LAB-4

For this lab, download 'Heart.csv' to a folder called 'Lab4'. If the file download to the "Downloads" folder by default, move the file to the folder 'Lab4'.

```
ibab@IBAB-MSc-BDB-Comp06:~$ cd Downloads
ibab@IBAB-MSc-BDB-Comp06:~/Downloads$ mkdir LAB4
ibab@IBAB-MSc-BDB-Comp06:~/Downloads$ cd LAB4
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ mv Heart.csv LAB4
mv: cannot stat 'Heart.csv': No such file or directory
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ls -l
total 0
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ cd ..
ibab@IBAB-MSc-BDB-Comp06:~/Downloads$ ls -l
total 144
drwxrwxrwx 83 ibab ibab  4096 Jul 22 16:59 etc_learn
-rw-rw-r--  1 ibab ibab 96755 Jul 24 16:19 etc.zip
-rw-rw-r--  1 ibab ibab    24 Jul 31 09:30 file1
-rw-rw-r--  1 ibab ibab    24 Jul 31 09:32 'file1(1)'
-rw-rw-r--  1 ibab ibab    23 Jul 31 09:31 file2
-rw-rw-r--  1 ibab ibab    48 Jul 31 09:31 file3
-rw-rw-r--  1 ibab ibab    48 Jul 31 09:41 file3_sorted
-rw-rw-r--  1 ibab ibab 19925 Jul 31 14:17 Heart.csv
drwxrwxr-x  2 ibab ibab  4096 Jul 31 14:30 LAB4
-rw-rw-r--  1 ibab ibab     0 Jul 23 09:47 testfile
-rw-rw-r--  1 ibab ibab     0 Jul 23 09:47 testfile2
-rw-rw-r--  1 ibab ibab     0 Jul 23 09:47 testfile-slink
ibab@IBAB-MSc-BDB-Comp06:~/Downloads$ mv Heart.csv LAB4
ibab@IBAB-MSc-BDB-Comp06:~/Downloads$ ls -l
total 124
drwxrwxrwx 83 ibab ibab  4096 Jul 22 16:59 etc_learn
-rw-rw-r--  1 ibab ibab 96755 Jul 24 16:19 etc.zip
-rw-rw-r--  1 ibab ibab    24 Jul 31 09:30 file1
-rw-rw-r--  1 ibab ibab    24 Jul 31 09:32 'file1(1)'
-rw-rw-r--  1 ibab ibab    23 Jul 31 09:31 file2
-rw-rw-r--  1 ibab ibab    48 Jul 31 09:31 file3
-rw-rw-r--  1 ibab ibab    48 Jul 31 09:41 file3_sorted
drwxrwxr-x  2 ibab ibab  4096 Jul 31 14:32 LAB4
-rw-rw-r--  1 ibab ibab     0 Jul 23 09:47 testfile
-rw-rw-r--  1 ibab ibab     0 Jul 23 09:47 testfile2
-rw-rw-r--  1 ibab ibab     0 Jul 23 09:47 testfile-slink
ibab@IBAB-MSc-BDB-Comp06:~/Downloads$ cd LAb4
bash: cd: LAb4: No such file or directory
ibab@IBAB-MSc-BDB-Comp06:~/Downloads$ cd LAB4
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ls -l
total 20
-rw-rw-r-- 1 ibab ibab 19925 Jul 31 14:17 Heart.csv
```

