
ATOM    152  CG  LYS A 189     -24.980  -2.573  24.353  1.00 21.18           C
ATOM    153  CD  LYS A 189     -24.991  -1.568  25.500  1.00 23.97           C
ATOM    154  CE  LYS A 189     -23.703  -1.601  26.298  1.00 25.23           C
ATOM    155  NZ  LYS A 189     -23.673  -0.401  27.204  1.00 25.98           N
ATOM    156  N   ALA A 190     -25.651  -1.581  20.618  1.00 19.73           N
ATOM    157  CA  ALA A 190     -24.689  -1.402  19.528  1.00 20.13           C
ATOM    158  C   ALA A 190     -24.697   0.033  19.011  1.00 20.31           C
ATOM    159  O   ALA A 190     -23.654   0.575  18.652  1.00 20.46           O
ATOM    160  CB  ALA A 190     -24.972  -2.370  18.386  1.00 20.01           C
ATOM    161  N   GLN A 191     -25.879   0.633  18.973  1.00 20.86           N
ATOM    162  CA  GLN A 191     -26.024   2.004  18.459  1.00 22.02           C
ATOM    163  C   GLN A 191     -25.233   3.028  19.288  1.00 21.64           C
ATOM    164  O   GLN A 191     -24.787   4.046  18.754  1.00 21.77           O
ATOM    165  CB  GLN A 191     -27.500   2.393  18.374  1.00 22.25           C
ATOM    166  CG  GLN A 191     -28.199   1.933  17.086  1.00 25.97           C
ATOM    167  CD  GLN A 191     -27.735   2.695  15.851  1.00 30.74           C
ATOM    168  OE1 GLN A 191     -28.111   3.853  15.635  1.00 33.63           O
ATOM    169  NE2 GLN A 191     -26.910   2.047  15.035  1.00 32.02           N
ATOM    170  N   GLU A 192     -25.051   2.742  20.577  1.00 21.46           N
ATOM    171  CA  GLU A 192     -24.277   3.615  21.482  1.00 21.62           C
ATOM    172  C   GLU A 192     -22.849   3.877  20.973  1.00 21.84           C
ATOM    173  O   GLU A 192     -22.341   5.002  21.037  1.00 20.87           O
ATOM    174  CB  GLU A 192     -24.256   3.024  22.902  1.00 21.24           C
ATOM    175  CG  GLU A 192     -25.645   2.977  23.531  1.00 21.99           C
ATOM    176  CD  GLU A 192     -25.689   2.475  24.965  1.00 22.37           C
ATOM    177  OE1 GLU A 192     -24.668   1.990  25.496  1.00 22.90           O
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ATOM    177  OE1 GLU A 192      -24.668   1.990  25.496  1.00 22.90           O
ATOM    178  OE2 GLU A 192      -26.783   2.565  25.568  1.00 25.93           O
ATOM    179  N   THR A 193      -22.217   2.832  20.450  1.00 22.20           N
ATOM    180  CA  THR A 193      -20.820   2.910  20.040  1.00 23.10           C
ATOM    181  C   THR A 193      -20.673   2.774  18.526  1.00 24.43           C
ATOM    182  O   THR A 193      -19.560   2.654  18.023  1.00 23.91           O
ATOM    183  CB  THR A 193      -20.006   1.791  20.694  1.00 23.11           C
ATOM    184  OG1 THR A 193      -20.622   0.538  20.378  1.00 22.12           O
ATOM    185  CG2 THR A 193      -19.949   1.957  22.207  1.00 22.37           C
ATOM    186  N   SER A 194      -21.792   2.789  17.806  1.00 26.17           N
ATOM    187  CA  SER A 194      -21.785   2.502  16.374  1.00 28.66           C
ATOM    188  C   SER A 194      -20.976   3.535  15.607  1.00 30.43           C
ATOM    189  O   SER A 194      -21.196   4.739  15.764  1.00 30.63           O
ATOM    190  CB  SER A 194      -23.206   2.411  15.808  1.00 28.78           C
ATOM    191  OG  SER A 194      -23.179   2.059  14.427  1.00 29.52           O
ATOM    192  N   GLY A 195      -20.043   3.045  14.791  1.00 32.35           N
ATOM    193  CA  GLY A 195      -19.179   3.890  13.965  1.00 34.45           C
ATOM    194  C   GLY A 195      -19.806   4.280  12.636  1.00 36.12           C
ATOM    195  O   GLY A 195      -19.172   4.964  11.819  1.00 36.57           O
ATOM    196  N   GLU A 196      -21.044   3.837  12.413  1.00 37.26           N
ATOM    197  CA  GLU A 196      -21.822   4.225  11.232  1.00 38.38           C
ATOM    198  C   GLU A 196      -23.273   4.535  11.614  1.00 38.59           C
ATOM    199  O   GLU A 196      -23.676   4.309  12.751  1.00 38.87           O
ATOM    200  CB  GLU A 196      -21.760   3.138  10.144  1.00 38.61           C
ATOM    201  CG  GLU A 196      -22.511   1.843  10.474  1.00 40.20           C
ATOM    202  CD  GLU A 196      -21.760   0.951  11.457  1.00 42.45           C
ATOM    203  OE1 GLU A 196      -22.418   0.352  12.338  0.50 42.52           O
ATOM    204  OE2 GLU A 196      -20.513   0.856  11.354  1.00 43.56           O
ATOM    205  N   GLU A 197      -24.042   5.069  10.667  1.00 38.83           N
ATOM    206  CA  GLU A 197      -25.464   5.336  10.878  1.00 38.88           C
ATOM    207  C   GLU A 197      -26.270   4.317  10.074  1.00 38.33           C
ATOM    208  O   GLU A 197      -26.494   4.507   8.877  1.00 38.98           O
ATOM    209  CB  GLU A 197      -25.821   6.766  10.445  1.00 39.07           C
ATOM    210  CG  GLU A 197      -27.249   7.230  10.822  1.00 40.48           C
ATOM    211  CD  GLU A 197      -27.277   8.390  11.820  1.00 42.86           C
ATOM    212  OE1 GLU A 197      -26.348   9.232  11.792  1.00 43.40           O
ATOM    213  OE2 GLU A 197      -28.241   8.474  12.621  1.00 43.51           O
ATOM    214  N   ILE A 198      -26.691   3.231  10.722  1.00 37.57           N
ATOM    215  CA  ILE A 198      -27.447   2.184  10.020  1.00 36.57           C
ATOM    216  C   ILE A 198      -28.889   2.619   9.745  1.00 35.29           C
ATOM    217  O   ILE A 198      -29.574   3.164  10.616  1.00 36.01           O
ATOM    218  CB  ILE A 198      -27.389   0.782  10.718  1.00 36.84           C
ATOM    219  CG1 ILE A 198      -28.057   0.812  12.097  1.00 37.53           C
