Lab 1

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Grading policy: GP 517

- Mid sem exam: 30%

- End sem exam: 40%

- Lab assignments: 30%

Objectives

- In this class, we will be processing a 2D line "Viking Graben": http://s3.amazonaws.com/open.source.geoscience/open_data/Mobil_Avo_Viking_Graben_Line_12/mobil_avo.html

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Seis see

- Install seis see software on your laptops and load the data. It lets you view the data and do some limited processing. You can compare processing steps with Seis See and Seismic Unix.

Unix commands

- Login: seismiclab :: seismiclab

- Open Terminal

- Type following commands:

  - cd /home/seismiclab *(go to the directory seismiclab)*

  - pwd *(shows which directory you are in)*

  - ls -lh *(lists the contents of the directory and their sizes)*

  - mkdir your_name *(for e.g. bshekar)*

  - cd your_name

  - mkdir Viking_graben

  - move the vikinggraben.segy file to this directory: you may use the mouse if you like to do so

SU command structure

- suprogram < indata > outdata optional_parameters

- suprogram: Some SU program

- < denotes input to the program

- > is the output of the program

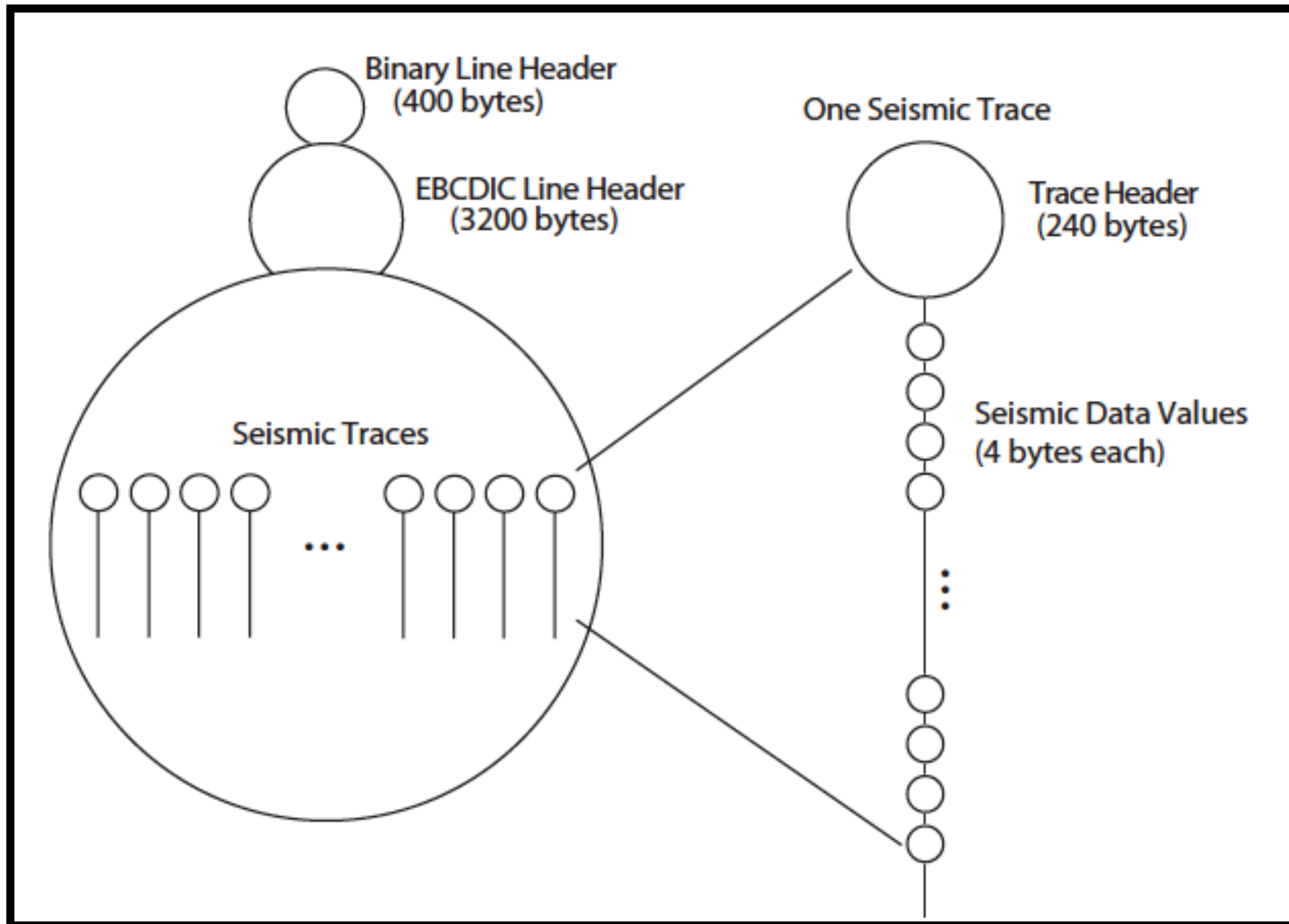- the program may require some additional parameters to be specified

