

Quiz navigation

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Finish review

Started on Sunday, July 24, 2022, 5:08 PM
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Completed on Sunday, July 24, 2022, 6:41 PM
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Marks 32/14/40.00
Grade 80.35 out of 100.00

Question 1

Correct

1.00 points out of 1.00

Flag question

For this assignment we will be using a set of `perl` scripts created by IRIS DMC staff to make the `event`, `station`, and `dataset` web services easier to use from the command line in linux. Each of these scripts starts with the word `Fetch`, so they are often called the Fetch scripts.
To begin with, create a directory called `fetch` inside the `irisdmcc` directory you would have made in an earlier assignment, and then `cd` into the new `fetch` directory.
The executable Fetch scripts reside in a common location for programs on your OSL desktop and you can list them using this command:

```
(iris) $ls /usr/local/bin/Fetch*
```


Which of the following scripts are available for you to use?

Select one or more:

- ☒ a. FetchMetadata ✓ 1 of 4 correct answers
- ☐ b. FetchTimeseries
- ☒ c. FetchData ✓ 1 of 4 correct answers
- ☐ d. FetchStation
- ☒ e. FetchEvent ✓ 1 of 4 correct answers
- ☒ f. FetchSyn ✓ 1 of 4 correct answers

Check

Correct
Marks for this submission: 1.00/1.00.

Question 2

Correct

1.00 points out of 1.00

Flag question

We will start by using the `FetchEvent` script to identify some earthquakes of interest. Go ahead and run this command to see a summary of how to use the script:

```
(iris) $ls /usr/local/bin/irisdmcc/Fetch* FetchEvent
```


Which of the following are options available with this script?

Select one or more:

- ☐ a. --starttime
- ☒ b. --lat min:max ✓ 1 of 7 correct answers
- ☐ c. --endtime
- ☒ d. --depth min:max ✓ 1 of 7 correct answers
- ☐ e. --lat min:max
- ☒ f. --radius lat:lon:maxradius[minradius] ✓ 1 of 7 correct answers
- ☐ g. --mag min:max
- ☒ h. --mag min:max ✓ 1 of 7 correct answers
- ☒ i. --s starttime ✓ 1 of 7 correct answers
- ☐ j. --radius lat:lon:maxradius[minradius]
- ☐ k. --lon min:max
- ☒ l. --e endtime ✓ 1 of 7 correct answers
- ☐ m. --depth min:max
- ☒ n. --lon min:max ✓ 1 of 7 correct answers

Check

Correct
Marks for this submission: 1.00/1.00.

Question 3

Correct

0.67 points out of 1.00

Flag question

This assignment will focus on learning more about the Magnitude 6.4 Puerto Rico earthquake that occurred on January 7, 2020. Which of the following options would correctly specify the start and end time to find this earthquake?

Select one:

- ☐ a. --s 2020-01-07 --e 2020-01-07
- ☐ b. --s 2020-01-07 --e 2020-01-08
- ☐ c. --s 2020-01-07 --e 2020-01-07
- ☐ d. --s 2020/01/07 --e 2020/01/08
- ☐ e. --s 2020/01/07 --e 2020/01/07
- ☐ f. --s 2020/01/07 --e 2020/01/07
- ☒ g. --s 2020-01-07 --e 2020-01-08 ✓
- ☐ h. --s 2020/01/07 --e 2020/01/08

Check

Correct
Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.67/1.00.

Question 4

Correct

1.00 points out of 1.00

Flag question

Which option would correctly specify a magnitude range of 6 to 7 to find this earthquake?

Answer: ✓

Check

Correct
Marks for this submission: 1.00/1.00.

Question 5

Correct

1.00 points out of 1.00

Flag question

Now go ahead and run the `FetchEvent` command with the magnitude, start and end time limits to retrieve a list of earthquakes. How many earthquakes are in the returned list?

Answer: ✓

Check

Correct
Marks for this submission: 1.00/1.00.

Question 6

Correct

1.00 points out of 1.00

Flag question

You already know the date of the earthquake, but what is the origin time of the earthquake? It should be in the format: HH:MM:SS.SSS. Remember we just want the time, NOT the year, month and day.