1. Create symbolic and hard links to the data file you downloaded. What happens if you use the same name for the links? Print the screenshot of the output message and paste it in your answers. Also how do you prove that you have created the links correctly? Use the appropriate command to prove it.

```
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ln heart.csv heart_hardlink.csv
ln: failed to access 'heart.csv': No such file or directory
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ in Heart.csv heart_hardlink.csv
bash: syntax error near unexpected token `in'
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ln Heart.csv heart_hardlink.csv
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ln -s Heart.csv Heart_symlink.csv
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ls -l
total 40
-rw-rw-r-- 2 ibab ibab 19925 Jul 31 14:17 Heart.csv
-rw-rw-r-- 2 ibab ibab 19925 Jul 31 14:17 heart_hardlink.csv
lrwxrwxrwx 1 ibab ibab     9 Jul 31 14:41 Heart_symlink.csv -> Heart.csv
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ln LAB4 LAB4_hardlink.csv
ln: failed to access 'LAB4': No such file or directory
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ls -l
total 40
-rw-rw-r-- 2 ibab ibab 19925 Jul 31 14:17 Heart.csv
-rw-rw-r-- 2 ibab ibab 19925 Jul 31 14:17 heart_hardlink.csv
lrwxrwxrwx 1 ibab ibab     9 Jul 31 14:41 Heart_symlink.csv -> Heart.csv
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ls -l
total 40
-rw-rw-r-- 2 ibab ibab 19925 Jul 31 14:17 Heart.csv
-rw-rw-r-- 2 ibab ibab 19925 Jul 31 14:17 heart_hardlink.csv
lrwxrwxrwx 1 ibab ibab     9 Jul 31 14:41 Heart_symlink.csv -> Heart.csv
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ln Heart.csv Heart.csv
ln: failed to create hard link 'Heart.csv': File exists
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ^C
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ls -li Heart.csv heart_hardlink.csv
29117249 -rw-rw-r-- 2 ibab ibab 19925 Jul 31 14:17 Heart.csv
29117249 -rw-rw-r-- 2 ibab ibab 19925 Jul 31 14:17 heart_hardlink.csv
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$
```

 Same inode number represents that we have got the hardlink

2. What command will you use to determine the filetype of the downloaded data file? Execute this command and take a screenshot of the command and the output to paste it in your work.

```
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ file Heart.csv
Heart.csv: CSV text
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$
```

3. View the contents of the data file using more and less commands. How many pages are there?

```
"275",59,1,"typical",134,204,0,0,162,0,0.8,1,2,"normal","Yes"
"276",64,1,"typical",170,227,0,2,155,0,0.6,2,0,"reversable","No"
"277",66,0,"nonanginal",146,278,0,2,152,0,0,2,1,"normal","No"
"278",39,0,"nonanginal",138,220,0,0,152,0,0,2,0,"normal","No"
"279",57,1,"nontypical",154,232,0,2,164,0,0,1,1,"normal","Yes"
"280",58,0,"asymptomatic",130,197,0,0,131,0,0.6,2,0,"normal","No"
"281",57,1,"asymptomatic",110,335,0,0,143,1,3,2,1,"reversable","Yes"
"282",47,1,"nonanginal",130,253,0,0,179,0,0,1,0,"normal","No"
"283",55,0,"asymptomatic",128,205,0,1,130,1,2,2,1,"reversable","Yes"
"284",35,1,"nontypical",122,192,0,0,174,0,0,1,0,"normal","No"
"285",61,1,"asymptomatic",148,203,0,0,161,0,0,1,1,"reversable","Yes"
"286",58,1,"asymptomatic",114,318,0,1,140,0,4.4,3,3,"fixed","Yes"
"287",58,0,"asymptomatic",170,225,1,2,146,1,2.8,2,2,"fixed","Yes"
"288",58,1,"nontypical",125,220,0,0,144,0,0.4,2,NA,"reversable","No"
"289",56,1,"nontypical",130,221,0,2,163,0,0,1,0,"reversable","No"
"290",56,1,"nontypical",120,240,0,0,169,0,0,3,0,"normal","No"
"291",67,1,"nonanginal",152,212,0,2,150,0,0.8,2,0,"reversable","Yes"
"292",55,0,"nontypical",132,342,0,0,166,0,1.2,1,0,"normal","No"
"293",44,1,"asymptomatic",120,169,0,0,144,1,2.8,3,0,"fixed","Yes"
"294",63,1,"asymptomatic",140,187,0,2,144,1,4,1,2,"reversable","Yes"
"295",63,0,"asymptomatic",124,197,0,0,136,1,0,2,0,"normal","Yes"
"296",41,1,"nontypical",120,157,0,0,182,0,0,1,0,"normal","No"
"297",59,1,"asymptomatic",164,176,1,2,90,0,1,2,2,"fixed","Yes"
"298",57,0,"asymptomatic",140,241,0,0,123,1,0.2,2,0,"reversable","Yes"
"299",45,1,"typical",110,264,0,0,132,0,1.2,2,0,"reversable","Yes"
"300",68,1,"asymptomatic",144,193,1,0,141,0,3.4,2,2,"reversable","Yes"
"301",57,1,"asymptomatic",130,131,0,0,115,1,1.2,2,1,"reversable","Yes"
"302",57,0,"nontypical",130,236,0,2,174,0,0,2,1,"normal","Yes"
"303",38,1,"nonanginal",138,175,0,0,173,0,0,1,NA,"normal","No"
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$
```