ATOM    220  CG2 ILE A 198      -25.941   0.265  10.792  1.00 36.74           C
ATOM    221  CD1 ILE A 198      -28.621  -0.537  12.539  1.00 38.43           C
ATOM    222  N   SER A 199      -29.326   2.382   8.516  1.00 33.45           N
ATOM    223  CA  SER A 199      -30.640   2.811   8.054  1.00 31.29           C
ATOM    224  C   SER A 199      -31.578   1.620   7.892  1.00 29.24           C
ATOM    225  O   SER A 199      -32.790   1.798   7.759  1.00 28.70           O
ATOM    226  CB  SER A 199      -30.505   3.555   6.726  1.00 31.53           C
ATOM    227  OG  SER A 199      -29.665   2.841   5.830  1.00 33.46           O
ATOM    228  N   LYS A 200      -30.993   0.420   7.874  1.00 26.73           N
ATOM    229  CA  LYS A 200      -31.745  -0.835   7.833  1.00 24.20           C
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|---|---|---|---|---|---|---|---|---|---|---|---|
| ATOM | 229 | CA | LYS | A | 200 | -31.745 | -0.835 | 7.833 | 1.00 | 24.20 | C |
| ATOM | 230 | C | LYS | A | 200 | -31.208 | -1.820 | 8.880 | 1.00 | 23.56 | C |
| ATOM | 231 | O | LYS | A | 200 | -30.014 | -1.861 | 9.160 | 1.00 | 23.03 | O |
| ATOM | 232 | CB | LYS | A | 200 | -31.682 | -1.479 | 6.440 | 1.00 | 24.17 | C |
| ATOM | 233 | CG | LYS | A | 200 | -32.216 | -0.609 | 5.294 | 1.00 | 23.41 | C |
| ATOM | 234 | CD | LYS | A | 200 | -32.263 | -1.375 | 3.981 | 1.00 | 22.93 | C |
| ATOM | 235 | CE | LYS | A | 200 | -32.479 | -0.443 | 2.786 | 1.00 | 21.93 | C |
| ATOM | 236 | NZ | LYS | A | 200 | -31.331 | 0.512 | 2.647 | 1.00 | 19.78 | N |
| ATOM | 237 | N | PHE | A | 201 | -32.102 | -2.617 | 9.451 | 1.00 | 22.85 | N |
| ATOM | 238 | CA | PHE | A | 201 | -31.709 | -3.640 | 10.421 | 1.00 | 22.70 | C |
| ATOM | 239 | C | PHE | A | 201 | -32.776 | -4.707 | 10.497 | 1.00 | 22.14 | C |
| ATOM | 240 | O | PHE | A | 201 | -33.918 | -4.481 | 10.100 | 1.00 | 21.35 | O |
| ATOM | 241 | CB | PHE | A | 201 | -31.465 | -3.033 | 11.816 | 1.00 | 23.03 | C |
| ATOM | 242 | CG | PHE | A | 201 | -32.527 | -2.059 | 12.254 | 1.00 | 24.17 | C |
| ATOM | 243 | CD1 | PHE | A | 201 | -32.345 | -0.689 | 12.083 | 1.00 | 25.93 | C |
| ATOM | 244 | CD2 | PHE | A | 201 | -33.708 | -2.505 | 12.838 | 1.00 | 24.45 | C |
| ATOM | 245 | CE1 | PHE | A | 201 | -33.325 | 0.217 | 12.483 | 1.00 | 26.21 | C |
| ATOM | 246 | CE2 | PHE | A | 201 | -34.694 | -1.603 | 13.243 | 1.00 | 24.70 | C |
| ATOM | 247 | CZ | PHE | A | 201 | -34.501 | -0.237 | 13.057 | 1.00 | 25.38 | C |
| ATOM | 248 | N | TYR | A | 202 | -32.410 | -5.870 | 11.024 | 1.00 | 22.49 | N |
| ATOM | 249 | CA | TYR | A | 202 | -33.382 | -6.937 | 11.146 | 1.00 | 22.70 | C |
| ATOM | 250 | C | TYR | A | 202 | -33.967 | -7.006 | 12.549 | 1.00 | 22.40 | C |
| ATOM | 251 | O | TYR | A | 202 | -33.256 | -7.283 | 13.524 | 1.00 | 22.87 | O |
| ATOM | 252 | CB | TYR | A | 202 | -32.802 | -8.292 | 10.713 | 1.00 | 23.34 | C |
| ATOM | 253 | CG | TYR | A | 202 | -33.761 | -9.446 | 10.948 | 1.00 | 23.98 | C |
| ATOM | 254 | CD1 | TYR | A | 202 | -33.433 | -10.488 | 11.816 | 1.00 | 24.52 | C |
| ATOM | 255 | CD2 | TYR | A | 202 | -35.011 | -9.476 | 10.324 | 1.00 | 23.91 | C |
| ATOM | 256 | CE1 | TYR | A | 202 | -34.317 | -11.546 | 12.043 | 1.00 | 24.21 | C |
| ATOM | 257 | CE2 | TYR | A | 202 | -35.907 | -10.524 | 10.551 | 1.00 | 23.70 | C |
| ATOM | 258 | CZ | TYR | A | 202 | -35.546 | -11.561 | 11.403 | 1.00 | 24.61 | C |
| ATOM | 259 | OH | TYR | A | 202 | -36.433 | -12.599 | 11.626 | 1.00 | 24.07 | O |
| ATOM | 260 | N | LEU | A | 203 | -35.259 | -6.706 | 12.635 | 1.00 | 21.56 | N |
| ATOM | 261 | CA | LEU | A | 203 | -36.079 | -6.988 | 13.807 | 1.00 | 21.32 | C |
| ATOM | 262 | C | LEU | A | 203 | -36.996 | -8.155 | 13.453 | 1.00 | 20.36 | C |
| ATOM | 263 | O | LEU | A | 203 | -37.763 | -8.042 | 12.499 | 1.00 | 19.87 | O |
| ATOM | 264 | CB | LEU | A | 203 | -36.957 | -5.782 | 14.148 | 1.00 | 21.26 | C |
| ATOM | 265 | CG | LEU | A | 203 | -36.545 | -4.765 | 15.215 | 1.00 | 23.82 | C |
| ATOM | 266 | CD1 | LEU | A | 203 | -35.059 | -4.627 | 15.328 | 1.00 | 23.04 | C |
| ATOM | 267 | CD2 | LEU | A | 203 | -37.210 | -3.428 | 14.951 | 1.00 | 22.01 | C |
| ATOM | 268 | N | PRO | A | 204 | -36.946 | -9.257 | 14.232 | 1.00 | 19.91 | N |
| ATOM | 269 | CA | PRO | A | 204 | -37.883 | -10.360 | 14.000 | 1.00 | 19.27 | C |
| ATOM | 270 | C | PRO | A | 204 | -39.312 | -9.861 | 13.831 | 1.00 | 18.61 | C |
| ATOM | 271 | O | PRO | A | 204 | -39.777 | -9.035 | 14.618 | 1.00 | 18.10 | O |
| ATOM | 272 | CB | PRO | A | 204 | -37.765 | -11.194 | 15.284 | 1.00 | 19.29 | C |
| ATOM | 273 | CG | PRO | A | 204 | -36.357 | -10.992 | 15.708 | 1.00 | 19.73 | C |
| ATOM | 274 | CD | PRO | A | 204 | -36.032 | -9.548 | 15.352 | 1.00 | 19.59 | C |
| ATOM | 275 | N | ASN | A | 205 | -39.969 | -10.324 | 12.769 | 1.00 | 17.90 | N |
| ATOM | 276 | CA | ASN | A | 205 | -41.355 | -9.968 | 12.495 | 1.00 | 18.10 | C |
| ATOM | 277 | C | ASN | A | 205 | -42.247 | -11.006 | 13.181 | 1.00 | 18.05 | C |
| ATOM | 278 | O | ASN | A | 205 | -42.411 | -12.113 | 12.655 | 1.00 | 17.42 | O |
| ATOM | 279 | CB | ASN | A | 205 | -41.669 | -9.983 | 10.987 | 1.00 | 18.39 | C |
| ATOM | 280 | CG | ASN | A | 205 | -40.668 | -9.188 | 10.107 | 1.00 | 18.94 | C |
| ATOM | 281 | OD1 | ASN | A | 205 | -40.832 | -9.161 | 8.884 | 1.00 | 22.20 | O |

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ATOM    281  OD1 ASN A 205      -40.832  -9.161   8.884  1.00 22.20           O
ATOM    282  ND2 ASN A 205      -39.657  -8.569  10.698  1.00 19.63           N
