DATA WAREHOUSING AND DATA MINING LAB (CSD-421) LAB ASSIGNMENT 4

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Contents

1 Program 1

1.1 Question

Develop a command line program to extract the features of a protein sequence file.

Input File		Output File							
Sequence	**Class**	**SN**	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**Class**
PGGGKVQIVYKPV	+	1	4	0	2	3	2	1	1
PGGGKVYKPV	-	2	5	3	3	2	2	2	0
PGGGKNAEVYKPV	-	3	4	5	2	3	3	4	0
PGGGKVQIVEKPV	-	4	3	4	0	2	5	5	1
QTAPVPMPDLKNVKVY	-	....	....	...	....	.....	.....	.....	.....
KPVDLSKVTSKCGSLGNIHLDF	-								

1.2 Description

- Input files contain only two columns: the first column is the protein sequence and the second column is the class (either -ve or +ve).
- Extract the feature of the sequence as given below rule:

  SN→ SN of sequence
  F1→ Count the number of N in sequence
  F2→ Count the number H in sequence
  F3→ Count the number Q in sequence
  F4→ Count the number G in sequence
  F5→ Count the number D in sequence
  F6→ Count the number T in sequence
  Class→ Replace "+ with 1" and "– with 0"

1.3 Run

Run the program through the command line as

python extractFeatures.py <inputFile1> <inputFile2> ………… **n**

Example:
- python extractFeatures.py inputfile1.csv
- python extractFeatures.py inputfile1.csv inputfile2.csv
- python extractFeatures.py inputfile1.csv inputfile2.csv inputfile3.csv

1.4   Input Output Files

- Input File(s) → file1.csv | file1.csv file2.txt | file1.txt file2.csv file3.txt
- Output Files → One result file and one log file
  - **Result file:**
    - It contains the extracted features for every sequence present in the input file(s).
    - Name of the result file → "result-" + str(time.time()) + ".csv"
    - e.g. → **"result-20202109.csv"**

  - **Logfile:**
    - It contains three columns (inputFileName, Sequence, Class) having issues with the sequences or with the class label in the input file(s).
      - Missing sequence or sequences having any numeric value
      - Missing class label
    - Name of the log file → "log-" + str(time.time()) + ".csv"
    - e.g. → **"log-20200909.csv"**
    - Logfile content

FileName, Sequence, Class	
file1.csv, AGERT5DCT, +	← Sequence contain numeric value
file2.csv, ARGVT,	← Sequence class is missing
file3.txt, , -	← Sequence is missing
file4.txt, A4ADER,	← Sequence contain numeric value & class is missing

1.5   Check for

- Correct number of parameters
- Show appropriate message for wrong inputs.
- Handling of "File not Found" exception
- Input file(s) contain only two columns.
- Output file name will be "result-" + str(time.time()) + ".csv"
- Log file name will be "log-" + str(time.time()) + ".csv"

1.6   Code

```
1  __author__ = 'Akshat Raj Vansh'
2  __version__ = '0.1.0'
3  __license__ = 'MIT'
4
5  import sys
6  import time
7
8  result = [['SN', 'F1', 'F2', 'F3', 'F4', 'F5', 'F6', 'Class']]
9  log = [['Filename', 'Sequence', 'Class']]
10
11
12 def encodeString(word):
13     return word.encode('unicode_escape')
14
15
16 def containsDigit(string):
17     return any(char.isdigit() for char in string)
18
19
20 def validateData(filename, data):
21     for x in data:
22         if (containsDigit(x[0]) or len(x[1]) == 0):
23             log.append(
24                 [filename[filename.rfind('\\')+1:], str(x[0]), str(x[1])])
25             data.remove(x)
26
27
28 def readFile(filename):
29     try:
30         file = open(encodeString(filename), "r")
31         inputFile = file.readlines()
32         data = [(x.replace('\n', '')).split(',') for x in inputFile]
33         file.close()
34         data = data[1:]
35         validateData(filename, data)
36         return data
37     except:
38         print(filename+' is not a valid file')
39         return []
40
41
42 def getTableValues(seq_no, data_item):
43     protein_sequence = data_item[0]
44     protein_class = data_item[1]
45     result = {'SN': seq_no,
46               'F1': protein_sequence.count('N'),
47               'F2': protein_sequence.count('H'),
48               'F3': protein_sequence.count('Q'),
49               'F4': protein_sequence.count('G'),
50               'F5': protein_sequence.count('D'),
51               'F6': protein_sequence.count('T'),
52               'Class': 1 if protein_class == '+' else 0}
53     return result.values()
54
55
56 def findResult(files):
```
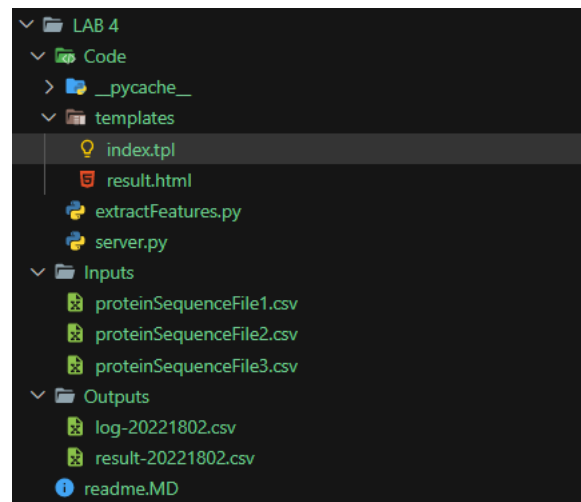
```python
57      data = []
58      for i in range(len(files)):
59          data.extend(readFile(files[i]))
60      for seq_no, data_item in enumerate(data):
61          result.append(list(getTableValues(seq_no + 1, data_item)))
62
63
64  def generateLog():
65      print("Generating log...")
66      file = open('.\\Outputs\\log-'+time.strftime("%Y%d%m")+'.csv', 'w+')
67      file.writelines((','.join(str(x)
68                      for x in log[i])+'\n') for i in range(len(log)))
69      file.close()
70
71
72  def generateResult(files):
73      print('Generating result...')
74      findResult(files)
75      file = open('.\\Outputs\\result-'+time.strftime("%Y%d%m")+'.csv', 'w+')
76      file.writelines((','.join(str(x)
77                      for x in result[i])+'\n') for i in range(len(result)))
78      file.close()
79
80
81  def main(files):
82      generateResult(files)
83      generateLog()
84
85
86  def webService(string_files):
87      files = string_files.split(',')
88      main(files)
89      resultname = 'result-'+time.strftime("%Y%d%m")+'.csv'
90      logname = 'log-'+time.strftime("%Y%d%m")+'.csv'
91      output = {'result': 'Outputs\\'+ resultname,
92                'log': '\\Outputs\\'+ logname,
93                'resultname': resultname,
94                'logname': logname}
95      return output
96
97  def checkArguments(args):
98      if(len(args) == 0):
99          print('Invalid Number of argumverents')
100     else:
101         main(args)
102
103
104 if __name__ == "__main__":
105     print('Number of arguments:', len(sys.argv), 'arguments.')
106     print('Argument List:', str(sys.argv))
107     checkArguments(sys.argv[1:])
```

