GIS 540 Exam

Course number: GIS 540

Test ID: exam

Instructor: Dr. Tateosian

Time Limit: 120 minutes

Materials allowed: Scrap paper (students may not take scrap paper away from the exam).

General instructions: **Write clearly**. Use complete sentences for short answer questions. Write name and unity login id (e.g. jkrowlin) on each page. Return all pages of the exam and scrap paper to the proctor. Do not discuss the exam with other students before the exams are returned.

Total points available _____

Total points deducted _____

Total points earned _____

1. In the left table, match the Python expression with the term that describes it. In the right table, specify whether the code would evaluate as True or False if used as a Boolean expression in a conditional statement. There is one expression that can't be used this way; For this one, write ERROR. Assume that fileN is 'data1.shp', inF is 'data2.shp', and x is 5.

Match	Python code	Description
	fileN[3]	A. assignment
	fileN[:-4]	B. comparison
	"workspace"	C. exponentiation
	fileN == inF	D. floor division
	fileN = inF	E. string literal
	fileN + inF	F. indexing
	x + 3	G. slicing
	1//x	H. empty list
	x**3	I. addition
	[]	J. concatenation

Python code	True or False?
fileN[3]	
fileN[:-4]	
"workspace"	
fileN == inF	
fileN = inF	
fileN + inF	
x + 3	
1//x	
x**3	
[]	

2. Label each item in the list as **A** for arcpy method, **F** for built-in function, **K** for keyword, **L** for list method, **M** for built-in module, **O** for os.path method, or **S** for string method. *There are 2 built-in modules and three of each of the rest.*

____ Describe	____ reverse	___ float	____getmtime	____ strip
____ sys	____CheckOutExtension	____ replace	____ if	____ splitext
____ dirname	____ while	____ append	____ format	____ sort
____ int	____ os	____ or	____ range	____Buffer_analysis

3. Write a Python WHILE-loop equivalent to the following FOR-loop.

FOR-loop	WHILE-loop
for x in range(2,12,2): print(x)	

4. Use the script arguments on the left and the code fragments in the middle in the table below to give the output. If the code would cause an error, write *ERROR* and give a *brief explanation*.
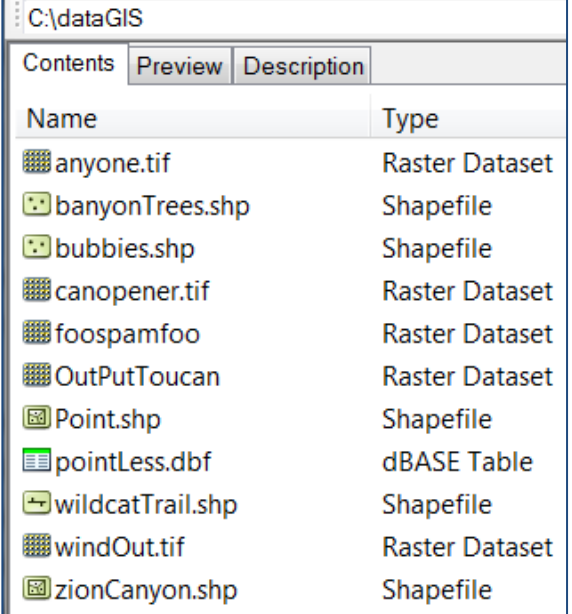
Arguments	Python code	Output or cause of error
| 8 5 | ```
a = sys.argv[1]
b = sys.argv[2]
print(a + b)
``` | |
| C:/data p.shp 50 | ```
d = sys.argv[1]
f = sys.argv[2]
u = sys.argv[3]
print('{0}/{1} has {2} polys'.format(d,f,u))
``` | |
| 8 | ```
myList = [7, 4, 6] + [int(sys.argv[1])]
max = max(myList)
print(max(myList))
``` | |
| 35 | ```
latInput = int(sys.argv[1])
latNC = 35.78
if latInput < int(latNC):
    print('South')
else:
    print('North')
``` | |
| SUBDIVISION | ```
fd = sys.argv[1]
fd.lower( )
print(fd)
``` | |
| a.txt b.shp c.qt | ```
argList = sys.argv
for f in argList:
    print(os.path.splitext(f)[1])
``` | |
| A B C | ```
myList = []
myList.append(sys.argv[1])
myList.append(sys.argv[2])
myList.append(sys.argv[3])
myList.reverse()
print(myList)
``` | |
| C:/data/bird.JPG | ```
dsc = arcpy.Describe(sys.argv[1])
if dsc.dataType == "ShapeFile" or
"Folder":
    print("Sh or Fo")
else:
print("Other")
``` | |
| GIS | ```
print('I'm good at {0}'.format(sys.argv[1]))
``` | |

5. Under each arcpy listing method in the table below, give the list contents. If the list is empty, write EMPTY and give a brief explanation. Assume the user passed in the following arguments:

C:/dataGIS anyo *one

Also assume the following code has been executed:

import arcpy, sys
arcpy.env.workspace = sys.argv[1]
subStr = '*{0}*'.format(sys.argv[2])

L1 = arcpy.ListRasters("*", "GRID")	
L2 = arcpy.ListTables("wind*")	**Figure 1**: Contents of C:\dataGIS in ArcCatalog.
L3 = arcpy.ListRasters("sys.argv[3]")	
L4 = arcpy.ListFeatureClasses(subStr)	

6. Answer the following questions about the traceback error shown in the box below:

    a. Which line number of 'convertLat.py' did the error occur on?

    b. What is the name of the exception?

    c. Explain why the exception was thrown.