More- 6 spaces

```
"270",42,1,"nonanginal",130,180,0,0,150,0,0,1,0,"normal","No"
"271",61,1,"asymptomatic",140,207,0,2,138,1,1.9,1,1,"reversable","Yes"
"272",66,1,"asymptomatic",160,228,0,2,138,0,2.3,1,0,"fixed","No"
"273",46,1,"asymptomatic",140,311,0,0,120,1,1.8,2,2,"reversable","Yes"
"274",71,0,"asymptomatic",112,149,0,0,125,0,1.6,2,0,"normal","No"
"275",59,1,"typical",134,204,0,0,162,0,0.8,1,2,"normal","Yes"
"276",64,1,"typical",170,227,0,2,155,0,0.6,2,0,"reversable","No"
"277",66,0,"nonanginal",146,278,0,2,152,0,0,2,1,"normal","No"
"278",39,0,"nonanginal",138,220,0,0,152,0,0,2,0,"normal","No"
"279",57,1,"nontypical",154,232,0,2,164,0,0,1,1,"normal","Yes"
"280",58,0,"asymptomatic",130,197,0,0,131,0,0.6,2,0,"normal","No"
"281",57,1,"asymptomatic",110,335,0,0,143,1,3,2,1,"reversable","Yes"
"282",47,1,"nonanginal",130,253,0,0,179,0,0,1,0,"normal","No"
"283",55,0,"asymptomatic",128,205,0,1,130,1,2,2,1,"reversable","Yes"
"284",35,1,"nontypical",122,192,0,0,174,0,0,1,0,"normal","No"
"285",61,1,"asymptomatic",148,203,0,0,161,0,0,1,1,"reversable","Yes"
"286",58,1,"asymptomatic",114,318,0,1,140,0,4.4,3,3,"fixed","Yes"
"287",58,0,"asymptomatic",170,225,1,2,146,1,2.8,2,2,"fixed","Yes"
"288",58,1,"nontypical",125,220,0,0,144,0,0.4,2,NA,"reversable","No"
"289",56,1,"nontypical",130,221,0,2,163,0,0,1,0,"reversable","No"
"290",56,1,"nontypical",120,240,0,0,169,0,0,3,0,"normal","No"
"291",67,1,"nonanginal",152,212,0,2,150,0,0.8,2,0,"reversable","Yes"
"292",55,0,"nontypical",132,342,0,0,166,0,1.2,1,0,"normal","No"
"293",44,1,"asymptomatic",120,169,0,0,144,1,2.8,3,0,"fixed","Yes"
"294",63,1,"asymptomatic",140,187,0,2,144,1,4,1,2,"reversable","Yes"
"295",63,0,"asymptomatic",124,197,0,0,136,1,0,2,0,"normal","Yes"
"296",41,1,"nontypical",120,157,0,0,182,0,0,1,0,"normal","No"
"297",59,1,"asymptomatic",164,176,1,2,90,0,1,2,2,"fixed","Yes"
"298",57,0,"asymptomatic",140,241,0,0,123,1,0.2,2,0,"reversable","Yes"
"299",45,1,"typical",110,264,0,0,132,0,1.2,2,0,"reversable","Yes"
"300",68,1,"asymptomatic",144,193,1,0,141,0,3.4,2,2,"reversable","Yes"
"301",57,1,"asymptomatic",130,131,0,0,115,1,1.2,2,1,"reversable","Yes"
"302",57,0,"nontypical",130,236,0,2,174,0,0,2,1,"normal","Yes"
"303",38,1,"nonanginal",138,175,0,0,173,0,0,1,NA,"normal","No"
(END)
```