1.7   Output

Running the python script


```
PS D:\Coding\Data Mining\LAB 4> python .\Code\extractFeatures.py .\Inputs\proteinSequenceFile1.csv .\Input
s\proteinSequenceFile2.csv .\Inputs\proteinSequenceFile3.csv
Number of arguments: 4 arguments.
Argument List: ['.\\Code\\extractFeatures.py', '.\\Inputs\\proteinSequenceFile1.csv', '.\\Inputs\\proteinS
equenceFile2.csv', '.\\Inputs\\proteinSequenceFile3.csv']
Generating result...
Generating log...
PS D:\Coding\Data Mining\LAB 4> 
```

Storing Output

1.8   Result File

```
1   SN,F1,F2,F3,F4,F5,F6,Class
2   1,1,0,0,2,2,3,1
3   2,0,2,0,1,1,0,1
4   3,2,0,1,2,0,0,1
5   4,0,0,1,0,0,1,0
6   5,1,0,0,1,0,0,0
7   6,0,1,1,1,0,1,0
8   7,0,0,0,0,0,1,1
9   8,0,0,0,2,0,1,0
10  9,1,0,0,0,0,1,1
11  10,1,0,0,0,0,0,1
12  11,0,0,1,1,1,0,0
13  12,1,0,0,0,0,0,1
14  13,1,1,0,1,1,2,0
15  14,0,1,1,2,2,0,1
16  15,0,0,0,0,0,1,1
17  16,0,0,1,0,0,1,1
18  17,0,0,0,0,1,0,0
19  18,0,0,0,0,2,0,0
20  19,0,1,0,0,0,0,0
21  20,0,0,0,0,2,0,0
22  21,1,0,0,1,0,0,0
23  22,1,0,0,1,0,0,0
24  23,2,1,4,0,0,0,0
25  24,0,0,0,0,0,1,1
26  25,0,2,1,0,1,0,1
27  26,1,0,0,2,1,1,0
28  27,0,0,0,0,0,1,0
29  28,0,0,0,1,1,0,0
30  29,0,0,0,1,0,1,0
31  30,0,0,1,1,0,0,1
32  31,0,0,0,0,1,0,0
33  32,0,0,2,0,0,1,0
34  33,0,0,0,0,0,1,1
35  34,1,0,0,2,1,0,0
36  35,0,0,0,0,0,1,1
37  36,0,1,0,0,1,0,0
38  37,0,0,0,0,2,0,0
39  38,1,0,0,1,0,0,0
40  39,0,0,0,1,0,0,1
41  40,0,0,0,0,0,0,0
42  41,0,1,0,0,1,0,0
43  42,1,1,0,1,0,1,0
44  43,1,0,0,1,0,0,0
45  44,1,1,0,1,0,0,0
46  45,0,0,0,0,1,1,0
47  46,0,0,0,1,1,3,0
48  47,2,2,0,0,1,4,1
49  48,1,0,0,0,1,1,1
50  49,2,0,0,0,0,0,0
51  50,1,1,0,0,1,1,1
52  51,0,0,0,1,2,0,0
53  52,0,0,0,0,0,1,1
54  53,0,2,1,1,1,0,1
55  54,2,1,1,0,0,0,0
56  55,1,0,0,4,1,2,0
```

```
57    56,0,0,0,3,0,0,0
58    57,0,0,1,1,0,3,0
59    58,0,0,0,2,1,1,0
60    59,0,0,0,0,0,0,1
61    60,1,0,0,1,0,1,0
62    61,0,0,1,0,0,1,1
63    62,0,0,1,1,2,1,0
64    63,0,0,0,0,0,1,0
65    64,0,0,0,0,1,0,1
66    65,0,1,0,1,0,0,0
67    66,1,2,1,2,1,0,1
68    67,0,1,1,1,0,0,1
69    68,2,1,1,4,3,1,0
70    69,0,0,0,0,0,2,0
71    70,0,0,0,0,0,1,0
72    71,1,1,2,2,0,1,1
73    72,0,0,0,0,0,1,0
74    73,0,0,0,0,0,1,0
75    74,0,0,0,0,0,0,1
76    75,0,2,1,0,1,0,1
77    76,1,1,1,4,0,3,1
78    77,1,0,1,3,0,2,1
79    78,0,0,1,0,0,1,1
80    79,1,0,0,1,1,0,0
81    80,0,0,1,0,0,1,0
82    81,0,0,0,0,0,1,0
83    82,0,1,1,1,0,5,0
84    83,0,0,0,0,0,0,0
85    84,0,0,0,0,0,1,0
86    85,0,0,0,1,0,2,1
87    86,0,0,0,1,1,1,0
88    87,0,1,0,1,0,0,0
89    88,0,0,2,1,1,1,0
90    89,0,0,1,0,0,0,0
91    90,0,0,0,0,0,1,0
92    91,1,2,0,5,0,1,0
93    92,0,0,0,0,0,2,0
94    93,1,0,3,0,0,1,0
95    94,0,0,1,0,0,1,1
96    95,0,0,1,0,0,0,0
97    96,2,0,0,1,1,2,0
98    97,1,1,0,1,2,0,0
99    98,0,0,0,0,0,0,1
100   99,0,0,1,0,0,1,0
101   100,0,0,1,0,0,1,0
102   101,0,0,0,0,0,1,1
103   102,2,1,2,0,2,0,1
104   103,0,0,0,0,1,0,0
105   104,1,0,0,1,0,0,1
106   105,0,0,0,0,1,1,0
107   106,0,2,0,2,1,0,1
108   107,0,0,0,0,0,1,1
109   108,0,0,0,0,0,1,0
110   109,0,0,0,0,1,0,0
111   110,0,0,1,0,0,1,0
112   111,0,1,2,0,1,0,0
113   112,0,0,0,0,0,1,0
114   113,1,1,0,0,0,0,0
```

```
115  114,0,1,0,2,0,0,0
116  115,0,0,0,0,0,0,1
117  116,0,1,2,0,0,1,0
118  117,1,0,0,3,0,3,1
119  118,1,1,1,0,0,3,0
120  119,1,0,0,1,0,1,0
121  120,0,0,0,0,0,2,1
122  121,0,0,0,0,0,1,1
123  122,0,0,0,1,2,5,1
124  123,0,0,1,1,1,1,0
125  124,1,1,2,3,0,1,0
126  125,0,0,0,0,0,1,0
127  126,1,0,1,2,0,0,1
128  127,0,0,0,0,0,0,1
129  128,1,0,1,1,2,0,0
130  129,2,0,0,0,0,0,0
131  130,0,0,0,0,0,1,0
132  131,1,0,0,1,0,1,0
133  132,3,1,0,2,1,0,1
134  133,0,0,0,0,2,0,1
135  134,0,0,1,0,1,0,0
136  135,0,0,0,0,0,0,1
137  136,1,0,1,3,0,3,1
138  137,0,0,0,1,1,0,1
139  138,0,0,0,4,0,0,0
140  139,3,0,1,1,3,2,1
141  140,0,1,0,0,0,0,0
142  141,1,0,1,0,0,0,0
143  142,0,0,0,0,1,0,0
144  143,0,0,0,0,0,1,1
145  144,0,0,0,0,0,1,1
146  145,2,0,0,1,0,2,0
147  146,0,0,0,0,1,0,1
148  147,1,1,1,0,0,0,0
149  148,0,0,0,0,0,0,1
150  149,0,0,0,0,0,1,0
151  150,1,0,2,1,0,0,1
152  151,0,1,2,1,1,1,1
153  152,0,0,0,1,0,1,0
154  153,0,0,0,0,0,1,0
155  154,1,0,1,1,0,0,0
156  155,1,0,0,1,0,0,0
157  156,3,0,1,0,1,0,0
158  157,1,0,1,1,0,1,0
159  158,0,1,0,0,0,1,0
160  159,0,2,2,3,2,0,1
161  160,0,0,0,1,1,0,0
162  161,2,1,2,1,0,0,0
163  162,0,0,0,0,0,0,0
164  163,0,0,0,0,0,3,0
165  164,1,0,0,0,0,0,1
166  165,0,0,0,0,0,1,1
167  166,0,0,1,1,0,0,0
168  167,1,0,0,1,0,2,1
169  168,3,1,1,0,1,0,0
170  169,1,0,1,0,0,0,0
171  170,0,0,1,0,0,1,1
172  171,0,0,1,0,0,1,0
```

```
173    172,0,0,0,0,1,1,1
174    173,0,0,0,0,0,2,0
175    174,0,0,0,0,0,1,0