ATOM    283  N   CYS A 206      -42.818 -10.663  14.336  1.00 17.84           N
ATOM    284  CA  CYS A 206      -43.625 -11.622  15.106  1.00 17.83           C
ATOM    285  C   CYS A 206      -45.118 -11.479  14.845  1.00 18.36           C
ATOM    286  O   CYS A 206      -45.623 -10.361  14.652  1.00 18.35           O
ATOM    287  CB  CYS A 206      -43.376 -11.456  16.612  1.00 17.73           C
ATOM    288  SG  CYS A 206      -41.654 -11.522  17.121  1.00 17.34           S
ATOM    289  N   ASN A 207      -45.824 -12.610  14.844  1.00 18.54           N
ATOM    290  CA  ASN A 207      -47.282 -12.593  14.923  1.00 18.73           C
ATOM    291  C   ASN A 207      -47.713 -12.386  16.381  1.00 19.14           C
ATOM    292  O   ASN A 207      -46.874 -12.401  17.293  1.00 19.85           O
ATOM    293  CB  ASN A 207      -47.916 -13.848  14.274  1.00 18.43           C
ATOM    294  CG  ASN A 207      -47.609 -15.147  15.029  1.00 18.66           C
ATOM    295  OD1 ASN A 207      -47.546 -15.180  16.254  1.00 18.06           O
ATOM    296  ND2 ASN A 207      -47.442 -16.236  14.278  1.00 19.03           N
ATOM    297  N   LYS A 208      -49.012 -12.189  16.590  1.00 19.70           N
ATOM    298  CA  LYS A 208      -49.580 -11.893  17.916  1.00 20.21           C
ATOM    299  C   LYS A 208      -49.491 -13.063  18.913  1.00 20.08           C
ATOM    300  O   LYS A 208      -49.635 -12.860  20.118  1.00 20.32           O
ATOM    301  CB  LYS A 208      -51.043 -11.459  17.773  1.00 20.47           C
ATOM    302  CG  LYS A 208      -51.935 -12.512  17.115  1.00 20.38           C
ATOM    303  CD  LYS A 208      -53.396 -12.222  17.359  1.00 22.10           C
ATOM    304  CE  LYS A 208      -54.291 -13.221  16.642  1.00 20.94           C
ATOM    305  NZ  LYS A 208      -54.187 -14.607  17.174  1.00 20.34           N
ATOM    306  N   ASN A 209      -49.280 -14.275  18.399  1.00 19.57           N
ATOM    307  CA  ASN A 209      -49.083 -15.465  19.242  1.00 19.88           C
ATOM    308  C   ASN A 209      -47.633 -15.638  19.679  1.00 19.32           C
ATOM    309  O   ASN A 209      -47.304 -16.579  20.421  1.00 19.64           O
ATOM    310  CB  ASN A 209      -49.550 -16.730  18.508  1.00 19.75           C
ATOM    311  CG  ASN A 209      -50.776 -16.486  17.661  1.00 21.13           C
ATOM    312  OD1 ASN A 209      -50.811 -16.838  16.468  1.00 23.95           O
ATOM    313  ND2 ASN A 209      -51.778 -15.856  18.251  1.00 17.82           N
ATOM    314  N   GLY A 210      -46.771 -14.739  19.205  1.00 19.30           N
ATOM    315  CA  GLY A 210      -45.353 -14.753  19.536  1.00 18.56           C
ATOM    316  C   GLY A 210      -44.513 -15.719  18.713  1.00 18.50           C
ATOM    317  O   GLY A 210      -43.364 -15.993  19.062  1.00 17.75           O
ATOM    318  N   PHE A 211      -45.091 -16.250  17.638  1.00 18.35           N
ATOM    319  CA  PHE A 211      -44.325 -16.984  16.632  1.00 18.84           C
ATOM    320  C   PHE A 211      -43.945 -16.063  15.478  1.00 18.62           C
ATOM    321  O   PHE A 211      -44.212 -14.856  15.535  1.00 19.06           O
ATOM    322  CB  PHE A 211      -45.076 -18.238  16.160  1.00 19.06           C
ATOM    323  CG  PHE A 211      -44.992 -19.373  17.138  1.00 19.94           C
ATOM    324  CD1 PHE A 211      -43.859 -20.175  17.187  1.00 20.48           C
ATOM    325  CD2 PHE A 211      -46.021 -19.604  18.044  1.00 22.97           C
ATOM    326  CE1 PHE A 211      -43.759 -21.224  18.112  1.00 20.71           C
ATOM    327  CE2 PHE A 211      -45.933 -20.643  18.976  1.00 21.29           C
ATOM    328  CZ  PHE A 211      -44.800 -21.450  19.005  1.00 20.87           C
ATOM    329  N   TYR A 212      -43.285 -16.622  14.463  1.00 18.56           N
ATOM    330  CA  TYR A 212      -42.776 -15.843  13.332  1.00 18.09           C
ATOM    331  C   TYR A 212      -43.769 -15.774  12.184  1.00 18.14           C
ATOM    332  O   TYR A 212      -44.280 -16.800  11.744  1.00 18.14           O
ATOM    333  CB  TYR A 212      -41.449 -16.441  12.834  1.00 18.04           C
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ATOM    344  O   HIS A 213     -42.635 -15.316   9.449  1.00 17.33           O
ATOM    345  CB  HIS A 213     -44.804 -13.005   9.931  1.00 18.71           C
ATOM    346  CG  HIS A 213     -45.862 -12.251  10.673  1.00 19.72           C
ATOM    347  ND1 HIS A 213     -47.197 -12.594  10.619  1.00 20.89           N
ATOM    348  CD2 HIS A 213     -45.784 -11.167  11.480  1.00 20.60           C
ATOM    349  CE1 HIS A 213     -47.894 -11.761  11.371  1.00 21.53           C
ATOM    350  NE2 HIS A 213     -47.060 -10.888  11.907  1.00 21.26           N
ATOM    351  N   SER A 214     -44.533 -15.922   8.401  1.00 17.92           N
ATOM    352  CA  SER A 214     -43.835 -16.637   7.317  1.00 19.10           C
ATOM    353  C   SER A 214     -42.890 -15.727   6.548  1.00 18.52           C
ATOM    354  O   SER A 214     -41.765 -16.093   6.253  1.00 18.58           O
ATOM    355  CB  SER A 214     -44.830 -17.290   6.356  1.00 19.46           C
ATOM    356  OG  SER A 214     -45.258 -18.530   6.890  1.00 23.83           O
ATOM    368  N   GLN A 216     -40.348 -12.761   6.573  1.00 17.58           N
ATOM    369  CA  GLN A 216     -39.487 -11.936   7.424  1.00 16.83           C
ATOM    370  C   GLN A 216     -38.810 -10.882   6.577  1.00 16.91           C
ATOM    371  O   GLN A 216     -38.184 -11.199   5.561  1.00 16.53           O