4. Output the first 35 lines of the data file using the appropriate command. Save the screenshot in your work.

```
"","Age","Sex","ChestPain","RestBP","Chol","Fbs","RestECG","MaxHR","ExAng","Oldpeak","Slope","Ca","Thal","AHD"
"1",63,1,"typical",145,233,1,2,150,0,2.3,3,0,"fixed","No"
"2",67,1,"asymptomatic",160,286,0,2,108,1,1.5,2,3,"normal","Yes"
"3",67,1,"asymptomatic",120,229,0,2,129,1,2.6,2,2,"reversable","Yes"
"4",37,1,"nonanginal",130,250,0,0,187,0,3.5,3,0,"normal","No"
"5",41,0,"nontypical",130,204,0,2,172,0,1.4,1,0,"normal","No"
"6",56,1,"nontypical",120,236,0,0,178,0,0.8,1,0,"normal","No"
"7",62,0,"asymptomatic",140,268,0,2,160,0,3.6,3,2,"normal","Yes"
"8",57,0,"asymptomatic",120,354,0,0,163,1,0.6,1,0,"normal","No"
"9",63,1,"asymptomatic",130,254,0,2,147,0,1.4,2,1,"reversable","Yes"
"10",53,1,"asymptomatic",140,203,1,2,155,1,3.1,3,0,"reversable","Yes"
"11",57,1,"asymptomatic",140,192,0,0,148,0,0.4,2,0,"fixed","No"
"12",56,0,"nontypical",140,294,0,2,153,0,1.3,2,0,"normal","No"
"13",56,1,"nonanginal",130,256,1,2,142,1,0.6,2,1,"fixed","Yes"
"14",44,1,"nontypical",120,263,0,0,173,0,0.1,0,"reversable","No"
"15",52,1,"nonanginal",172,199,1,0,162,0,0.5,1,0,"reversable","No"
"16",57,1,"nonanginal",150,168,0,0,174,0,1.6,1,0,"normal","No"
"17",48,1,"nontypical",110,229,0,0,168,0,1,3,0,"reversable","Yes"
"18",54,1,"asymptomatic",140,239,0,0,160,0,1.2,1,0,"normal","No"
"19",48,0,"nonanginal",130,275,0,0,139,0,0.2,1,0,"normal","No"
"20",49,1,"nontypical",130,266,0,0,171,0,0.6,1,0,"normal","No"
"21",64,1,"typical",110,211,0,2,144,1,1.8,2,0,"normal","No"
"22",58,0,"typical",150,283,1,2,162,0,1,1,0,"normal","No"
"23",58,1,"nontypical",120,284,0,2,160,0,1.8,2,0,"normal","Yes"
"24",58,1,"nonanginal",132,224,0,2,173,0,3.2,1,2,"reversable","Yes"
"25",60,1,"asymptomatic",130,206,0,2,132,1,2.4,2,2,"reversable","Yes"
"26",50,0,"nonanginal",120,219,0,0,158,0,1.6,2,0,"normal","No"
"27",58,0,"nonanginal",120,340,0,0,172,0,0,1,0,"normal","No"
"28",66,0,"typical",150,226,0,0,114,0,2.6,3,0,"normal","No"
"29",43,1,"asymptomatic",150,247,0,0,171,0,1.5,1,0,"normal","No"
"30",40,1,"asymptomatic",110,167,0,2,114,1,2,2,0,"reversable","Yes"
"31",69,0,"typical",140,239,0,0,151,0,1.8,1,2,"normal","No"
"32",60,1,"asymptomatic",117,230,1,0,160,1,1.4,1,2,"reversable","Yes"
"33",64,1,"nonanginal",140,335,0,0,158,0,0,1,0,"normal","Yes"
"34",59,1,"asymptomatic",135,234,0,0,161,0,0.5,2,0,"reversable","No"
"35",44,1,"nonanginal",130,233,0,0,179,1,0.4,1,0,"normal","No"
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$
```