176    175,0,1,0,0,0,0,0
177    176,0,1,0,0,2,0,0
178    177,0,2,1,1,1,0,1
179    178,0,1,0,0,0,1,0
180    179,0,0,0,0,0,2,1
181    180,0,1,0,1,0,0,0
182    181,0,0,0,0,0,0,0
183    182,0,0,1,0,0,1,1
184    183,0,0,0,1,0,0,0
185    184,1,0,0,0,1,0,0
186    185,0,1,0,1,0,0,0
187    186,0,0,0,0,1,1,0
188    187,0,1,0,2,1,2,0
189    188,0,0,1,0,0,1,1
190    189,0,0,0,0,0,0,0
191    190,0,0,0,0,1,0,0
192    191,1,1,1,0,0,0,0
193    192,1,0,0,0,2,0,0
194    193,0,0,0,0,1,1,0
195    194,0,0,0,0,1,1,0
196    195,1,1,0,1,0,0,1
197    196,0,0,0,0,0,1,1
198    197,0,0,0,1,1,0,1
199    198,2,0,0,1,1,0,0
200    199,0,0,0,0,0,1,1
201    200,0,0,0,0,0,1,1
202    201,0,0,0,0,0,1,1
203    202,0,0,0,0,0,0,0
204    203,0,0,0,3,1,0,1
205    204,0,0,0,1,2,1,0
206    205,0,0,0,0,0,1,1
207    206,0,0,1,0,0,0,1
208    207,0,0,1,0,0,1,0
209    208,0,0,2,1,0,0,0
210    209,1,1,1,0,0,1,0
211    210,0,0,0,0,0,1,0
212    211,0,0,0,2,1,1,0
213    212,0,0,0,0,0,0,0
214    213,1,1,0,0,1,0,0
215    214,1,1,2,0,0,0,0
216    215,0,0,0,0,0,1,1
217    216,0,0,0,0,0,0,1
218    217,1,1,0,0,0,1,0
219    218,0,1,1,1,3,0,0
220    219,0,0,0,0,0,1,1
221    220,2,1,0,0,1,0,0
222    221,0,0,0,0,1,0,0
223    222,2,0,1,2,0,3,1
224    223,1,0,0,0,0,1,1
225    224,0,0,0,0,0,0,0
226    225,0,0,0,1,0,1,1
227    226,0,0,1,1,1,1,0
228    227,1,1,0,1,0,1,0
229    228,1,0,1,3,2,0,0
230    229,0,0,0,2,0,0,0
```

```
231    230,0,0,1,0,0,1,0
232    231,0,0,1,0,0,1,0
233    232,0,0,0,0,0,0,0
234    233,1,0,0,1,0,0,0
235    234,0,0,2,2,1,0,0
236    235,0,0,0,3,1,0,0
237    236,1,0,0,1,0,1,0
238    237,0,0,0,0,0,0,0
239    238,0,1,0,1,0,0,0
240    239,0,0,0,0,0,0,0
241    240,0,0,1,0,0,0,0
242    241,1,1,1,1,0,2,1
243    242,0,2,1,0,1,0,1
244    243,0,0,0,1,0,0,1
245    244,0,0,0,1,2,3,1
246    245,3,1,0,1,0,0,0
247    246,0,0,0,0,0,1,0
248    247,0,0,0,0,1,3,1
249    248,0,0,0,0,0,2,0
250    249,2,0,0,0,1,0,0
251    250,0,2,1,1,1,0,1
252    251,0,0,0,0,0,0,1
253    252,1,2,1,2,1,0,1
254    253,0,0,0,0,0,1,1
255    254,0,0,0,1,0,1,0
256    255,0,0,1,0,0,1,0
257    256,0,0,0,0,0,1,0
258    257,0,0,1,0,0,1,0
259    258,0,2,1,1,0,0,1
260    259,0,0,0,0,0,0,1
261    260,0,0,0,0,0,1,1
262    261,0,0,0,4,1,0,0
263    262,2,0,0,1,0,0,0
264    263,0,0,0,0,0,2,0
265    264,0,0,0,1,0,0,0
266    265,0,0,0,0,1,0,1
267    266,2,1,0,0,1,0,0
268    267,1,0,1,0,0,0,1
269    268,0,0,1,1,1,1,0
270    269,0,1,1,1,1,0,1
271    270,0,0,0,0,0,0,1
272    271,0,0,0,0,1,1,0
273    272,0,0,0,1,0,1,0
274    273,1,1,1,0,0,0,0
275    274,2,1,1,4,3,1,0
276    275,1,0,0,1,0,2,1
277    276,1,1,0,1,0,0,0
278    277,1,2,1,5,0,1,0
279    278,1,0,0,0,1,2,0
280    279,0,0,0,0,0,1,0
281    280,1,0,0,3,3,2,1
282    281,0,0,0,0,0,1,0
283    282,0,0,0,0,0,1,1
284    283,0,0,1,0,0,0,0
285    284,0,0,0,0,1,0,1
286    285,0,1,1,0,0,0,0
287    286,0,0,0,0,0,1,0
288    287,0,0,0,0,1,2,1
```

```
289   288,1,0,0,1,0,0,0
290   289,1,1,0,0,3,0,0
291   290,0,0,0,0,0,1,1
292   291,0,0,0,0,0,1,0
293   292,0,0,1,0,2,0,0
294   293,1,2,1,3,2,0,1
295   294,0,0,0,0,0,1,0
296   295,0,0,1,0,0,0,1
297   296,0,0,0,0,0,1,0
298   297,2,1,0,1,0,0,0
299   298,2,1,0,1,0,0,0
300   299,0,0,0,1,0,1,0
301   300,0,0,0,0,0,2,0
302   301,0,0,1,0,0,1,0
303   302,0,1,0,1,2,3,0
304   303,0,0,0,0,1,1,1
305   304,0,0,1,0,0,1,0
306   305,0,1,0,0,0,0,0
307   306,0,0,1,0,0,1,0
308   307,0,0,0,0,0,1,0
309   308,1,0,1,1,2,0,1
310   309,0,0,0,0,0,0,1
311   310,0,0,1,0,0,0,0
312   311,0,0,0,0,0,1,0
313   312,0,0,0,0,0,1,1
314   313,1,1,0,0,0,1,1
315   314,0,0,2,0,0,1,0
316   315,0,1,0,0,1,0,0
317   316,0,0,1,2,1,1,0
318   317,0,1,0,0,0,0,1
319   318,0,0,0,0,1,0,1
320   319,3,0,1,1,3,2,0
321   320,2,0,0,1,1,1,0
322   321,0,2,1,1,1,0,0
323   322,0,0,0,2,1,0,0
324   323,0,0,0,2,1,1,0
325   324,0,2,0,1,0,0,0
326   325,0,0,0,0,0,1,1
327   326,2,1,2,0,2,1,0
328   327,0,0,0,0,0,1,1
329   328,0,0,0,3,0,0,0
330   329,0,0,0,0,0,1,1
331   330,1,0,0,0,0,1,0
332   331,0,2,1,1,1,0,1
333   332,0,0,0,0,0,2,0
334   333,0,0,0,0,1,0,0
335   334,1,0,2,5,0,3,1
336   335,0,0,0,0,0,1,1
337   336,1,3,1,6,3,0,1
338   337,1,0,0,1,0,4,0
339   338,0,0,1,0,0,1,0
340   339,1,0,0,1,0,0,0
341   340,0,0,0,0,0,1,0
342   341,0,0,0,0,1,0,0
343   342,0,0,0,0,0,0,0
344   343,2,0,1,2,3,1,0
345   344,0,2,0,0,1,1,0
346   345,1,1,0,1,2,3,0
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347   346,0,0,1,1,0,0,0
348   347,0,0,0,2,1,1,0
349   348,0,1,0,1,1,0,0
350   349,1,0,1,0,2,0,0
351   350,1,0,0,0,1,0,0
352   351,0,0,1,0,0,1,0
353   352,2,0,0,1,0,0,0