SU commands

- You can find the name of the programs to do specific tasks by using the following help feature:

  - $ suname read *(henceforth, commands to be typed in the terminal will be denoted by the shorthand "$" sign)*

  - $ suname read —> lists all programs with associated keyword "read"

  - the command "segyread" can read segy data. To understand how it works, simply type:

  - $ segyread

  - Typing the name of the command brings up the manual and how the particular program works

Reading SEG-Y data
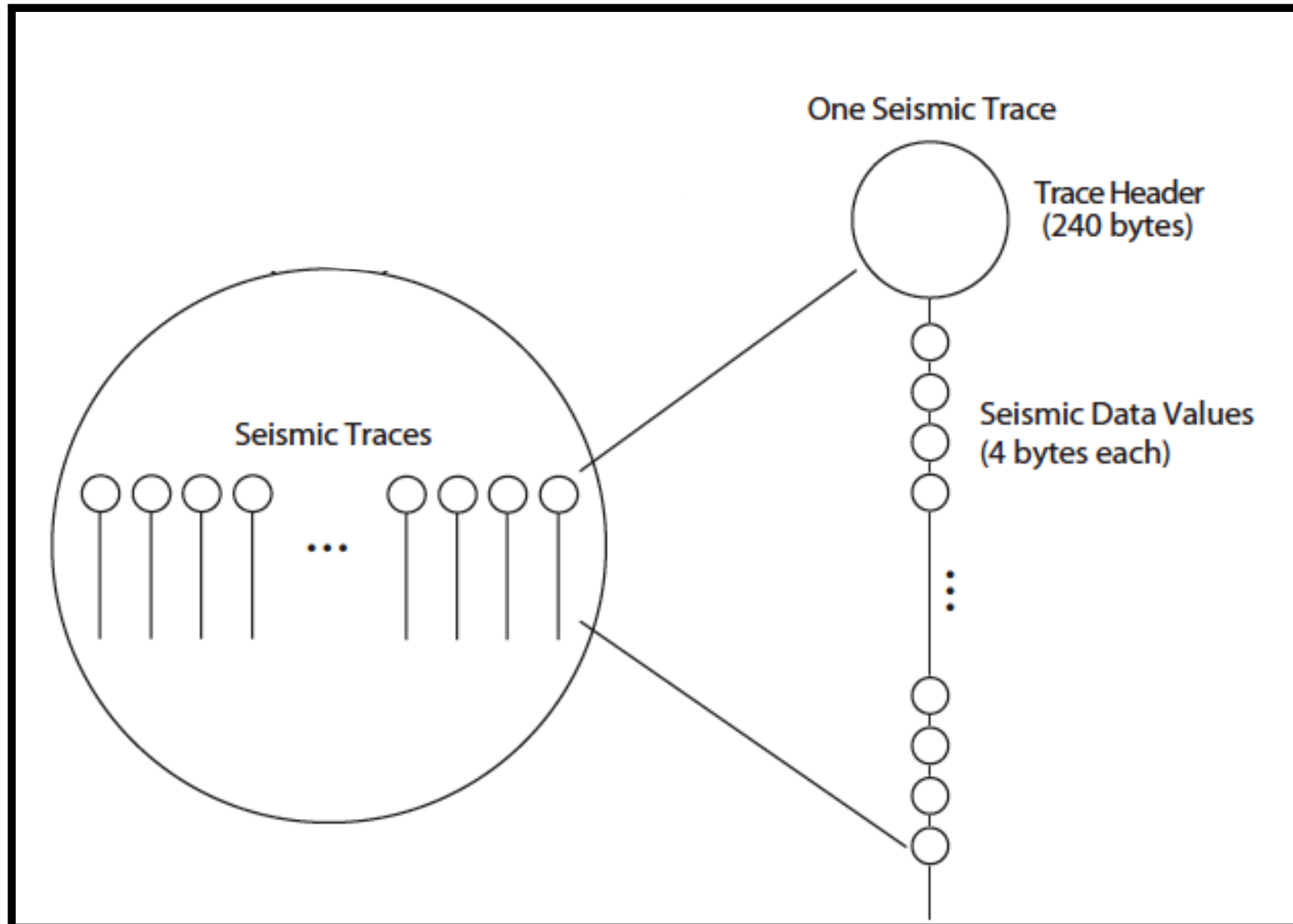
- $ segyread tape=seismic.segy hfile=vikinggraben_ebcdic_hdr bfile=vikinggraben_bin_hdr > vikinggraben.su

