BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: M.Sc. **SEMESTER: IInd**
BRANCH: MGI **SESSION: SP/2023**

SUBJECT: GI518 SPATIAL DATA HANDLING THROUGH PROGRAMMING

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:
1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data handbook/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO
Q.1(a)	Using rep () and seq () as needed, create the vectors 0 0 0 0 0 1 1 1 1 1 2 2 2 2 2 3 3 3 3 3 4 4 4 4 4 and 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5 1 2 3 4 5	[5]	CO1
Q.1(b)	The following are sample observations on incoming solar radiation at a greenhouse.	[5]	CO1

11.1	10.6	6.3	8.8	10.7	11.2	8.9	12.2

i. Assign the data to an object called solar.radiation.
ii. Find the mean, median, range, and variance of the radiation observations.

Q.2(a) The *WorldPhones* matrix holds counts of the numbers of telephones in the major regions of the world for several years. [5] CO2

Year	N.Amer	Europe	Asia	S.Amer	Oceania	Africa	Mid.Amer
1951	45939	21574	2876	1815	1646	89	555
1956	60423	29990	4708	2568	2366	1411	733
1957	64721	32510	5230	2695	2526	1546	773
1958	68484	35218	6662	2845	2691	1663	836
1959	71799	37598	6856	3000	2868	1769	911
1960	76036	40341	8220	3145	3054	1905	1008
1961	79831	43173	9053	3338	3224	2005	1076

Write the R script to display the first row corresponding to Year 1951 and the barplot for the same.

Q.2(b) Describe the task performed using the following R script. [5] CO2

```
name <- LETTERS[1:10]
longitude <- c(-116.7, -120.4, -116.7, -113.5, -115.5,
-120.8, -119.5, -113.7, -113.7, -110.7)
latitude <- c(45.3, 42.6, 38.9, 42.1, 35.7, 38.9,
36.2, 39, 41.6, 36.9)
stations <- cbind(longitude, latitude)
set.seed(0)
precip <- round((runif(length(latitude))*10)^3)
psize <- 1 + precip/500
plot(stations, cex=psize, pch=20, col='red', main='Precipitation')
text(stations, name, pos=4)
breaks <- c(100, 250, 500, 1000)
legend.psize <- 1+breaks/500
legend("topright",   legend=breaks,   pch=20,   pt.cex=legend.psize,
col='red', bg='gray')
```

PTO

Q.3(a) Describe the task performed using the following Python script. [5] CO3

i.
```
string = "Py"
      string = string + "thon"
```
ii.
```
print("Please" +
                " enter your name: ")
```
iii.
```
team = str(49) + "ers"
```
iv.
```
greeting = "H & S"
      n = len(greeting)
```
v.
```
string = "Sally"
      ch = string[1]
```
vi.
```
last = string[len(string) - 1]
```

Q.3(b) Describe the output of the following Python script. [5] CO3

```
for i in range(4) :
    for j in range(i + 1) :
        print("*", end="")
    print()
```

Q.4(a) Describe the output of the following Python script. [5] CO4

```
first = input("Enter your first name: ")
second = input("Enter your significant other's first name: ")

initials = first[0] + "&" + second[0]
print(initials)
```

Q.4(b) Describe the following Python script for vector data handing. [5] CO4

```
data = et.data.get_data('spatial-vector-lidar')
os.chdir(os.path.join(et.io.HOME, 'earth-analytics'))
plot_centroid_path = os.path.join("data", "spatial-vector-lidar",
                                  "california", "neon-sjer-site",
                                  "vector_data",
"SJER_plot_centroids.shp")

sjer_plot_locations = gpd.read_file(plot_centroid_path)
sjer_plot_locations.head(6)
sjer_plot_locations.geom_type
type(sjer_plot_locations)
```

Q.5(a) Describe the following GEE script. [5] CO5

```
var point = ee.Geometry.Point([-122.292, 37.9018]);

var l8 = ee.ImageCollection('LANDSAT/LC08/C02/T1_TOA');

var image = ee.Image(
  l8.filterBounds(point)
    .filterDate('2015-01-01', '2015-12-31')
    .sort('CLOUD_COVER')
    .first()
);
var nir = image.select('B5');
var red = image.select('B4');
var ndvi = nir.subtract(red).divide(nir.add(red)).rename('NDVI');

Map.centerObject(image, 9);
var ndviParams = {min: -1, max: 1, palette: ['blue', 'white',
'green']};
Map.addLayer(ndvi, ndviParams, 'NDVI image');
```

Q.5(b) Explain the importance of selecting multiple pallet colours while visualizing NDVI output? [5] CO5

:::::27/04/2023 E:::::