ATOM    372  CB  GLN A 216     -38.417 -12.769   8.150  1.00 16.94           C
ATOM    373  CG  GLN A 216     -38.974 -13.769   9.161  1.00 16.52           C
ATOM    374  CD  GLN A 216     -39.640 -13.095  10.339  1.00 16.09           C
ATOM    375  OE1 GLN A 216     -39.027 -12.252  11.022  1.00 15.64           O
ATOM    376  NE2 GLN A 216     -40.893 -13.457  10.589  1.00 14.49           N
ATOM    377  N   CYS A 217     -38.912  -9.625   7.014  1.00 16.94           N
ATOM    378  CA  CYS A 217     -38.270  -8.525   6.294  1.00 16.91           C
ATOM    379  C   CYS A 217     -37.384  -7.678   7.198  1.00 16.97           C
ATOM    380  O   CYS A 217     -37.647  -7.538   8.411  1.00 16.75           O
ATOM    381  CB  CYS A 217     -39.320  -7.622   5.639  1.00 17.22           C
ATOM    382  SG  CYS A 217     -40.478  -8.464   4.537  1.00 18.26           S
ATOM    383  N   GLU A 218     -36.340  -7.121   6.592  1.00 16.79           N
ATOM    384  CA  GLU A 218     -35.546  -6.069   7.216  1.00 18.15           C
ATOM    385  C   GLU A 218     -36.422  -4.859   7.451  1.00 17.77           C
ATOM    386  O   GLU A 218     -37.338  -4.577   6.663  1.00 17.55           O
ATOM    387  CB  GLU A 218     -34.398  -5.636   6.313  1.00 18.22           C
ATOM    388  CG  GLU A 218     -33.270  -6.626   6.156  1.00 21.61           C
ATOM    389  CD  GLU A 218     -32.200  -6.090   5.225  1.00 24.73           C
ATOM    390  OE1 GLU A 218     -31.004  -6.339   5.502  1.00 27.34           O
ATOM    391  OE2 GLU A 218     -32.550  -5.418   4.222  1.00 24.10           O
ATOM    392  N   THR A 219     -36.117  -4.151   8.538  1.00 17.82           N
ATOM    393  CA  THR A 219     -36.720  -2.866   8.838  1.00 17.58           C
ATOM    394  C   THR A 219     -35.901  -1.783   8.146  1.00 17.52           C
ATOM    395  O   THR A 219     -34.672  -1.758   8.234  1.00 17.92           O
ATOM    396  CB  THR A 219     -36.804  -2.634  10.359  1.00 17.50           C
ATOM    397  OG1 THR A 219     -37.707  -3.591  10.934  1.00 17.69           O
ATOM    398  CG2 THR A 219     -37.329  -1.232  10.673  1.00 16.71           C
ATOM    399  N   SER A 220     -36.592  -0.905   7.431  1.00 18.10           N
ATOM    400  CA  SER A 220     -35.936   0.177   6.727  1.00 18.76           C
ATOM    401  C   SER A 220     -36.502   1.537   7.156  1.00 18.01           C
ATOM    402  O   SER A 220     -37.695   1.670   7.389  1.00 17.11           O
ATOM    403  CB  SER A 220     -36.107  -0.010   5.226  1.00 19.04           C
ATOM    404  OG  SER A 220     -35.857   1.208   4.553  1.00 22.71           O
ATOM    405  N   MET A 221     -35.635   2.537   7.222  1.00 18.98           N
ATOM    406  CA  MET A 221     -36.036   3.903   7.580  1.00 21.13           C
ATOM    407  C   MET A 221     -35.385   4.915   6.636  1.00 20.38           C
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ATOM    408  O   MET A 221      -35.168   6.072   7.002  1.00 19.76           O
ATOM    409  CB  MET A 221      -35.626   4.216   9.027  1.00 20.63           C
ATOM    410  CG  MET A 221      -36.286   3.349  10.096  1.00 22.82           C
ATOM    411  SD  MET A 221      -35.787   3.830  11.765  1.00 26.61           S
ATOM    412  CE  MET A 221      -36.444   5.490  11.874  1.00 25.56           C
ATOM    413  N   ASP A 222      -35.073   4.478   5.418  1.00 20.40           N
ATOM    414  CA  ASP A 222      -34.270   5.298   4.508  1.00 20.45           C
ATOM    415  C   ASP A 222      -34.877   5.473   3.121  1.00 20.58           C
ATOM    416  O   ASP A 222      -34.208   5.977   2.228  1.00 20.57           O
ATOM    417  CB  ASP A 222      -32.856   4.725   4.386  1.00 20.76           C
ATOM    418  CG  ASP A 222      -32.849   3.279   3.882  1.00 20.03           C
ATOM    419  OD1 ASP A 222      -31.774   2.660   3.934  1.00 22.26           O
ATOM    420  OD2 ASP A 222      -33.911   2.768   3.445  1.00 21.53           O
ATOM    421  N   GLY A 223      -36.125   5.041   2.943  1.00 20.55           N
ATOM    422  CA  GLY A 223      -36.815   5.170   1.658  1.00 21.58           C
ATOM    423  C   GLY A 223      -36.480   4.069   0.668  1.00 21.57           C
ATOM    424  O   GLY A 223      -36.861   4.134  -0.498  1.00 21.96           O
ATOM    425  N   GLU A 224      -35.766   3.053   1.141  1.00 21.38           N
ATOM    426  CA  GLU A 224      -35.450   1.891   0.324  1.00 21.72           C
ATOM    427  C   GLU A 224      -36.126   0.661   0.914  1.00 21.14           C
ATOM    428  O   GLU A 224      -36.255   0.536   2.135  1.00 20.93           O
ATOM    429  CB  GLU A 224      -33.948   1.673   0.260  1.00 22.09           C
ATOM    430  CG  GLU A 224      -33.177   2.741  -0.500  1.00 24.47           C
ATOM    431  CD  GLU A 224      -31.682   2.620  -0.299  1.00 28.43           C
ATOM    432  OE1 GLU A 224      -31.207   1.510   0.038  1.00 30.43           O
ATOM    433  OE2 GLU A 224      -30.980   3.638  -0.483  1.00 31.11           O
ATOM    434  N   ALA A 225      -36.575  -0.234   0.039  1.00 20.59           N
ATOM    435  CA  ALA A 225      -37.186  -1.492   0.463  1.00 20.30           C
ATOM    436  C   ALA A 225      -36.151  -2.361   1.188  1.00 19.93           C
ATOM    437  O   ALA A 225      -35.013  -2.494   0.724  1.00 19.69           O
ATOM    438  CB  ALA A 225      -37.732  -2.226  -0.750  1.00 20.55           C
ATOM    439  N   GLY A 226      -36.537  -2.937   2.327  1.00 19.20           N
ATOM    440  CA  GLY A 226      -35.705  -3.955   2.980  1.00 18.85           C