Answer: ✓

Check

Correct
Marks for this submission: 1.00/1.00.

Question 7

Correct

1.00 points out of 1.00

Flag question

What is the latitude of the earthquake?

Answer: ✓

Check

Correct
Marks for this submission: 1.00/1.00.

Question 8

Correct

1.00 points out of 1.00

Flag question

What is the longitude of the earthquake?

Answer: ✓

Check

Correct
Marks for this submission: 1.00/1.00.

Question 9

Correct

1.00 points out of 1.00

Flag question

Next we will do a search for events (all magnitudes) within about 20 km (0.2 degrees) of the magnitude 6.4 earthquake. What options for the `FetchEvent` command would accomplish this?

Select one:

- ☐ a. --lat 17.8672:20 --lon -66.828:20
- ☐ b. --lon 17.8672:2 --lat -66.828:0.2
- ☐ c. --radius -66.828:17.8672:20
- ☐ d. --lat 17.8672:2 --lon -66.828:0.2
- ☐ e. --radius 17.8672:-66.828:20
- ☒ f. --radius 17.8672:-66.828:0.2 ✓
- ☐ g. --radius -66.828:17.8672:0.2
- ☐ h. --lon 17.8672:20 --lat -66.828:20

Check

Correct
Marks for this submission: 1.00/1.00.

Question 10

Correct

1.00 points out of 1.00

Flag question

Now you should run the `FetchEvent` command with correct answer from the previous question and a start and end time that is a month before and after the date of the earthquake. You should store the output of this command as a file called `indios.txt` so you can use this list of earthquakes. Which command would list the number of earthquakes in the file returned by `FetchEvent`?

Answer: ✓

Check

Correct
Marks for this submission: 1.00/1.00.

Question 11

Correct

0.33 points out of 1.00

Flag question

How many earthquakes were returned by `FetchEvent`?

Answer: ✓

Check

Correct
Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.33/1.00.

Question 12

Correct

1.00 points out of 1.00

Flag question

Different characters can be used to separate columns of information in text files. We call these field delimiters. The most common is a space, but when you download a file of earthquakes, you may see that the columns are separated by a comma (",") or a vertical bar ("|").
`awk` expects each column of information to be separated by a space unless you directly tell it otherwise. Fortunately, there is an option in `awk` to set the field delimiter: `-F`.
For example, let's say this is the first line in our text file (`file.txt`): `2019-12-08T06:03:43.490,17.996,-66.7546,16`
Each column is separated by a comma, however, if we were to type `awk '{print $1}' file.txt` in the command line, `2019-12-08T06:03:43.490,17.996,-66.7546,16` would be returned as there are no spaces in between the columns. So, `awk` thinks that is one column.
If we instead were to type `awk -F "," '{print $1}' file.txt` we would get `2019-12-08T06:03:43.490` in return as the `-F "field delimiter"` tells `awk` that each column is separated by a comma. It is important to note that the `-F "field delimiter"` goes before the first apostrophe.
Use the `head` command to look at the first 10 lines of the `indios.txt` file you created. What is the field delimiter that separates the columns of information in this file?

Answer: ✓

Check

Correct
Marks for this submission: 1.00/1.00.

Question 13

Correct

1.00 points out of 1.00

Flag question

Which column number has the date time information?

Answer: ✓

Check

Correct
Marks for this submission: 1.00/1.00.

Question 14

Correct

1.00 points out of 1.00

Flag question

Which column number has the magnitude information?

Answer: ✓

Check

Correct
Marks for this submission: 1.00/1.00.

Question 15

Not answered

1.00 points out of 1.00

Flag question

Place the following in the correct order for an `awk` command to create an output file called `indios.date.mag` that has the date time information in the first column and the magnitude information in the second column.

awk

Choose...

,

Choose...

\$9

Choose...

-F "|"

Choose...

}'

Choose...

indios.txt

Choose...

indios.date.mag

Choose...

>!

Choose...

\$2

Choose...

{print

Choose...

Check

Correct
Marks for this submission: 1.00/1.00.