- Now convert ebcdic header to ascii:

  - $ dd if=vikinggraben_ebcdic_hdr of=vikinggraben_ebcdic conv=ascii

- Read the ebcdic header using:

  - $ gedit vikinggraben_ebcdic

  - .. compare with "seis see"

SEG-Y data format

Source: 3D seismology, Chris Liner

SU data format

One Seismic Trace

Trace Header
(240 bytes)

Seismic Traces

Seismic Data Values
(4 bytes each)

...

Stripping away trace headers

- $ sustrip < vikinggraben.su > vikinggraben.bin head=vikinggraben_trace_hdrs

- $ ls -lh

    - observe the *size* of the trace headers, can you verify if the trace header is 240 bytes multiplied by the number of traces?

Trace headers

- $ surange < vikinggraben.su

  - what does ep, sx, gx.. etc mean?

  - $ sukeyword sx

    (to get out of sukeyword putput, just hit 'q' on your keyboard)

  - compare this with what you saw with Seis See.. number of traces, shots (ep), receivers etc

More headers

- You can output headers to an ascii file by:

    - $ sugethw < vikinggraben.su key=sx,gx,sy,gy,offset,cdp output=geom > asciihdrs_VG.asc

    - *here I wrote sx,gx, … and so on in "geometry" mode on to the ascii file*

Sorting data

- Sort the data with increasing cdp and offset:

  - $ susort < vikinggraben.su > cdpsorted_VG.su cdp offset

Viewing and Windowing data

- The data can be viewed as wiggles by:

  - $ suxwigb < cdpsorted_VG.su key=tracl & —> this will not work as there are a lot of traces

  - One can instead window to view a few CDPS:

    - $ suwind < cdpsorted_VG.su key=cdp min=101 max=105 | suxwigb key=tracl & —> Here I used the pipe | so I could use multiple commands on the dataset, without saving any intermediate files. Note that the "key" parameter controls the x-axis parameter. One can use key to plot the data as a function of source or receiver coordinates, CDP numbers, etc.

    - one can also plot the data with a certain amount of clipping:

      $ suwind < cdpsorted_VG.su key=cdp min=101 max=105 | suxwigb key=tracl perc=99 & —> Here the "perc" parameter controls the amount of clipping. In this instance, the top 1 percentile of the data has been discarded and the rest are plotted.

- Now we will create the "near trace gather" just like we did in Seis See. Use the SU command **suwind** to generate the near trace gather ntg_VG.su (hint: use *key=offset min=x max =x* as optional parameters, where *x* is a number that is the minimum offset in the data.

    - View the near trace gather using:

    - $ suxwigb < ntg_VG.su key=cdp &

    - $ suximage < ntg_VG.su perc=99 &