ATOM    441  C   GLY A 226      -35.821  -5.315   2.294  1.00 18.42           C
ATOM    442  O   GLY A 226      -36.804  -5.578   1.596  1.00 18.31           O
ATOM    443  N   LEU A 227      -34.808  -6.166   2.487  1.00 18.11           N
ATOM    444  CA  LEU A 227      -34.812  -7.532   1.968  1.00 17.92           C
ATOM    445  C   LEU A 227      -35.853  -8.348   2.738  1.00 17.33           C
ATOM    446  O   LEU A 227      -36.002  -8.161   3.945  1.00 16.48           O
ATOM    447  CB  LEU A 227      -33.431  -8.175   2.139  1.00 18.26           C
ATOM    448  CG  LEU A 227      -32.270  -7.657   1.283  1.00 20.78           C
ATOM    449  CD1 LEU A 227      -30.917  -8.132   1.816  1.00 23.35           C
ATOM    450  CD2 LEU A 227      -32.451  -8.046  -0.194  1.00 21.98           C
ATOM    451  N   CYS A 228      -36.584  -9.216   2.037  1.00 16.71           N
ATOM    452  CA  CYS A 228      -37.472 -10.166   2.703  1.00 17.38           C
ATOM    453  C   CYS A 228      -37.100 -11.586   2.299  1.00 17.41           C
ATOM    454  O   CYS A 228      -36.573 -11.806   1.216  1.00 17.14           O
ATOM    455  CB  CYS A 228      -38.947  -9.920   2.362  1.00 17.03           C
ATOM    456  SG  CYS A 228      -39.619  -8.273   2.708  1.00 18.75           S
ATOM    457  N   TRP A 229      -37.406 -12.535   3.178  1.00 17.59           N
ATOM    458  CA  TRP A 229      -37.214 -13.963   2.910  1.00 18.64           C
ATOM    459  C   TRP A 229      -38.313 -14.754   3.622  1.00 18.91           C
ATOM    460  O   TRP A 229      -39.155 -14.171   4.325  1.00 18.74           O
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ATOM    460  O   TRP A 229     -39.155 -14.171   4.325  1.00 18.74           O
ATOM    461  CB  TRP A 229     -35.820 -14.414   3.366  1.00 19.05           C
ATOM    462  CG  TRP A 229     -35.545 -14.189   4.825  1.00 19.34           C
ATOM    463  CD1 TRP A 229     -35.685 -15.100   5.834  1.00 19.36           C
ATOM    464  CD2 TRP A 229     -35.086 -12.975   5.440  1.00 19.75           C
ATOM    465  NE1 TRP A 229     -35.345 -14.530   7.042  1.00 19.95           N
ATOM    466  CE2 TRP A 229     -34.964 -13.230   6.829  1.00 19.97           C
ATOM    467  CE3 TRP A 229     -34.763 -11.698   4.953  1.00 19.95           C
ATOM    468  CZ2 TRP A 229     -34.541 -12.251   7.739  1.00 20.31           C
ATOM    469  CZ3 TRP A 229     -34.324 -10.728   5.858  1.00 19.00           C
ATOM    470  CH2 TRP A 229     -34.228 -11.008   7.234  1.00 19.70           C
ATOM    471  N   CYS A 230     -38.301 -16.079   3.450  1.00 18.85           N
ATOM    472  CA  CYS A 230     -39.332 -16.931   4.016  1.00 18.94           C
ATOM    473  C   CYS A 230     -38.794 -17.854   5.106  1.00 18.50           C
ATOM    474  O   CYS A 230     -37.736 -18.464   4.946  1.00 18.93           O
ATOM    475  CB  CYS A 230     -40.004 -17.763   2.915  1.00 19.33           C
ATOM    476  SG  CYS A 230     -40.630 -16.761   1.539  1.00 21.95           S
ATOM    477  N   VAL A 231     -39.537 -17.962   6.205  1.00 18.37           N
ATOM    478  CA  VAL A 231     -39.114 -18.795   7.338  1.00 17.92           C
ATOM    479  C   VAL A 231     -40.202 -19.788   7.737  1.00 17.70           C
ATOM    480  O   VAL A 231     -41.346 -19.646   7.344  1.00 17.73           O
ATOM    481  CB  VAL A 231     -38.723 -17.944   8.571  1.00 18.29           C
ATOM    482  CG1 VAL A 231     -37.542 -17.009   8.238  1.00 18.20           C
ATOM    483  CG2 VAL A 231     -39.946 -17.177   9.121  1.00 18.39           C
ATOM    484  N   TYR A 232     -39.826 -20.793   8.525  1.00 18.07           N
ATOM    485  CA  TYR A 232     -40.801 -21.624   9.208  1.00 18.02           C
ATOM    486  C   TYR A 232     -41.359 -20.832  10.407  1.00 17.80           C
ATOM    487  O   TYR A 232     -40.593 -20.347  11.239  1.00 17.24           O
ATOM    488  CB  TYR A 232     -40.142 -22.912   9.681  1.00 18.50           C
ATOM    489  CG  TYR A 232     -39.552 -23.774   8.570  1.00 18.40           C
ATOM    490  CD1 TYR A 232     -40.379 -24.437   7.660  1.00 20.13           C
ATOM    491  CD2 TYR A 232     -38.167 -23.966   8.470  1.00 18.40           C
ATOM    492  CE1 TYR A 232     -39.841 -25.241   6.655  1.00 19.48           C
ATOM    493  CE2 TYR A 232     -37.617 -24.774   7.465  1.00 18.57           C
ATOM    494  CZ  TYR A 232     -38.465 -25.404   6.570  1.00 19.11           C
ATOM    495  OH  TYR A 232     -37.938 -26.204   5.592  1.00 18.92           O
ATOM    496  N   PRO A 233     -42.695 -20.681  10.497  1.00 18.03           N
ATOM    497  CA  PRO A 233     -43.253 -19.870  11.598  1.00 17.74           C
ATOM    498  C   PRO A 233     -42.902 -20.308  13.024  1.00 17.82           C
ATOM    499  O   PRO A 233     -42.882 -19.469  13.932  1.00 17.24           O
ATOM    500  CB  PRO A 233     -44.765 -19.946  11.362  1.00 17.97           C
ATOM    501  CG  PRO A 233     -44.897 -20.256   9.893  1.00 18.42           C
ATOM    502  CD  PRO A 233     -43.756 -21.183   9.606  1.00 18.27           C
ATOM    503  N   TRP A 234     -42.624 -21.598  13.224  1.00 17.63           N
ATOM    504  CA  TRP A 234     -42.345 -22.098  14.563  1.00 17.85           C
ATOM    505  C   TRP A 234     -40.928 -21.831  15.057  1.00 17.77           C
ATOM    506  O   TRP A 234     -40.704 -21.864  16.260  1.00 18.60           O
ATOM    507  CB  TRP A 234     -42.687 -23.593  14.706  1.00 17.64           C
ATOM    508  CG  TRP A 234     -41.958 -24.497  13.754  1.00 16.96           C