Question 16

Correct

0.67 points out of 1.00

Flag question

Go ahead and run the command in the order you identified from the previous question. Then use the `head` command to look at the first 10 lines of the `indios.date.mag` file you created. I would like you to plot the magnitudes over time in GMT, but the time format GMT expects is `YYYY-MM-DDThh:mm:ss.sss` and magnitude in a decimal value so we need to see if the output is in the right format. Which of the following are issues with the format of the `indios.date.mag` file?

Select one or more:

- ☐ a. magnitudes are listed as integers instead of decimals

- ☐ b. time is in the wrong format
- ☒ c. date is in the wrong format ✓ 1 of 3 correct answers
- ☒ d. magnitude has text indicating the type of magnitude measurement ✓ 1 of 3 correct answers
- ☒ e. date and time do not have a T between them ✓ 1 of 3 correct answers

Check

Correct
Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.67/1.00.

Question 17

Correct
0.33 points out of 1.00
Flag question

We can overcome these problems by doing three things:
1. substitute a ":" for a "T" in the date
2. substitute a "T" for a ":" in the original date-time column
3. split the magnitude column by ":"

If you recall from Module 1, **awk** is powerful text processor that can accomplish all of the above by applying these commands on the original **indios.txt** file:

- gsub("T",".")
- sub(":", "T", \$2)
- split(\$9, s, ":") (\$9 is the column you want to split, s is the variable you will use to refer to the new columns as, and ":" tells awk to split the column at the ":". You can then use [] to refer to the new column numbers. For example after you split the magnitude column, s[1] would refer to the 1st column)

We can combine these commands at once by separating them with a semicolon. After performing these commands, we want to isolate the correct date-time (column 9) and magnitude (part of the new variable s). Then, we want to put the date-time and magnitude into a new file, which we'll call **indios.tm**.

Putting all of this together, which of the following is the full awk command we need to solve the three problems and create indios.tm? **Read through each answer choice carefully!**

- Select one:
- ☐ a. awk -F "T" '{gsub("T",".");sub(":", "T", \$2);split(\$9, s, ":");print \$2, s}' indios.txt >| indios.tm
- ☐ b. awk -F "T" '{gsub("T",".");sub(":", "T", \$2);split(\$9, s, ":");print sub, split}' indios.txt >| indios.tm
- ☒ c. awk -F "T" '{gsub("T",".");sub(":", "T", \$2);split(\$9, s, ":");print \$2, s[20]}' indios.txt >| indios.tm ✓ Correct, go ahead and run this full command.
- ☐ d. awk -F "T" '{gsub("T",".");sub(":", "T", \$2);split(\$9, s, ":");print \$2, T}' indios.txt | indios.tm
- ☐ e. awk -F "T" '{gsub("T",".");sub(":", "T", \$2);split(\$9, s, ":");print \$2, s[20]}' indios.txt | indios.tm
- ☐ f. awk -F "T" '{gsub("T",".");sub(":", "T", \$2);split(\$9, s, ":");print T, s}' indios.txt >| indios.tm

Check

Correct
Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.33/1.00.

Question 18

Correct
1.00 points out of 1.00
Flag question

Make sure you have run the full awk command from the previous question to create **indios.tm**. Then you can plot **indios.tm** using GMT. Which GMT command should we use to plot magnitude versus time?

- Select one:
- ☒ a. psxy ✓
- ☐ b. gv
- ☐ c. plotxy
- ☐ d. psetxt
- ☐ e. plot

Check

Correct
Marks for this submission: 1.00/1.00.

Question 19

Correct
0.33 points out of 1.00
Flag question

In GMT, we need to specify our plot range to indicate when values are in the date-time format. We do this by listing the date-time value with a "T" after it. Which of the following would specify the date-time range of our downloaded events and a magnitude range of 0 to 6.5 for GMT?

- Select one:
- ☐ a. -R2019-12-01T2020-02-01T/0/6.5
- ☐ b. -R0/6.5/T2019-12-01/T2020-02-01
- ☐ c. -R0/6.5/2019-12-01T2020-02-01T
- ☐ d. -RT2019-12-01T2020-02-01/0/6.5
- ☐ e. -R0/6.5/T2019-12-01/T2020-02-01
- ☒ f. -R2019-12-01T2020-02-01T/0/6.5 ✓

Check

Correct
Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.33/1.00.