(5) Output the last 15 lines of the data file using the appropriate command. Save the screenshot in your work.

```
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ tail -n 15 Heart.csv
"289",56,1,"nontypical",130,221,0,2,163,0,0,1,0,"reversable","No"
"290",56,1,"nontypical",120,240,0,0,169,0,0,3,0,"normal","No"
"291",67,1,"nonanginal",152,212,0,2,150,0,0.8,2,0,"reversable","Yes"
"292",55,0,"nontypical",132,342,0,0,166,0,1.2,1,0,"normal","No"
"293",44,1,"asymptomatic",120,169,0,0,144,1,2.8,3,0,"fixed","Yes"
"294",63,1,"asymptomatic",140,187,0,2,144,1,4,1,2,"reversable","Yes"
"295",63,0,"asymptomatic",124,197,0,0,136,1,0,2,0,"normal","Yes"
"296",41,1,"nontypical",120,157,0,0,182,0,0,1,0,"normal","No"
"297",59,1,"asymptomatic",164,176,1,2,90,0,1,2,2,"fixed","Yes"
"298",57,0,"asymptomatic",140,241,0,0,123,1,0.2,2,0,"reversable","Yes"
"299",45,1,"typical",110,264,0,0,132,0,1.2,2,0,"reversable","Yes"
"300",68,1,"asymptomatic",144,193,1,0,141,0,3.4,2,2,"reversable","Yes"
"301",57,1,"asymptomatic",130,131,0,0,115,1,1.2,2,1,"reversable","Yes"
"302",57,0,"nontypical",130,236,0,2,174,0,0,2,1,"normal","Yes"
"303",38,1,"nonanginal",138,175,0,0,173,0,0,1,NA,"normal","No"
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$
```

(6) Use the history command to list the last few commands, and execute the second last command in your list. Do this using both the process ID and the first letter of the command.

```
450  file Heart.csv
451  more Heart.csv
452  less Heart.csv
453  more Heart.csv
454  cd Downloads/LAB4/Heart.csv
455  cd Downloads/LAB4
456  more Heart.csv
457  head -n 35 Hewart.csv
458  head -n 35 Heart.csv
459  head -n 36 Heart.csv
460  tail -n 15 Heart.csv
461  history
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$
```