354   353,0,0,0,1,0,2,1
355   354,0,1,0,0,0,0,0
356   355,1,0,1,4,2,0,0
357   356,0,0,0,0,0,1,1
358   357,0,0,0,1,0,0,0
359   358,0,0,1,0,0,0,0
360   359,0,0,0,0,0,1,0
361   360,0,0,1,0,0,1,1
362   361,0,0,0,0,1,0,1
363   362,1,0,0,0,0,1,1
364   363,0,0,0,0,1,0,0
365   364,1,0,0,0,0,1,1
366   365,0,1,1,1,3,0,1
367   366,0,0,1,0,0,1,0
368   367,0,0,0,0,0,2,1
369   368,0,0,0,0,1,0,0
370   369,0,0,0,0,0,2,1
371   370,0,0,0,0,1,0,0
372   371,3,0,0,0,3,2,1
373   372,3,0,0,0,1,2,1
374   373,0,0,0,0,1,1,0
375   374,0,0,1,0,0,1,0
376   375,0,0,0,0,0,0,1
377   376,1,1,0,0,0,1,0
378   377,0,1,1,1,1,0,1
379   378,1,0,1,2,1,1,0
380   379,0,1,0,1,1,0,0
381   380,0,0,0,0,0,0,1
382   381,0,0,0,2,0,0,0
383   382,0,0,1,0,0,0,1
384   383,0,0,1,0,1,1,0
385   384,1,0,0,1,2,1,0
386   385,0,0,1,0,0,1,0
387   386,3,0,0,2,0,0,0
388   387,0,2,1,1,1,0,0
389   388,0,0,3,1,0,1,0
390   389,1,0,2,0,1,0,0
391   390,0,0,0,0,0,1,0
392   391,1,0,0,0,2,0,0
393   392,1,0,0,1,0,1,0
394   393,0,0,0,0,0,2,1
395   394,1,1,1,1,0,2,1
396   395,1,0,0,1,0,0,0
397   396,2,2,0,0,1,4,1
398   397,0,0,0,3,0,1,1
399   398,0,0,0,0,0,0,1
400   399,2,0,0,1,1,2,0
401   400,1,0,0,1,0,1,0
402   401,1,1,1,0,0,0,0
403   402,0,0,1,1,1,0,0
404   403,0,1,0,0,0,0,0
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405    404,0,0,0,0,0,2,1
406    405,1,0,0,0,0,1,0
407    406,0,0,0,0,1,1,0
408    407,0,1,0,0,1,0,0
409    408,0,0,0,0,0,1,1
410    409,1,0,1,0,2,0,0
411    410,0,0,0,0,1,0,0
412    411,0,2,1,0,1,0,1
413    412,1,2,1,5,0,1,0
414    413,0,0,0,0,1,1,1
415    414,3,0,1,1,3,2,1
416    415,0,0,0,0,1,0,0
417    416,1,0,0,0,0,1,1
418    417,0,0,0,1,0,1,0
419    418,1,0,0,0,1,1,1
420    419,0,0,0,0,0,1,1
421    420,0,0,0,0,0,0,0
422    421,1,1,2,3,0,1,0
423    422,0,0,0,0,0,1,0
424    423,1,0,1,1,2,0,0
425    424,1,0,0,1,0,0,0
426    425,0,0,0,0,1,0,0
427    426,0,2,1,1,1,0,1
428    427,0,0,0,0,0,1,0
429    428,0,0,0,0,0,1,0
430    429,0,0,0,1,0,0,0
431    430,0,0,0,0,0,1,1
432    431,1,0,0,1,0,0,0
433    432,0,1,0,1,0,0,0
434    433,1,0,0,0,1,2,0
435    434,0,0,0,0,0,1,0
436    435,0,2,1,1,1,0,1
437    436,1,0,0,0,0,0,1
438    437,0,2,0,2,1,0,1
439    438,0,0,0,0,0,0,1
440    439,0,0,1,0,0,1,1
441    440,0,0,0,0,0,0,0
442    441,0,0,1,1,1,1,0
443    442,1,0,3,0,0,1,0
444    443,0,0,1,0,0,1,0
445    444,0,0,0,0,0,0,1
446    445,0,0,1,0,0,0,0
447    446,0,0,0,0,1,2,1
448    447,1,0,0,0,0,1,0
449    448,0,0,0,1,0,0,1
450    449,0,0,1,0,0,1,0
451    450,2,1,0,0,1,0,0
452    451,2,0,1,0,0,0,0
453    452,2,0,0,1,1,2,0
454    453,0,0,0,1,0,0,0
455    454,0,0,0,0,0,1,0
456    455,1,0,0,1,0,0,0
457    456,1,0,0,1,0,0,0
458    457,0,0,0,0,0,1,0
459    458,0,0,1,0,0,1,0
460    459,0,1,0,2,1,2,0
461    460,1,2,1,2,1,0,1
462    461,0,0,1,0,0,1,0
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463    462,0,0,0,1,2,5,1
464    463,0,0,0,0,0,2,1
465    464,0,1,0,0,1,0,0
466    465,1,0,0,3,0,3,1
467    466,2,0,1,2,0,1,1
468    467,1,0,2,5,0,3,1
469    468,0,0,1,0,0,1,1
470    469,0,0,0,0,0,0,1
471    470,1,0,0,1,0,1,0
472    471,3,0,1,1,3,2,0
473    472,1,1,0,0,0,0,0
474    473,0,0,0,0,0,1,1
475    474,1,1,0,1,0,1,0
476    475,1,0,1,0,0,0,1
477    476,0,0,1,0,0,1,0
478    477,0,0,0,0,0,1,1
479    478,0,0,0,0,0,0,1
480    479,1,0,0,2,2,3,1
481    480,0,0,0,0,0,0,1
482    481,0,0,0,0,0,1,1
483    482,0,2,1,1,1,0,0
484    483,0,0,1,0,1,1,0
485    484,2,1,0,1,0,0,0
486    485,0,0,0,0,0,1,1
487    486,1,0,1,4,2,0,0
488    487,0,0,1,0,0,1,0
489    488,0,0,1,0,0,0,1
490    489,1,3,1,3,2,0,1
491    490,0,0,0,0,0,0,1
492    491,0,0,0,1,0,2,1
493    492,0,0,0,0,0,0,1
494    493,1,0,1,2,1,1,0
495    494,0,0,0,0,0,0,0
496    495,1,1,1,0,0,0,0
497    496,0,0,0,0,1,0,0
498    497,0,0,1,0,0,1,0
499    498,2,0,0,0,0,0,0
500    499,0,0,1,0,0,0,1
501    500,0,0,0,1,0,1,1
502    501,1,0,0,2,0,5,0
503    502,0,0,0,0,0,1,0
504    503,1,1,1,0,0,1,0
505    504,0,0,0,0,0,0,1
506    505,0,0,1,0,0,1,1
507    506,2,0,0,0,0,0,0
508    507,0,2,1,1,1,0,0
509    508,0,0,0,0,1,1,0
510    509,0,0,0,2,1,1,0
511    510,0,1,0,0,2,0,0
512    511,0,0,0,1,1,0,1
513    512,2,0,0,1,0,0,0
514    513,0,0,1,0,0,1,0
515    514,0,1,0,1,0,0,0
516    515,0,0,0,0,0,1,1
517    516,0,0,0,0,0,0,1
518    517,0,0,0,0,1,0,0
519    518,0,0,0,0,0,1,1
520    519,0,0,0,0,0,0,0
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521    520,0,1,1,1,3,0,0
522    521,0,1,0,0,0,1,0
523    522,0,0,1,0,0,0,0
524    523,1,0,0,0,0,0,1
525    524,0,0,0,0,0,1,0
526    525,0,0,0,0,2,0,0
527    526,0,0,0,0,0,1,1
528    527,0,0,1,1,0,0,1