Question 20

Correct
0.67 points out of 1.00
Flag question

Specifying the axis border in GMT for calendar time can be rather complicated. You can learn some more about the GMT -B option by reviewing the manual page for the `psbasemap` command using `gmt psbasemap`.

There are plenty of details in there, but if you focus on the -B information towards the top, I am hoping it will help when thinking about this question. For our plot, we are going to specify a primary X-axis that has tick marks for each day and a number for each week. Then the secondary X-axis will label the month, and label the Y-axis with a number every 1 and minor tick marks every 0.2. It turns out you can specify the primary and secondary axes with a separate -B option, so we will need two -B options to accomplish this. Which of the following would we need?

- Select one or more:
- ☐ a. -Bsa7R1dS
- ☐ b. -Bsa1MS/a1f.2W
- ☐ c. -Bpa1OS/a1f.2W
- ☐ d. -Bsa1OS
- ☒ e. -Bsa1OS/a1f.2W ✓ 1 of 2 correct answers
- ☒ f. -Bpa7R1dS ✓ 1 of 2 correct answers
- ☐ g. -Bpa7R1dS/a1f.2W
- ☐ h. -Bpa7W1dS

Check

Correct
Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.67/1.00.

Question 21

Correct
0.88 points out of 1.00
Flag question

Now you should put it together. Which of the following would be needed for the full GMT command?

- Select one or more:
- ☒ a. -R2019-12-01T2020-02-01T/0/6.5 ✓ 1 of 8 correct answers.
- ☒ b. -Bpa7R1dS ✓ 1 of 8 correct answers.
- ☒ c. -JX9/6 ✓ 1 of 8 correct answers.
- ☒ d. -Bsa1OS/a1f.2W ✓ 1 of 8 correct answers.
- ☒ e. -Sc.03 ✓ 1 of 8 correct answers.
- ☐ f. plot
- ☐ g. indios.txt
- ☐ h. -JM7
- ☒ i. gmt psxy ✓ 1 of 8 correct answers.
- ☒ j. indios.tm ✓ 1 of 8 correct answers.
- ☒ k. >| indios.ps ✓ 1 of 8 correct answers.

Check

Go ahead and run the full command:
gmt psxy indios.tm -R2019-12-01T2020-02-01T/0/6.5 -JX9/6 -Sc.03 -Bpa7R1dS -Bsa1OS/a1f.2W >| indios.ps

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.88/1.00.

Question 22

Correct
1.00 points out of 1.00
Flag question

Which command would you run to view the output postscript file?

Answer: **gv indios.ps &**

Check

Correct
Marks for this submission: 1.00/1.00.

Question 23

Correct
1.00 points out of 1.00
Flag question

How would you characterize the seismicity before the Magnitude 6.4 earthquake "mainshock" on January 7, 2020?

- Select one:
- ☐ a. There was a burst of seismicity about a week earlier, but it died down to background levels before the mainshock.
- ☐ b. There were very few earthquakes until the day before the mainshock.
- ☐ c. There were very few earthquakes before the mainshock.
- ☒ d. There were several different bursts of seismicity in the 10 days leading up to the mainshock. ✓
- ☐ e. There was gradually increasing seismicity in the month leading up to the mainshock.

Check

Correct
Marks for this submission: 1.00/1.00.

Question 24

Correct
1.00 points out of 1.00
Flag question

How would you characterize the seismicity after the Magnitude 6.4 earthquake "mainshock" on January 7, 2020?

- Select one:
- ☐ a. There were very few earthquakes after the mainshock.
- ☐ b. There were several separated bursts of seismicity in the 10 days after the mainshock.
- ☐ c. There were many earthquakes right after the mainshock but very few earthquakes a week after the mainshock.
- ☒ d. There was a lot of seismicity after the mainshock that decayed gradually with many still occurring a month later. ✓
- ☐ e. There was a burst of seismicity about a week later, but it died down to background levels within a month.

Check

Correct
Marks for this submission: 1.00/1.00.

Question 25

Correct
1.00 points out of 1.00
Flag question

How would you characterize the magnitude pattern of this earthquake sequence? Choose all that apply.