Second Last Comannd is tail -n 15 Heart.csv and the number is 460 and starts with t

```
tail -n 15 Heart.csv
"289",56,1,"nontypical",130,221,0,2,163,0,0,1,0,"reversable","No"
"290",56,1,"nontypical",120,240,0,0,169,0,0,3,0,"normal","No"
"291",67,1,"nonanginal",152,212,0,2,150,0,0.8,2,0,"reversable","Yes"
"292",55,0,"nontypical",132,342,0,0,166,0,1.2,1,0,"normal","No"
"293",44,1,"asymptomatic",120,169,0,0,144,1,2.8,3,0,"fixed","Yes"
"294",63,1,"asymptomatic",140,187,0,2,144,1,4,1,2,"reversable","Yes"
"295",63,0,"asymptomatic",124,197,0,0,136,1,0,2,0,"normal","Yes"
"296",41,1,"nontypical",120,157,0,0,182,0,0,1,0,"normal","No"
"297",59,1,"asymptomatic",164,176,1,2,90,0,1,2,2,"fixed","Yes"
"298",57,0,"asymptomatic",140,241,0,0,123,1,0.2,2,0,"reversable","Yes"
"299",45,1,"typical",110,264,0,0,132,0,1.2,2,0,"reversable","Yes"
"300",68,1,"asymptomatic",144,193,1,0,141,0,3.4,2,2,"reversable","Yes"
"301",57,1,"asymptomatic",130,131,0,0,115,1,1.2,2,1,"reversable","Yes"
"302",57,0,"nontypical",130,236,0,2,174,0,0,2,1,"normal","Yes"
"303",38,1,"nonanginal",138,175,0,0,173,0,0,1,NA,"normal","No"
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ !t
tail -n 15 Heart.csv
"289",56,1,"nontypical",130,221,0,2,163,0,0,1,0,"reversable","No"
"290",56,1,"nontypical",120,240,0,0,169,0,0,3,0,"normal","No"
"291",67,1,"nonanginal",152,212,0,2,150,0,0.8,2,0,"reversable","Yes"
"292",55,0,"nontypical",132,342,0,0,166,0,1.2,1,0,"normal","No"
"293",44,1,"asymptomatic",120,169,0,0,144,1,2.8,3,0,"fixed","Yes"
"294",63,1,"asymptomatic",140,187,0,2,144,1,4,1,2,"reversable","Yes"
"295",63,0,"asymptomatic",124,197,0,0,136,1,0,2,0,"normal","Yes"
"296",41,1,"nontypical",120,157,0,0,182,0,0,1,0,"normal","No"
"297",59,1,"asymptomatic",164,176,1,2,90,0,1,2,2,"fixed","Yes"
"298",57,0,"asymptomatic",140,241,0,0,123,1,0.2,2,0,"reversable","Yes"
"299",45,1,"typical",110,264,0,0,132,0,1.2,2,0,"reversable","Yes"
"300",68,1,"asymptomatic",144,193,1,0,141,0,3.4,2,2,"reversable","Yes"
"301",57,1,"asymptomatic",130,131,0,0,115,1,1.2,2,1,"reversable","Yes"
"302",57,0,"nontypical",130,236,0,2,174,0,0,2,1,"normal","Yes"
"303",38,1,"nonanginal",138,175,0,0,173,0,0,1,NA,"normal","No"
```

7. The sort command. For each of the exercises below, find the correct combination of options for the sort command using the man pages. Make sure to show your sequence of steps clearly in your submission work.

(i) Sort the data according to the first column, keeping in mind that the first column has numbers. Save the output in a new file called col1_sorted.out.

```
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ sort -n -k1,1 Heart.csv > col1_sorted.out
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ head col1_sorted.out
"100",48,1,"asymptomatic",122,222,0,2,186,0,0,1,0,"normal","No"
"101",45,1,"asymptomatic",115,260,0,2,185,0,0,1,0,"normal","No"
"102",34,1,"typical",118,182,0,2,174,0,0,1,0,"normal","No"
"103",57,0,"asymptomatic",128,303,0,2,159,0,0,1,1,"normal","No"
"104",71,0,"nonanginal",110,265,1,2,130,0,0,1,1,"normal","No"
"10",53,1,"asymptomatic",140,203,1,2,155,1,3.1,3,0,"reversable","Yes"
"105",49,1,"nonanginal",120,188,0,0,139,0,2,2,3,"reversable","Yes"
"106",54,1,"nontypical",108,309,0,0,156,0,0,1,0,"reversable","No"
"107",59,1,"asymptomatic",140,177,0,0,162,1,0,1,1,"reversable","Yes"
"108",57,1,"nonanginal",128,229,0,2,150,0,0.4,2,1,"reversable","Yes"
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$
```

(ii) Sort the data according to the 'Age' column. Save the output in a new file called age_sorted.out.

```
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ sort -n -k2,2 Heart.csv > age-sorted.out
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ head col1_sorted.out
"100",48,1,"asymptomatic",122,222,0,2,186,0,0,1,0,"normal","No"
"101",45,1,"asymptomatic",115,260,0,2,185,0,0,1,0,"normal","No"
"102",34,1,"typical",118,182,0,2,174,0,0,1,0,"normal","No"
"103",57,0,"asymptomatic",128,303,0,2,159,0,0,1,1,"normal","No"
"104",71,0,"nonanginal",110,265,1,2,130,0,0,1,1,"normal","No"
"10",53,1,"asymptomatic",140,203,1,2,155,1,3.1,3,0,"reversable","Yes"
"105",49,1,"nonanginal",120,188,0,0,139,0,2,2,3,"reversable","Yes"
"106",54,1,"nontypical",108,309,0,0,156,0,0,1,0,"reversable","No"
"107",59,1,"asymptomatic",140,177,0,0,162,1,0,1,1,"reversable","Yes"
"108",57,1,"nonanginal",128,229,0,2,150,0,0.4,2,1,"reversable","Yes"
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$
```