529    528,0,0,0,0,0,0,0
530    529,0,0,2,1,0,0,0
531    530,2,0,1,2,3,1,0
532    531,0,0,0,0,0,1,1
533    532,0,0,1,0,0,0,0
534    533,0,0,0,1,0,1,0
535    534,0,1,0,0,0,1,0
536    535,0,0,0,0,0,2,1
537    536,3,0,0,2,0,0,0
538    537,0,0,0,0,0,0,1
539    538,0,0,0,0,1,0,0
540    539,0,0,0,0,0,3,0
541    540,0,0,0,0,0,0,0
542    541,0,0,0,0,0,1,1
543    542,0,0,0,2,1,1,0
544    543,2,0,0,1,1,0,0
545    544,0,1,0,1,1,0,0
546    545,0,0,0,0,1,0,1
547    546,0,0,1,0,0,1,0
548    547,0,0,0,0,0,1,0
549    548,0,0,0,1,0,1,0
550    549,0,1,0,1,0,0,0
551    550,0,0,1,0,0,1,1
552    551,0,0,0,0,0,0,0
553    552,1,1,2,2,0,1,1
554    553,0,0,1,0,0,1,0
555    554,1,0,0,1,0,0,0
556    555,1,0,0,0,0,1,1
557    556,0,0,0,0,0,1,0
558    557,0,2,1,1,0,0,1
559    558,0,1,1,1,0,1,0
560    559,0,0,0,0,0,1,1
561    560,0,0,0,0,0,1,0
562    561,0,0,0,0,1,0,1
563    562,0,0,1,0,0,0,0
564    563,0,0,1,1,1,1,0
565    564,0,0,0,0,0,0,0
566    565,2,1,1,4,3,1,0
567    566,0,0,0,0,0,1,1
568    567,1,0,1,1,4,2,0
569    568,0,0,0,0,0,1,1
570    569,0,0,0,0,1,0,1
571    570,0,0,0,1,2,1,0
572    571,0,0,0,0,1,0,1
573    572,0,0,0,0,0,1,0
574    573,0,0,0,0,0,1,1
575    574,1,1,0,0,0,1,0
576    575,0,0,0,0,0,0,0
577    576,0,1,0,0,0,0,0
578    577,0,0,0,0,0,1,1
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579   578,0,0,0,0,1,0,0
580   579,0,0,2,2,1,0,0
581   580,0,2,1,0,1,0,1
582   581,1,0,0,3,3,2,1
583   582,0,0,0,0,0,1,1
584   583,0,0,0,2,1,0,0
585   584,0,0,0,0,0,0,1
586   585,0,2,1,1,1,0,1
587   586,0,0,0,0,0,1,0
588   587,0,0,0,0,1,3,1
589   588,0,0,0,0,0,1,1
590   589,0,0,1,1,2,1,0
591   590,1,2,1,2,1,0,1
592   591,0,0,1,0,0,1,1
593   592,2,0,0,1,0,0,0
594   593,1,0,1,1,2,0,1
595   594,0,0,0,4,0,0,0
596   595,0,0,1,1,0,3,0
597   596,0,0,0,0,0,1,0
598   597,1,1,1,4,0,3,1
599   598,0,0,0,0,0,1,1
600   599,1,1,2,3,1,0,1
601   600,1,0,1,0,0,0,0
602   601,0,0,1,0,0,0,0
603   602,0,0,0,1,0,1,0
604   603,0,0,0,0,0,1,0
605   604,0,0,0,0,0,1,0
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607   606,0,0,0,0,0,1,0
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609   608,0,0,0,0,0,1,0
610   609,0,0,1,0,0,0,0
611   610,0,0,0,1,1,3,0
612   611,0,0,0,0,1,0,0
613   612,0,1,1,1,0,0,1
614   613,0,0,1,0,0,0,1
615   614,0,2,0,1,0,0,0
616   615,2,1,4,0,0,0,0
617   616,0,1,0,0,0,0,1
618   617,0,0,1,0,0,1,1
619   618,0,0,0,1,0,0,1
620   619,3,1,0,1,0,0,0
621   620,1,0,1,3,0,3,1
622   621,0,0,0,0,1,0,0
623   622,0,0,0,0,0,0,1
624   623,1,0,1,3,0,3,1
625   624,2,0,0,1,1,1,0
626   625,0,1,0,0,0,0,0
627   626,0,0,0,0,0,1,1
628   627,0,1,2,0,1,0,0
629   628,0,0,0,0,0,1,0
630   629,0,1,1,1,1,0,1
631   630,3,1,0,2,1,0,1
632   631,0,1,0,0,1,0,0
633   632,1,1,0,1,0,1,0
634   633,1,0,2,1,0,0,1
635   634,0,0,0,0,0,0,0
636   635,0,0,0,0,0,2,0
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691,0,0,0,2,0,0,0
692,0,0,0,0,0,1,0
693,0,0,1,0,0,1,0
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695    694,1,1,0,0,1,0,0
696    695,0,0,0,0,0,1,1
697    696,0,0,0,1,1,0,1
698    697,1,0,1,1,0,0,0
699    698,0,0,0,1,1,0,0
700    699,0,0,2,1,1,1,0
701    700,0,0,1,1,0,0,0
702    701,0,0,0,0,0,1,1
703    702,0,1,1,1,3,0,1
704    703,1,1,0,0,3,0,0
705    704,0,0,1,0,0,1,1
706    705,0,0,0,0,0,2,0
707    706,0,2,1,1,1,0,1
708    707,1,0,0,1,0,1,0
709    708,0,0,0,2,1,1,0
710    709,2,0,0,0,1,0,0
711    710,0,0,1,0,0,1,0
712    711,0,1,2,1,1,1,1
713    712,1,1,0,1,2,0,0
714    713,1,0,1,3,2,0,0
715    714,0,0,0,0,1,0,1
716    715,0,0,0,0,0,0,0
717    716,1,0,0,4,1,2,0
718    717,0,0,0,3,0,0,0
719    718,0,0,0,0,0,1,1
720    719,1,1,0,0,1,1,1
721    720,0,0,0,2,0,0,0
722    721,1,1,0,0,0,1,0
723    722,1,1,0,1,0,0,0
724    723,0,0,0,0,0,2,0
725    724,2,1,2,0,2,1,0
726    725,0,0,0,0,0,1,1
727    726,2,1,2,0,2,0,1
728    727,0,0,0,0,0,0,0
729    728,1,1,0,0,0,1,1
730    729,0,0,0,0,2,0,0
731    730,0,2,0,1,1,0,1
732    731,2,0,1,2,0,0,1
733    732,0,0,1,0,0,1,0
734    733,0,0,0,0,0,1,0
735    734,0,0,0,0,0,1,0
736    735,0,0,1,0,1,0,0
737    736,0,0,0,3,1,0,0
738    737,1,0,0,1,0,2,1
739    738,3,1,1,0,1,0,0
740    739,0,0,0,2,0,0,0
741    740,1,0,0,1,0,2,1
742    741,0,0,0,0,1,1,0
743    742,1,0,0,0,1,0,0
744    743,0,0,1,0,2,0,0
745    744,0,0,2,0,0,1,0
746    745,2,1,2,1,0,0,0
747    746,0,0,1,0,0,1,0
748    747,0,0,0,0,0,1,1
749    748,1,0,1,1,0,1,0
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752    751,0,0,0,0,2,0,1
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757  756,0,1,1,0,0,0,0
758  757,0,0,0,1,2,3,1
759  758,0,0,0,1,1,0,0