- Select one or more:
- ☒ a. The largest magnitude event is in the middle of the sequence. ✓ 1 of 2 correct answers.
- ☐ b. The largest magnitude event is near the end of the sequence.
- ☐ c. There are no earthquakes within 2.0 magnitude units of the largest earthquake.
- ☐ d. There are no earthquakes within 1.0 magnitude units of the largest earthquake.
- ☒ e. There are several earthquakes within 1.0 magnitude units of the largest earthquake. ✓ 1 of 2 correct answers.
- ☐ f. The largest magnitude event is the first in the sequence.

Check

Correct
Marks for this submission: 1.00/1.00.

Question 26

Correct
1.00 points out of 1.00
Flag question

Which of the following would best describe this sequence?

- Select one:
- ☒ a. A mixture of swarm and aftershock properties. ✓
- ☐ b. No patterns of either a swarm or aftershock sequence.
- ☐ c. A traditional mainshock-aftershock sequence.
- ☐ d. An earthquake swarm.

Check

Correct
Marks for this submission: 1.00/1.00.

Question 27

Correct
0.67 points out of 1.00
Flag question

Next we will request some seismic data from the largest events, but we need to decide which station to request. You can use the `FetchMetadata` script to help with this. Run the `FetchMetadata` script to get the help summary of the options available and their format. Then run `FetchMetadata` to find stations in the Puerto Rico network (PR) with the BHZ or HHZ channel, using the start time the same as your two month `FetchEvent` search. For the **end time you want to use the same day as the largest event** to ensure that the station is recording during the event. You should store the output in **sta.txt** file. Which of the following options is needed for this?

- Select one or more:
- ☐ a. -n PR
- ☒ b. -s 2019-12-07 ✓
- ☐ c. --s 2019-12-07
- ☐ d. >| sta.txt
- ☒ e. -o sta.txt ✓
- ☒ f. -C BHZ,HHZ ✓
- ☐ g. -c BHZ,HHZ
- ☒ h. -N PR ✓
- ☒ i. --e 2020-01-07 ✓
- ☐ j. --e 2020-01-07

Check

Go ahead and run the full command if you haven't already: `FetchMetadata -N PR -C BHZ,HHZ -s 2019-12-07 -e 2020-01-07 -o sta.txt`

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives 0.67/1.00.

Question 28

Correct
0.27 points out of 1.00
Flag question

Take a look at the **sta.txt** file you created. It would be ideal to look at the recordings closest to the earthquake, so we should sort the stations by their proximity to the earthquake location. There are several ways to do this, but each will require that we extract the longitude and latitude information from the **sta.txt** file. I will suggest we extract the longitude (x), latitude (y), and name (n) of each station into a file called **sta.xyn**

Which of the following would be needed to accomplish this using awk?

- Select one or more:
- ☐ a. {
- ☐ b. print \$5,\$6,\$2'
- ☐ c. sort }
- ☒ d. -F "T" ✓
- ☒ e. 'NR-1{ ✓
- ☐ f. split(\$0, s, "T");
- ☒ g. print \$6,\$5,\$2' ✓

- ☒ h. awk ✓

☐ i. sta.xyn >> sta.txt

☒ j. sta.txt >| sta.xyn ✓
- Check

Go ahead and run the full command if you haven't already: `awk -F ' ' 'NR>1{print $6,$5,$2}' sta.txt >| sta.xyn`

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives **0.27/1.00**.

Question 29

Correct

0.67 points out of 1.00

Flag question

As I mentioned in the previous question, there are several ways to sort the station locations by distance from the largest earthquake, including using the `distanc` web service like we have in a previous assignment. I would like to teach you how to calculate the distance using a GMT command called `mapproject`. This command takes input from a file that has longitude and latitude in the first two columns, and then can calculate a variety of things based on that input. The `-G` option calculates the distance between the input locations and either a point or a line. We will use `-G -66.828/17.8672+uk` to calculate the distance from the earthquake location in Kilometers. Since the input file `sta.xyn` has 3 columns, the output will add the distance calculation as the third column (the column after the latitude. Any trailing columns will be added after the distance, which is why the station name will be in column 4 now). Go ahead and try this command:

```
(iris) jqc@ecs:/work/username1:~/irisdemo/fetch> gmt mapproject sta.xyn -G -66.828/17.8672+uk | sort -k 3 -n >| sta.xynd
```

You can use `head` or `gedit` to see the results. What is the closest station to the largest earthquake?