(iii) Sort the data in a reverse manner according to the 'RestBP' column. Save the output in a new file called restbp_revsort.out.

```
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ sort -nr -k3,3 Heart.csv > restbp_revsort.out
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ head restbp_revsort.out
"","Age","Sex","ChestPain","RestBP","Chol","Fbs","RestECG","MaxHR","ExAng","Oldpeak","Slope","Ca","Thal","AHD"
"99",52,1,"nontypical",134,201,0,0,158,0,0.8,1,1,"normal","No"
"98",60,0,"asymptomatic",150,258,0,2,157,0,2.6,2,2,"reversable","Yes"
"97",59,1,"asymptomatic",110,239,0,2,142,1,1.2,2,1,"reversable","Yes"
"96",52,1,"asymptomatic",128,255,0,0,161,1,0,1,1,"reversable","Yes"
"9",63,1,"asymptomatic",130,254,0,2,147,0,1.4,2,1,"reversable","Yes"
"95",63,0,"nonanginal",135,252,0,2,172,0,0,1,0,"normal","No"
"94",44,0,"nonanginal",108,141,0,0,175,0,0.6,2,0,"normal","No"
"93",62,1,"nonanginal",130,231,0,0,146,0,1.8,2,3,"reversable","No"
"92",62,0,"asymptomatic",160,164,0,2,145,0,6.2,3,3,"reversable","Yes"
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$
```

(iv) Repeat (ii) and (iii) by giving GNU-style parameters to the sort command. This is where man pages are extremely useful!

```
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ sort --numeric-sort --key=2,2 Heart.csv > age_sorted_gnu.out
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ sort --reverse --numeric-sort --key=3,3 heart.csv > restbp_revsort_gnu.out
sort: cannot read: heart.csv: No such file or directory
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ sort --reverse --numeric-sort --key=3,3 Heart.csv > restbp_revsort_gnu.out
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ls
age_restbp_sorted.out  age_sorted_gnu.out  age-sorted.out  col1_sorted.out  Heart.csv  heart_hardlink.csv  Heart_symlink.csv  new1  restbp_revsort_gnu.out  restbp_revsort.out  sex-age_cp_sorted.out
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ head age_sorted_gnu.out
"100",48,1,"asymptomatic",122,222,0,2,186,0,0,1,0,"normal","No"
"101",45,1,"asymptomatic",115,260,0,2,185,0,0,1,0,"normal","No"
"102",34,1,"typical",118,182,0,2,174,0,0,1,0,"normal","No"
"103",57,0,"asymptomatic",128,303,0,2,159,0,0,1,1,"normal","No"
"104",71,0,"nonanginal",110,265,1,2,130,0,0,1,1,"normal","No"
"10",53,1,"asymptomatic",140,203,1,2,155,1,3.1,3,0,"reversable","Yes"
"105",49,1,"nonanginal",120,188,0,0,139,0,2,2,3,"reversable","Yes"
"106",54,1,"nontypical",108,309,0,0,156,0,0,1,0,"reversable","No"
"107",59,1,"asymptomatic",140,177,0,0,162,1,0,1,1,"reversable","Yes"
"108",57,1,"nonanginal",128,229,0,2,150,0,0.4,2,1,"reversable","Yes"
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ restbp_revsort_gnu.out
restbp_revsort_gnu.out: command not found
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ head restbp_revsort_gnu.out
"","Age","Sex","ChestPain","RestBP","Chol","Fbs","RestECG","MaxHR","ExAng","Oldpeak","Slope","Ca","Thal","AHD"
"99",52,1,"nontypical",134,201,0,0,158,0,0.8,1,1,"normal","No"
"98",60,0,"asymptomatic",150,258,0,2,157,0,2.6,2,2,"reversable","Yes"
"97",59,1,"asymptomatic",110,239,0,2,142,1,1.2,2,1,"reversable","Yes"
"96",52,1,"asymptomatic",128,255,0,0,161,1,0,1,1,"reversable","Yes"
"9",63,1,"asymptomatic",130,254,0,2,147,0,1.4,2,1,"reversable","Yes"
"95",63,0,"nonanginal",135,252,0,2,172,0,0,1,0,"normal","No"
"94",44,0,"nonanginal",108,141,0,0,175,0,0.6,2,0,"normal","No"
"93",62,1,"nonanginal",130,231,0,0,146,0,1.8,2,3,"reversable","No"
"92",62,0,"asymptomatic",160,164,0,2,145,0,6.2,3,3,"reversable","Yes"
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$
```