760  759,0,0,1,0,0,1,0
761  760,0,0,1,0,0,1,0
762  761,0,1,0,1,0,0,0
763  762,1,0,0,0,1,0,0
764  763,1,1,0,1,2,3,0
765  764,0,0,0,2,0,1,0
766  765,0,0,0,0,1,0,0
767  766,1,0,2,0,1,0,0
768  767,0,0,1,0,0,1,0
769  768,0,0,0,1,1,1,0
770  769,0,0,0,0,0,1,0
771  770,1,1,0,1,0,0,0
772  771,0,1,0,2,0,0,0
773  772,1,1,1,0,0,3,0
774  773,1,2,0,5,0,1,0
775  774,0,0,0,1,0,1,0
776  775,0,0,0,0,0,1,0
777  776,1,0,1,0,0,0,0
778  777,0,0,0,1,2,0,0
779  778,1,0,0,1,0,0,0
780  779,1,0,0,1,0,0,1
781  780,1,0,0,0,0,1,1
782  781,0,0,0,0,2,0,0
783  782,1,0,0,0,0,1,1
784  783,0,0,0,0,0,2,0
785  784,2,1,0,1,0,0,0
786  785,1,0,0,2,1,1,0
787  786,0,0,0,0,0,0,1
788  787,0,0,0,0,0,0,1
789  788,0,0,0,1,0,2,1
790  789,0,0,0,0,0,1,0
791  790,1,2,1,3,2,0,1
792  791,0,0,0,0,1,0,0
793  792,0,1,1,0,0,0,0
794  793,0,1,1,2,0,1,0
795  794,0,0,0,3,0,0,0
796  795,0,0,0,0,0,1,0
797  796,0,1,1,1,1,0,1
798  797,0,2,2,3,2,0,1
799  798,0,2,0,0,1,1,0
800  799,1,0,0,1,0,0,0
801  800,0,1,0,1,0,0,0
802  801,3,0,1,0,1,0,0
803  802,0,0,1,0,0,1,1
804  803,0,0,0,0,0,1,1
805  804,1,0,0,1,0,4,0
806  805,0,0,0,0,1,1,0
807  806,0,1,0,0,0,0,0
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810  809,0,0,0,0,2,0,1
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824    823,0,0,1,0,0,0,0
825    824,2,0,0,1,0,0,0
826    825,1,0,0,1,0,1,0
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833    832,1,0,1,0,0,0,0
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839    838,0,0,0,0,0,1,0
840    839,0,0,0,0,1,0,0
841    840,0,0,0,0,1,0,1
842    841,0,0,0,0,1,0,1
843    842,0,0,1,0,0,1,0
844    843,0,0,0,1,0,1,0
845    844,0,0,0,0,1,0,0
846    845,1,2,0,5,0,1,0
847    846,0,2,1,1,1,0,0
848    847,0,0,0,0,0,1,1
849    848,1,0,1,4,2,0,0
850    849,0,0,1,0,1,0,0
851    850,1,0,0,1,0,4,0
852    851,0,0,0,0,0,1,1
853    852,0,1,0,1,0,0,0
854    853,0,1,1,1,1,0,1
855    854,0,0,0,1,0,1,1
856    855,2,0,1,2,3,1,0
857    856,0,0,1,0,0,1,0
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860    859,0,0,2,2,1,0,0
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862    861,0,0,0,0,0,1,1
863    862,0,0,0,0,0,0,0
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865    864,0,0,1,1,1,1,0
866    865,0,0,0,0,0,1,1
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868    867,1,0,0,1,1,0,0
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983,0,0,0,2,0,0,0
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1064    1063,2,0,0,1,0,2,0
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1073    1072,0,1,0,1,0,0,0
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1079    1078,0,0,0,1,0,0,0
1080    1079,0,0,1,0,0,1,0
1081    1080,0,0,0,0,0,1,0
1082    1081,0,0,0,0,0,1,0
1083    1082,0,1,0,1,1,0,0
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1088    1087,1,1,0,1,0,1,0
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1090    1089,0,0,2,1,0,0,0
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1094    1093,0,2,1,0,1,0,1
1095    1094,0,0,1,0,2,0,0
1096    1095,0,0,0,0,0,1,0
1097    1096,1,2,1,5,0,1,0
1098    1097,1,1,1,1,0,2,1
1099    1098,1,0,0,4,1,2,0
1100    1099,0,0,0,0,0,0,1
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1104    1103,0,0,1,0,0,1,1
1105    1104,1,0,0,0,1,0,0
1106    1105,0,2,0,1,1,0,1
1107    1106,0,1,2,1,1,1,1
1108    1107,0,0,0,0,0,0,1
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1110    1109,0,0,0,0,1,0,0
1111    1110,0,0,0,0,1,0,0
1112    1111,0,1,0,1,0,0,0
1113    1112,1,1,0,0,0,1,0
1114    1113,0,0,0,1,0,2,1
1115    1114,0,0,0,0,0,1,0
1116    1115,0,0,0,0,1,0,0
1117    1116,0,0,0,0,0,1,1
1118    1117,0,0,0,0,0,1,1
1119    1118,1,0,0,0,1,2,0
1120    1119,1,0,0,1,0,0,0
1121    1120,1,1,1,0,0,0,0
1122    1121,0,0,1,0,1,1,0
1123    1122,0,0,0,2,1,1,0
1124    1123,1,0,2,1,0,0,1
1125    1124,1,0,2,0,1,0,0
1126    1125,0,0,0,0,0,2,1
1127    1126,0,0,2,0,0,1,0
1128    1127,0,1,0,0,2,0,0
1129    1128,1,0,2,5,0,3,1
1130    1129,0,0,1,0,0,1,1
1131    1130,0,0,0,0,1,0,0
1132    1131,1,0,1,2,1,1,0
1133    1132,0,0,1,0,0,1,0
1134    1133,0,0,0,0,0,0,1
1135    1134,0,0,0,0,1,1,0
1136    1135,0,1,0,0,0,0,0
1137    1136,0,0,2,0,0,1,0
1138    1137,0,0,0,0,1,2,1
1139    1138,0,0,1,1,2,1,0
1140    1139,1,1,0,1,0,0,0
1141    1140,0,0,0,0,0,1,1
1142    1141,1,0,0,1,0,0,1
1143    1142,1,0,0,0,0,1,1
1144    1143,0,0,1,1,0,0,1
1145    1144,2,0,0,0,0,0,0
1146    1145,0,0,0,0,0,1,0
1147    1146,1,1,2,3,0,1,0
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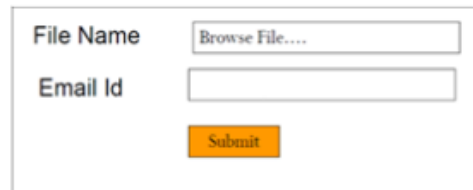
1.9   Log File