Answer: **MLPR** ✓

Check

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives **0.00/1.00**.

Question 30

Correct

0.67 points out of 1.00

Flag question

How far away is the station from the largest earthquake?

Answer: **25.5355874857** ✓

Check

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives **0.67/1.00**.

Question 31

Correct

0.67 points out of 1.00

Flag question

Now we should request the data for this station using the FetchData script. Run the FetchData script to get the help summary of the options available and their format. We will run FetchData with the network, station, and channel name specified, along with the start time (origin time of the earthquake), 50S for the endtime (to indicate we want 50 seconds of seismogram). I would recommend you send the output to a file called `indios.mseed` and the metadata to a file called `indios.meta` with the `-o` and `-m` options respectively. Which of the following would be needed to accomplish the data request with these specifications?

Select one or more:

☐ a. -o PR -s MLPR

☒ b. -C BHZ,HHZ ✓ 1 of 5 correct answers

☒ c. FetchData ✓ 1 of 5 correct answers

☒ d. -s 2020-01-07.08:24:25.143 -e 50S ✓ 1 of 5 correct answers

☐ e. -e 2020-01-07.08:24:25.143 -s 50S

☐ f. -m indios.mseed -o indios.meta

☐ g. -e BHZ,HHZ

☒ h. -o indios.mseed -m indios.meta ✓ 1 of 5 correct answers

☒ i. -N PR -S MLPR ✓ 1 of 5 correct answers

☐ j. FetchMetadata

Check

Go ahead and run the full command if you haven't already: `FetchData -N PR -S MLPR -C BHZ,HHZ -s 2020-01-07.08:24:25.143 -e 50S -o indios.mseed -m indios.meta`

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives **0.67/1.00**.

Question 32

Correct

1.00 points out of 1.00

Flag question

Now you will need to convert miniseed and metadata files into a SAC file. You can accomplish this with `mseed2sac` command provided by IRIS staff. Run `mseed2sac -h` to get the help summary of the options available and their format. What would be the correct way to run this with the files we downloaded using FetchData?

Select one:

☒ a. mseed2sac indios.mseed -m indios.meta ✓

☐ b. mseed2sac indios.meta -m indios.mseed

☐ c. mseed2sac indios.meta -ms indios.mseed

☐ d. mseed2sac indios.mseed -meta indios.meta

Check

Correct

Marks for this submission: 1.00/1.00.

Question 33

Correct

1.00 points out of 1.00

Flag question

Go ahead and run the correct answer from the previous question. What is the file it produced?

Answer: **PR.MLPR.BHZ.M.2020.007.082425.SAC** ✓

Check

Correct

Marks for this submission: 1.00/1.00.

Question 34

Correct

0.67 points out of 1.00

Flag question

Now open sac, read the file you identified in the previous question, and plot the seismogram. It may look like a normal seismogram at first glance, but you will likely find something unusual if you zoom in. Try changing the limits of the x-axis to be from 18 to 20 seconds. What do you notice about the seismic signal that is unusual?

Select one:

☐ a. The seismogram changes from low frequency energy to high frequency energy.

☒ b. The seismogram gets flat at the top and bottom of the amplitude range. ✓

☐ c. The seismogram changes from small amplitude at the beginning to large amplitude at the end.

☐ d. The seismogram stops abruptly during this time frame.

☐ e. The seismogram is missing data points during this time frame.

Check

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives **0.67/1.00**.

Question 35

Correct

1.00 points out of 1.00

Flag question

This observation is typically referred to as "clipping". It means the ground shaking is big enough that the seismic signal reaches the maximum and/or minimum level that the acquisition system can record and then artificially stops there. You can look at the minimum and maximum level in the SAC file header variables DEPMIN and DEPMAX (DEP stands for DEpendent variable) using the `lh` command. What appears to be the maximum level the acquisition system can record?