ATOM    509  CD1 TRP A 234     -40.786 -25.170  13.983  1.00 17.91           C
ATOM    510  CD2 TRP A 234     -42.363 -24.836  12.425  1.00 17.13           C
ATOM    511  NE1 TRP A 234     -40.439 -25.906  12.866  1.00 16.95           N
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ATOM    512  CE2 TRP A 234     -41.387 -25.721  11.899  1.00 17.40           C
ATOM    513  CE3 TRP A 234     -43.459 -24.480  11.625  1.00 17.41           C
ATOM    514  CZ2 TRP A 234     -41.478 -26.259  10.606  1.00 17.51           C
ATOM    515  CZ3 TRP A 234     -43.546 -25.004  10.342  1.00 17.72           C
ATOM    516  CH2 TRP A 234     -42.555 -25.887   9.843  1.00 17.50           C
ATOM    517  N   ASN A 235     -39.983 -21.554  14.152  1.00 17.27           N
ATOM    518  CA  ASN A 235     -38.590 -21.315  14.560  1.00 17.29           C
ATOM    519  C   ASN A 235     -37.885 -20.097  13.941  1.00 17.16           C
ATOM    520  O   ASN A 235     -36.793 -19.751  14.367  1.00 16.87           O
ATOM    521  CB  ASN A 235     -37.726 -22.587  14.409  1.00 17.29           C
ATOM    522  CG  ASN A 235     -37.407 -22.934  12.950  1.00 17.80           C
ATOM    523  OD1 ASN A 235     -37.834 -22.248  12.018  1.00 17.44           O
ATOM    524  ND2 ASN A 235     -36.651 -24.020  12.754  1.00 18.23           N
ATOM    525  N   GLY A 236     -38.506 -19.473  12.940  1.00 17.50           N
ATOM    526  CA  GLY A 236     -37.957 -18.276  12.295  1.00 18.22           C
ATOM    527  C   GLY A 236     -36.688 -18.500  11.480  1.00 19.13           C
ATOM    528  O   GLY A 236     -35.952 -17.548  11.210  1.00 18.66           O
ATOM    529  N   LYS A 237     -36.427 -19.755  11.099  1.00 18.90           N
ATOM    530  CA  LYS A 237     -35.253 -20.079  10.303  1.00 20.07           C
ATOM    531  C   LYS A 237     -35.652 -20.086   8.836  1.00 20.62           C
ATOM    532  O   LYS A 237     -36.709 -20.607   8.487  1.00 20.15           O
ATOM    533  CB  LYS A 237     -34.658 -21.438  10.712  1.00 20.03           C
ATOM    534  CG  LYS A 237     -34.152 -21.504  12.151  1.00 19.85           C
ATOM    535  CD  LYS A 237     -33.395 -22.819  12.393  1.00 20.64           C
ATOM    536  CE  LYS A 237     -32.887 -22.927  13.828  1.00 20.64           C
ATOM    537  NZ  LYS A 237     -32.303 -24.281  14.128  1.00 19.43           N
ATOM    549  N   ILE A 239     -36.322 -20.928   5.150  1.00 23.39           N
ATOM    550  CA  ILE A 239     -36.608 -22.157   4.423  1.00 24.14           C
ATOM    551  C   ILE A 239     -35.552 -22.319   3.324  1.00 25.20           C
ATOM    552  O   ILE A 239     -35.352 -21.409   2.518  1.00 25.16           O
ATOM    553  CB  ILE A 239     -38.055 -22.159   3.856  1.00 23.81           C
ATOM    554  CG1 ILE A 239     -39.067 -21.960   4.997  1.00 24.06           C
ATOM    555  CG2 ILE A 239     -38.335 -23.450   3.074  1.00 23.17           C
ATOM    556  CD1 ILE A 239     -40.505 -21.711   4.571  1.00 23.96           C
ATOM    557  N   PRO A 240     -34.847 -23.471   3.301  1.00 26.03           N
ATOM    558  CA  PRO A 240     -33.817 -23.658   2.275  1.00 26.67           C
ATOM    559  C   PRO A 240     -34.410 -23.482   0.877  1.00 26.91           C
ATOM    560  O   PRO A 240     -35.524 -23.932   0.615  1.00 27.37           O
ATOM    561  CB  PRO A 240     -33.340 -25.096   2.513  1.00 26.80           C
ATOM    562  CG  PRO A 240     -33.660 -25.369   3.954  1.00 26.50           C
ATOM    563  CD  PRO A 240     -34.952 -24.638   4.200  1.00 26.11           C
ATOM    564  N   GLY A 241     -33.693 -22.777   0.010  1.00 27.81           N
ATOM    565  CA  GLY A 241     -34.199 -22.463  -1.334  1.00 28.67           C
ATOM    566  C   GLY A 241     -35.099 -21.232  -1.404  1.00 29.09           C
ATOM    567  O   GLY A 241     -35.506 -20.821  -2.500  1.00 29.78           O
ATOM    568  N   SER A 242     -35.406 -20.646  -0.245  1.00 29.22           N
ATOM    569  CA  SER A 242     -36.237 -19.436  -0.167  1.00 28.62           C
ATOM    570  C   SER A 242     -35.646 -18.301  -0.992  1.00 28.58           C
ATOM    571  O   SER A 242     -34.427 -18.089  -0.985  1.00 28.71           O
ATOM    572  CB  SER A 242     -36.433 -18.977   1.290  1.00 28.97           C
ATOM    573  OG  SER A 242     -36.756 -17.583   1.376  1.00 27.17           O
ATOM    574  N   PRO A 243     -36.506 -17.572  -1.722  1.00 28.39           N
ATOM    575  CA  PRO A 243     -36.007 -16.356  -2.349  1.00 28.39           C
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ATOM    574  N   PRO A 243      -36.506 -17.572  -1.722  1.00 28.39           N
ATOM    575  CA  PRO A 243      -36.007 -16.356  -2.349  1.00 28.39           C
ATOM    576  C   PRO A 243      -35.683 -15.295  -1.290  1.00 28.20           C
ATOM    577  O   PRO A 243      -36.259 -15.313  -0.194  1.00 27.71           O
ATOM    578  CB  PRO A 243      -37.167 -15.904  -3.244  1.00 28.46           C
ATOM    579  CG  PRO A 243      -38.367 -16.600  -2.761  1.00 28.86           C
ATOM    580  CD  PRO A 243      -37.933 -17.820  -2.003  1.00 28.47           C
ATOM    581  N   GLU A 244      -34.736 -14.419  -1.613  1.00 27.80           N
ATOM    582  CA  GLU A 244      -34.478 -13.212  -0.837  1.00 28.29           C
ATOM    583  C   GLU A 244      -34.515 -12.022  -1.795  1.00 27.43           C
ATOM    584  O   GLU A 244      -33.620 -11.854  -2.622  1.00 27.85           O
ATOM    585  CB  GLU A 244      -33.138 -13.293  -0.100  1.00 28.06           C