```
1   Filename,Sequence,Class
2   proteinSequenceFile1.csv,PGGGKV3KPV,-
3   proteinSequenceFile1.csv,NLKHQPGGGKVQIVYKPVDLSKVTSKCGSLGNIHHKPGGGQVE,
4   proteinSequenceFile1.csv,PG33GKVQIVEKPV,-
5   proteinSequenceFile1.csv,KDRVQSKIGSLDNITHVPGGGN,
6   proteinSequenceFile1.csv,QTAPVPMPDLKNVKSKIGSTE,
7   proteinSequenceFile1.csv,KPVDLSKVTSKCGSLGNIHHKPGGGQVEVKSEKLDF,
8   proteinSequenceFile1.csv,PGGGKN8EVYKPV,-
9   proteinSequenceFile1.csv,QTAPVPMPDLKNVKSKIGS67ENLKHQPGGGKVQIVY,-
10  proteinSequenceFile1.csv,PGGG5VQIVYKPV,+
11  proteinSequenceFile2.csv,QTAPVPMPDLKNVKSKIGSTE,
12  proteinSequenceFile2.csv,PGGGKN8EVYKPV,-
13  proteinSequenceFile2.csv,PGGG5VQIVYKPV,+
14  proteinSequenceFile2.csv,QTAPVPMPDLKNVKSKIGS67ENLKHQPGGGKVQIVY,-
15  proteinSequenceFile2.csv,PG33GKVQIVEKPV,-
16  proteinSequenceFile2.csv,NLKHQPGGGKVQIVYKPVDLSKVTSKCGSLGNIHHKPGGGQVE,
17  proteinSequenceFile2.csv,KDRVQSKIGSLDNITHVPGGGN,
18  proteinSequenceFile2.csv,PGGGKV3KPV,-
19  proteinSequenceFile2.csv,KPVDLSKVTSKCGSLGNIHHKPGGGQVEVKSEKLDF,
20  proteinSequenceFile3.csv,PGGGKN8EVYKPV,-
21  proteinSequenceFile3.csv,QTAPVPMPDLKNVKSKIGS67ENLKHQPGGGKVQIVY,-
22  proteinSequenceFile3.csv,KDRVQSKIGSLDNITHVPGGGN,
23  proteinSequenceFile3.csv,KPVDLSKVTSKCGSLGNIHHKPGGGQVEVKSEKLDF,
24  proteinSequenceFile3.csv,PGGG5VQIVYKPV,+
25  proteinSequenceFile3.csv,PGGGKV3KPV,-
26  proteinSequenceFile3.csv,PG33GKVQIVEKPV,-
27  proteinSequenceFile3.csv,QTAPVPMPDLKNVKSKIGSTE,
```

2   Program 2

2.1   Question

Develop a webservice for program 1

2.2   User should get

- Result File
- Log File

2.3   Server Code