(v) Sort the data first according to age, and then according to RestBP. How would you do this? Explain the steps clearly.

```
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ sort -n -k2,2 -k3,3 Heart.csv > age_restbp_sorted.out
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ls
age_restbp_sorted.out  age-sorted.out  col1_sorted.out  Heart.csv  heart_hardlink.csv  Heart_symlink.csv  restbp_revsort.out
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ head age_restbp_revsort.out
head: cannot open 'age_restbp_revsort.out' for reading: No such file or directory
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ head age_restbp_sorted.out
"100",48,1,"asymptomatic",122,222,0,2,186,0,0,1,0,"normal","No"
"101",45,1,"asymptomatic",115,260,0,2,185,0,0,1,0,"normal","No"
"102",34,1,"typical",118,182,0,2,174,0,0,1,0,"normal","No"
"103",57,0,"asymptomatic",128,303,0,2,159,0,0,1,1,"normal","No"
"104",71,0,"nonanginal",110,265,1,2,130,0,0,1,1,"normal","No"
"10",53,1,"asymptomatic",140,203,1,2,155,1,3.1,3,0,"reversable","Yes"
"105",49,1,"nonanginal",120,188,0,0,139,0,2,2,3,"reversable","Yes"
"106",54,1,"nontypical",108,309,0,0,156,0,0,1,0,"reversable","No"
"107",59,1,"asymptomatic",140,177,0,0,162,1,0,1,1,"reversable","Yes"
"108",57,1,"nonanginal",128,229,0,2,150,0,0.4,2,1,"reversable","Yes"
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$
```

(vi) Sort the data according to sex, then according to age, then according to ChestPain. Explain the steps clearly.

Assuming Sex- 5
        Age- 6
        Chest pain – 7

```
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ sort -k5,5 -k6,6 -k7,7 Heart.csv > sex-age_cp_sorted.out
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ ls
age_restbp_sorted.out   age-sorted.out   col1_sorted.out   Heart.csv   heart_hardlink.csv   Heart_symlink.csv   restbp_revsort.out   sex-age_cp_sorted.out
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$ head sex-age_cp_sorted.out
"100",48,1,"asymptomatic",122,222,0,2,186,0,0,1,0,"normal","No"
"101",45,1,"asymptomatic",115,260,0,2,185,0,0,1,0,"normal","No"
"102",34,1,"typical",118,182,0,2,174,0,0,1,0,"normal","No"
"103",57,0,"asymptomatic",128,303,0,2,159,0,0,1,1,"normal","No"
"104",71,0,"nonanginal",110,265,1,2,130,0,0,1,1,"normal","No"
"10",53,1,"asymptomatic",140,203,1,2,155,1,3.1,3,0,"reversable","Yes"
"105",49,1,"nonanginal",120,188,0,0,139,0,2,2,3,"reversable","Yes"
"106",54,1,"nontypical",108,309,0,0,156,0,0,1,0,"reversable","No"
"107",59,1,"asymptomatic",140,177,0,0,162,1,0,1,1,"reversable","Yes"
"108",57,1,"nonanginal",128,229,0,2,150,0,0.4,2,1,"reversable","Yes"
ibab@IBAB-MSc-BDB-Comp06:~/Downloads/LAB4$
```