ATOM    586  CG  GLU A 244      -32.866 -12.110   0.845  1.00 29.84           C
ATOM    587  CD  GLU A 244      -31.803 -12.400   1.897  1.00 30.20           C
ATOM    588  OE1 GLU A 244      -31.390 -13.572   2.032  1.00 33.67           O
ATOM    589  OE2 GLU A 244      -31.387 -11.453   2.609  1.00 34.03           O
ATOM    590  N   ILE A 245      -35.563 -11.214  -1.682  1.00 26.43           N
ATOM    591  CA  ILE A 245      -35.780 -10.075  -2.583  1.00 25.65           C
ATOM    592  C   ILE A 245      -36.217  -8.832  -1.801  1.00 25.29           C
ATOM    593  O   ILE A 245      -36.768  -8.951  -0.700  1.00 25.02           O
ATOM    594  CB  ILE A 245      -36.850 -10.402  -3.671  1.00 25.53           C
ATOM    595  CG1 ILE A 245      -38.173 -10.846  -3.033  1.00 25.35           C
ATOM    596  CG2 ILE A 245      -36.325 -11.466  -4.663  1.00 24.89           C
ATOM    597  CD1 ILE A 245      -39.407 -10.707  -3.934  1.00 26.20           C
ATOM    609  N   GLY A 247      -38.835  -7.026  -1.580  1.00 23.42           N
ATOM    610  CA  GLY A 247      -40.259  -7.039  -1.851  1.00 24.01           C
ATOM    611  C   GLY A 247      -40.829  -8.273  -1.197  1.00 24.50           C
ATOM    612  O   GLY A 247      -40.080  -9.077  -0.649  1.00 24.29           O
ATOM    613  N   ASP A 248      -42.149  -8.408  -1.235  1.00 25.16           N
ATOM    614  CA  ASP A 248      -42.824  -9.555  -0.633  1.00 26.30           C
ATOM    615  C   ASP A 248      -42.603 -10.798  -1.502  1.00 26.46           C
ATOM    616  O   ASP A 248      -43.038 -10.830  -2.651  1.00 26.50           O
ATOM    617  CB  ASP A 248      -44.319  -9.255  -0.467  1.00 26.46           C
ATOM    618  CG  ASP A 248      -45.036 -10.274   0.400  1.00 27.46           C
ATOM    619  OD1 ASP A 248      -45.923  -9.862   1.176  1.00 29.63           O
ATOM    620  OD2 ASP A 248      -44.724 -11.481   0.312  1.00 29.49           O
ATOM    621  N   PRO A 249      -41.919 -11.825  -0.954  1.00 27.01           N
ATOM    622  CA  PRO A 249      -41.616 -13.040  -1.719  1.00 27.12           C
ATOM    623  C   PRO A 249      -42.839 -13.935  -1.935  1.00 27.58           C
ATOM    624  O   PRO A 249      -42.747 -14.917  -2.670  1.00 27.69           O
ATOM    625  CB  PRO A 249      -40.575 -13.763  -0.842  1.00 27.25           C
ATOM    626  CG  PRO A 249      -40.172 -12.767   0.229  1.00 26.22           C
ATOM    627  CD  PRO A 249      -41.376 -11.906   0.415  1.00 26.82           C
ATOM    628  N   ASN A 250      -43.965 -13.578  -1.315  1.00 28.06           N
ATOM    629  CA  ASN A 250      -45.188 -14.384  -1.319  1.00 28.66           C
ATOM    630  C   ASN A 250      -44.915 -15.766  -0.728  1.00 28.70           C
ATOM    631  O   ASN A 250      -44.998 -16.798  -1.417  1.00 29.19           O
ATOM    632  CB  ASN A 250      -45.827 -14.456  -2.721  1.00 29.27           C
ATOM    633  CG  ASN A 250      -46.426 -13.126  -3.167  1.00 31.00           C
ATOM    634  OD1 ASN A 250      -46.227 -12.687  -4.308  1.00 34.38           O
ATOM    635  ND2 ASN A 250      -47.167 -12.478  -2.272  1.00 31.93           N
ATOM    636  N   CYS A 251      -44.571 -15.756   0.557  1.00 28.18           N
ATOM    637  CA  CYS A 251      -44.118 -16.941   1.273  1.00 27.85           C
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ATOM    580  CD  PRO A 243      -37.933 -17.820  -2.003  1.00 28.47           C
ATOM    581  N   GLU A 244      -34.736 -14.419  -1.613  1.00 27.80           N
ATOM    582  CA  GLU A 244      -34.478 -13.212  -0.837  1.00 28.29           C
ATOM    583  C   GLU A 244      -34.515 -12.022  -1.795  1.00 27.43           C
ATOM    584  O   GLU A 244      -33.620 -11.854  -2.622  1.00 27.85           O
ATOM    585  CB  GLU A 244      -33.138 -13.293  -0.100  1.00 28.06           C
ATOM    586  CG  GLU A 244      -32.866 -12.110   0.845  1.00 29.84           C
ATOM    587  CD  GLU A 244      -31.803 -12.400   1.897  1.00 30.20           C
ATOM    588  OE1 GLU A 244      -31.390 -13.572   2.032  1.00 33.67           O
ATOM    589  OE2 GLU A 244      -31.387 -11.453   2.609  1.00 34.03           O
ATOM    590  N   ILE A 245      -35.563 -11.214  -1.682  1.00 26.43           N
ATOM    591  CA  ILE A 245      -35.780 -10.075  -2.583  1.00 25.65           C
ATOM    592  C   ILE A 245      -36.217  -8.832  -1.801  1.00 25.29           C
ATOM    593  O   ILE A 245      -36.768  -8.951  -0.700  1.00 25.02           O
ATOM    594  CB  ILE A 245      -36.850 -10.402  -3.671  1.00 25.53           C
ATOM    595  CG1 ILE A 245      -38.173 -10.846  -3.033  1.00 25.35           C
ATOM    596  CG2 ILE A 245      -36.325 -11.466  -4.663  1.00 24.89           C
ATOM    597  CD1 ILE A 245      -39.407 -10.707  -3.934  1.00 26.20           C
ATOM    609  N   GLY A 247      -38.835  -7.026  -1.580  1.00 23.42           N
ATOM    610  CA  GLY A 247      -40.259  -7.039  -1.851  1.00 24.01           C
ATOM    611  C   GLY A 247      -40.829  -8.273  -1.197  1.00 24.50           C
ATOM    612  O   GLY A 247      -40.080  -9.077  -0.649  1.00 24.29           O
ATOM    613  N   ASP A 248      -42.149  -8.408  -1.235  1.00 25.16           N
ATOM    614  CA  ASP A 248      -42.824  -9.555  -0.633  1.00 26.30           C
ATOM    615  C   ASP A 248      -42.603 -10.798  -1.502  1.00 26.46           C
ATOM    616  O   ASP A 248      -43.038 -10.830  -2.651  1.00 26.50           O
ATOM    617  CB  ASP A 248      -44.319  -9.255  -0.467  1.00 26.46           C
ATOM    618  CG  ASP A 248      -45.036 -10.274   0.400  1.00 27.46           C