Select one:

☐ a. 100000000000

☐ b. 10000000

☒ c. 10000000 ✓

☐ d. 10000000000

☐ e. 1000000000

Check

Correct

Marks for this submission: 1.00/1.00.

Question 36

Correct

0.67 points out of 1.00

Flag question

A seismogram that is clipped can be problematic for analysis since it has artificial parts to it, so we should look for a station where the signal is not clipped. We can use radius option of FetchData to retrieve other recordings within a degree (~100 km) of the earthquake. Reviewing the help summary for FetchData, which radius option would we need?

Select one:

☒ a. --radius 17.8672 -66.828:1 ✓

☐ b. --radius 17.8672 -66.828:100

☐ c. --radius 17.8672 -66.828:1

☐ d. --radius -66.828:17.8672:1

☐ e. --radius -66.828:17.8672:100

☐ f. --radius -66.828:17.8672:100

Check

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives **0.00/1.00**.

Question 37

Correct

0.67 points out of 1.00

Flag question

There is an additional "secret" option I find helpful when using FetchData: `-msl` which sets a minimum segment length. This requires a minimum length of seismogram when downloading. Since we will be requesting 50 seconds of seismogram, I would recommend a minimum length of 30 seconds. Which of the following would be needed to accomplish the data request with these specifications?

Select one or more:

☐ a. FetchMetadata

☐ b. -C BHZ,HHZ

☒ c. -o indios.mseed -m indios.meta ✓ 1 of 5 correct answers

☐ d. --radius -66.828:17.8672:1

☒ e. -s 2020-01-07.08:24:25.143 -e 50 -msl 30 ✓ 1 of 5 correct answers

☒ f. -C BHZ,HHZ ✓ 1 of 5 correct answers

☒ g. FetchData ✓ 1 of 5 correct answers

☒ h. --radius 17.8672 -66.828:1 ✓ 1 of 5 correct answers

☐ i. -m indios.mseed -o indios.meta

☐ j. -e 2020-01-07.08:24:25.143 -s 30 -msl 50

Check

Go ahead and run the full command if you have not already: `FetchData --radius 17.8672 -66.828:1 -C BHZ,HHZ -s 2020-01-07.08:24:25.143 -e 50 -msl 30 -o indios.mseed -m indios.meta`

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives **0.67/1.00**.

Question 38

Correct

1.00 points out of 1.00

Flag question

After you have run the full command using the correct answer feedback from the previous question, you will need to run the `mseed2sac` command again. How many SAC files are produced?

Answer: **15** ✓

Check

Correct

Marks for this submission: 1.00/1.00.

Question 39

Correct

0.67 points out of 1.00

Flag question

Now open sac, read these files, and plot the seismograms to see which stations are clipped and which are not. You will likely find the `ppk_perp1ot 1` is the best way to look at each individual seismogram and zoom in to see whether there are portions of the seismogram that are flat near the maximum or minimum amplitudes. As reminder, `ppk` uses the `n` key to go to the next seismogram, `b` to go back to the previous seismogram, `x` to zoom in, and `o` to return to old zoom level. Another clue besides rectangular shape to waveform peaks is several peaks at the same amplitude and whether the peaks are at the total amplitude limit on these instruments (the answer to a previous question), so look for waveforms with amplitudes significantly less than that. One last hint is that some stations have both BHZ and HHZ channels to look at, so consider whether there is evidence of clipping on either of them when deciding. Which of the following stations are not clipped?

Select one or more:

☐ a. ECPR

☐ b. OBIP

☒ c. HUMP ✓ 1 for 2 correct answers.

☐ d. EMPR

☒ e. GCPR ✓ 1 for 2 correct answers.

☐ f. CELP

Check

Correct

Marks for this submission: 1.00/1.00. Accounting for previous tries, this gives **0.67/1.00**.

Question 40

Correct

1.00 points out of 1.00

Flag question

Which station that is not clipped is the closest to the earthquake? You can look up the distances of each station from the earthquake in the `sta.xynd` file you created earlier.

Answer: **ECPR** ✓

Check

Great, you have identified the station we would want to do analysis comparing the seismogram with other events.

Correct

Marks for this submission: 1.00/1.00.

Finish review

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