```python
1  from black import out
2  import extractFeatures
3  from bottle import Bottle, template, request
4
5  app = Bottle()
6  output = {}
7
8  @app.route('/')
9  def index():
10     """Home Page"""
11     return template("./templates/index.tpl", result="", log="", resultname="", logname="")
12
13  @app.route('/', method="POST")
14  def formhandler():
15     """Handle the form submission"""
16
17     files = request.forms.get('files')
18     print(files)
19     output = extractFeatures.webService(files)
20     return template("./templates/index.tpl",
21                     result=output['result'],
22                     log=output['log'],
23                     resultname=output['resultname'],
24                     logname=output['logname'])
25
26  if __name__ == '__main__':
27     app.run(debug=True)
```

2.4   HTML Page

```html
<!DOCTYPE html>
<html>
<head>
    <title>LAB ASSIGNMENT 4</title>
    <meta name="viewport" content="width=device-width, initial-scale=1">
<style>
* {
  box-sizing: border-box;
}
.column {
  float: left;
  width: 50%;
  padding: 10px;
  height: 600px;
   overflow-x: hidden;
            overflow-y: auto;
            text-align: justify;
}

.row:after {
  content: "";
  display: table;
  clear: both;
}
    </style>
</head>

<body>
    <form method="post" action="/">
        <fieldset>
            <legend>DATA MINING AND WAREHOUSING LAB ASSIGNMENT 4</legend>
            <center>
                <ul>
                    <label for="files">Select files : </label>
                    <input type="file" id="files" name="files" multiple /> Email ID:
                    <input name="first" />
                </ul>

                <input type="submit" value="Generate Result" />
            </center>
        </fieldset>
    </form>
    <br />

</div>
 <div class="row">
  <div class="column" style="background-color:#aaa;">
    <h2>{{resultname}}</h2>
    <p>{{result}}</p>
  </div>
  <div class="column" style="background-color:#bbb;">
    <h2>{{logname}}</h2>
    <p>{{log}}</p>
  </div>
</div>

```
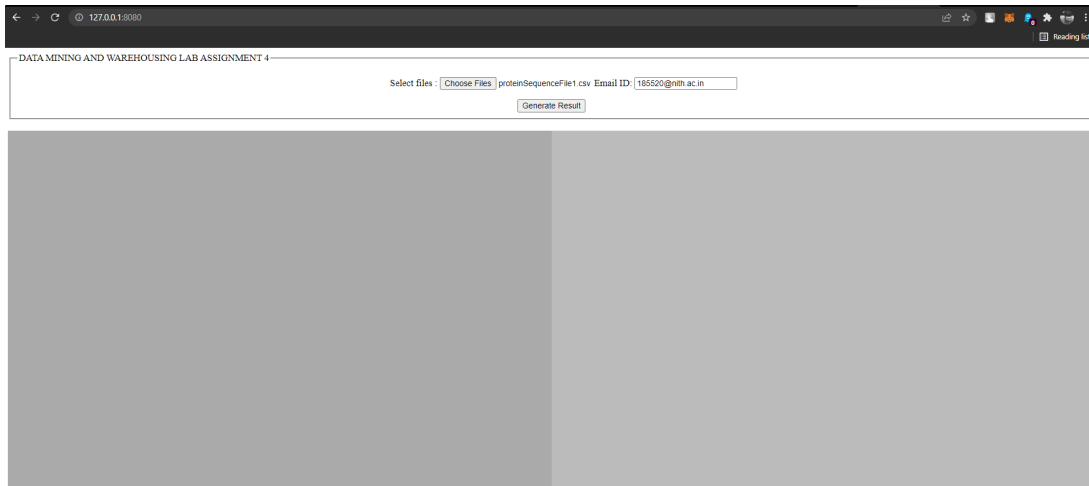
```
57  </body>
58
59  </html>
```

2.5   Output

Before Selecting the files

After submitting the selected files