ATOM    619  OD1 ASP A 248      -45.923  -9.862   1.176  1.00 29.63           O
ATOM    620  OD2 ASP A 248      -44.724 -11.481   0.312  1.00 29.49           O
ATOM    621  N   PRO A 249      -41.919 -11.825  -0.954  1.00 27.01           N
ATOM    622  CA  PRO A 249      -41.616 -13.040  -1.719  1.00 27.12           C
ATOM    623  C   PRO A 249      -42.839 -13.935  -1.935  1.00 27.58           C
ATOM    624  O   PRO A 249      -42.747 -14.917  -2.670  1.00 27.69           O
ATOM    625  CB  PRO A 249      -40.575 -13.763  -0.842  1.00 27.25           C
ATOM    626  CG  PRO A 249      -40.172 -12.767   0.229  1.00 26.22           C
ATOM    627  CD  PRO A 249      -41.376 -11.906   0.415  1.00 26.82           C
ATOM    628  N   ASN A 250      -43.965 -13.578  -1.315  1.00 28.06           N
ATOM    629  CA  ASN A 250      -45.188 -14.384  -1.319  1.00 28.66           C
ATOM    630  C   ASN A 250      -44.915 -15.766  -0.728  1.00 28.70           C
ATOM    631  O   ASN A 250      -44.998 -16.798  -1.417  1.00 29.19           O
ATOM    632  CB  ASN A 250      -45.827 -14.456  -2.721  1.00 29.27           C
ATOM    633  CG  ASN A 250      -46.426 -13.126  -3.167  1.00 31.00           C
ATOM    634  OD1 ASN A 250      -46.227 -12.687  -4.308  1.00 34.38           O
ATOM    635  ND2 ASN A 250      -47.167 -12.478  -2.272  1.00 31.93           N
ATOM    636  N   CYS A 251      -44.571 -15.756   0.557  1.00 28.18           N
ATOM    637  CA  CYS A 251      -44.118 -16.941   1.273  1.00 27.85           C
ATOM    638  C   CYS A 251      -45.248 -17.940   1.495  1.00 28.66           C
ATOM    639  O   CYS A 251      -46.370 -17.574   1.840  1.00 29.40           O
ATOM    640  CB  CYS A 251      -43.484 -16.541   2.607  1.00 27.05           C
ATOM    641  SG  CYS A 251      -41.988 -15.536   2.435  1.00 22.88           S
ATOM    642  OXT CYS A 251      -45.044 -19.143   1.329  1.00 29.75           O
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^ATOM/ && $5=="A" {res[$4]++} END {for (r in res) print r, res[r]}' protein.pdb
PHE 22
GLY 28
CYS 37
ARG 55
ILE 32
MET 8
GLU 81
ALA 15
SER 36
VAL 21
ASP 16
TRP 42
HIS 10
LEU 32
GLN 18
TYR 48
PRO 42
ASN 40
THR 14
LYS 45
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^ATOM/ {print $3 "," $4 "," $5}' protein.pdb
N,TRP,A
CA,TRP,A
C,TRP,A
O,TRP,A
CB,TRP,A
CG,TRP,A
CD1,TRP,A
CD2,TRP,A
NE1,TRP,A
CE2,TRP,A
CE3,TRP,A
CZ2,TRP,A
CZ3,TRP,A
CH2,TRP,A
N,LYS,A
CA,LYS,A
C,LYS,A
O,LYS,A
CB,LYS,A
CG,LYS,A
CD,LYS,A
CE,LYS,A
NZ,LYS,A
N,GLU,A
CA,GLU,A
C,GLU,A
O,GLU,A
CB,GLU,A
CG,GLU,A
CD,GLU,A
OE1,GLU,A
OE2,GLU,A
N,PRO,A
CA,PRO,A
C,PRO,A
O,PRO,A
CB,PRO,A
CG,PRO,A
CD,PRO,A
N,CYS,A
CA,CYS,A
C,CYS,A
O,CYS,A
CB,CYS,A
SG,CYS,A
N,ARG,A
CA,ARG,A
C,ARG,A
O,ARG,A
CB,ARG,A
CG,ARG,A
CD,ARG,A
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CA,ILE,A
C,ILE,A
O,ILE,A
CB,ILE,A
CG1,ILE,A
CG2,ILE,A
CD1,ILE,A
N,ARG,A
CA,ARG,A
C,ARG,A
O,ARG,A
CB,ARG,A
CG,ARG,A
CD,ARG,A
NE,ARG,A
CZ,ARG,A
NH1,ARG,A
NH2,ARG,A
N,GLY,A
CA,GLY,A
C,GLY,A
O,GLY,A
N,ASP,A
CA,ASP,A
C,ASP,A
O,ASP,A
CB,ASP,A
CG,ASP,A
OD1,ASP,A
OD2,ASP,A
N,PRO,A
CA,PRO,A
C,PRO,A
O,PRO,A
CB,PRO,A
CG,PRO,A
CD,PRO,A
N,ASN,A
CA,ASN,A
C,ASN,A
O,ASN,A
CB,ASN,A
CG,ASN,A
OD1,ASN,A
ND2,ASN,A
N,CYS,A
CA,CYS,A
C,CYS,A
O,CYS,A
CB,CYS,A
SG,CYS,A
OXT,CYS,A
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^>/ {print} !/^>/ {print toupper($0)}' protein.fasta > protein_upper.fasta
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ cat protein_upper.fasta
>sp|O15516|CLOCK_HUMAN Circadian locomoter output cycles protein kaput OS=Homo sapiens OX=9606 GN=CLOCK PE=1 SV=1
MLFTVSCSKMSSIVDRDDSSIFDGLVEEDDKDKAKRVSRNKSEKKRRDQFNVLIKELGSM
LPGNARKMDKSTVLQKSIDFLRKHKEITAQSDASEIRQDWKPTFLSNEEFTQLMLEALDG
FFLAIMTDGSIIYVSESVTSLLEHLPSDLVDQSIFNFIPEGEHSEVYKILSTHLLESDSL
TPEYLKSKNQLEFCCHMLRGTIDPKEPSTYEYVKFIGNFKSLNSVSSSAHNGFEGTIQRT
HRPSYEDRVCFVATVRLATPQFIKEMCTVEEPNEEFTSRHSLEWKFLFLDHRAPPIIGYL
PFEVLGTSGYDYYHVDDLENLAKCHEHLMQYGKGKSCYYRFLTKGQQWIWLQTHYYITYH
QWNSRPEFIVCTHTVVSYAEVRAERRRELGIEESLPETAADKSQDSGSDNRINTVSLKEA
LERFDHSPTPSASSRSSRKSSHTAVSDPSSTPTKIPTDTSTPPRQHLPAHEKMVQRRSSF
SSQSINSQSVGSSLTQPVMSQATNLPIPQGMSQFQFSAQLGAMQHLKDQLEQRTRMIEAN
IHRQQEELRKIQEQLQMVHGQGLQMFLQQSNPGLNFGSVQLSSGNSSNIQQLAPINMQGQ
VVPTNQIQSGMNTGHIGTTQHMIQQQTLQSTSTQSQQNVLSGHSQQTSLPSQTQSTLTAP
LYNTMVISQPAAGSMVQIPSSMPQNSTQSAAVTTFTQDRQIRFSQGQQLVTKLVTAPVAC
GAVMVPSTMLMGQVVTAYPTFATQQQQSQTLSVTQQQQQQSSQEQQLTSVQQPSQAQLTQ
PPQQFLQTSRLLHGNPSTQLILSAAFPLQQSTFPQSHHQQHQSQQQQQLSRHRTDSLPDP
SKVQPQ
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^>/ {if (seqlen>0) {print header, seqlen}; header=$0; seqlen=0; next} {seqlen+=length($0)} END {print header, seqlen}' prot
ein.fasta | sort -k2 -nr | head -1
>sp|O15516|CLOCK_HUMAN Circadian locomoter output cycles protein kaput OS=Homo sapiens OX=9606 GN=CLOCK PE=1 SV=1 846
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^ATOM/ {print $4}' protein.pdb | sort -u
ALA
ARG
ASN
ASP
CYS
GLN
GLU
GLY
HIS
ILE
LEU
LYS
MET
PHE
PRO
SER
THR
TRP
TYR
VAL
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ awk '/^ATOM/ {print $5}' protein.pdb | sort -u | wc -l
1
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```

```
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$ sed '/^>/d' clock_gene.fasta
| \awk '{for(i=1;i<=length($0);i++){base=substr($0,i,1); count[base]++}} END {print "A =", count["A"];
print "T =", count["T"]; print "G =", count["G"]; print "C =", count["C"]}'
A = 35332
T = 39197
G = 23471
C = 21007
user_ac@choudhary-ASUS-TUF-Gaming-A15-FA506ICB-FA506ICB:~/Downloads/lab3$
```