```
Traceback (most recent call last):
  File "C:\Python27\ArcGIS10.2\Lib\site-packages\scriptutils.py", line 326, in RunScript
    exec codeObject in __main__.__dict__
  File "C:\temp\convertLat.py", line 23, in <module>
    decimalDegrees = float(degree + (minute/60 + second/3600))
NameError: name 'degree' is not defined
```

7. Complete the script, addYears.py, started in the box below. It should take two user arguments: a date stamp (formatted YYYY-DD-MM) and an integer, x. The code should print a date stamp with x years added to the original date stamp. For example, if the user enters 2011-01-28 and 5, the script should print "The updated date stamp is 2016-01-28".

```
1  # addYears.py

2  import sys

3  dateStamp =

4  x =

5

6

7

8

9  print('The updated date stamp is {0}'.format(newDateStamp))
```

8. This script should take a polygon shapefile and set the values of its 'sqkmArea' field to the polygon areas (in km^2). If the field does not exist yet, the script should create the field. In the box below, correct the 9 mistakes in the code.

```
1  import arcpy, sys

2  inputFile = sys.argv(1)

3  areaField == 'sqkmArea'

4  fields = arcpy.ListFields()

5  nameList = [f.type for f in fields]

6  if areaField in nameList:

7  arcpy.AddField_management(areaField, 'Double')

8  expression = "!shape.length@squarekilometers!"

9  arcpy.CalculateField_management(inputFile, areaField, expression, 'PYTHON')

10 print("Field {0} calculated in the input shapefile {1}".format(inputFile, areaField))
```

9. The script 'PointsToLine_nonBatch.py' in the first box below creates a Shapefile with lines connecting the points in the 'C:/data/nests.shp' file. Rewrite this as 'PointsToLine_Batch.py' in the second box. The batch version should call the Points to Line (Management) tool on all the Point Shapefiles in the 'C:/data' directory whose names contain the substring "tucan".

1	*# PointsToLine_nonBatch.py*
2	import arcpy, os
3	arcpy.env.workspace = 'C:/data'
4	inputFile = 'nests.shp'
5	outputFile = os.path.splitext(inputFile)[0] + 'Line.shp'
6	arcpy.PointsToLine_management(inputFile, outputFile) print('{0}
7	created.'.format(outputFile))

1	*# PointsToLine_Batch.py*
2	
3	
4	
5	
6	
7	
8	

10. Fill in the blanks to complete getSize.py. Use sys.argv, os.path.dirname, os.listdir, and
os.path.getsize to print the size of each of the files in the directory where the script resides.

1	*# getSize.py*
2	import _____
3	scriptPath = _____
4	scriptDirectory = _____
5	fileList = _____
6	**for** _____
7	fullPathFileName = _____
8	theSize = _____
	print _____

11. By design, handleShapes.py should determine the data type of an input file. If the input file is a polygon shapefile with more than 50 records, as counted by the GetCount (management) tool, the script should find a point inside each polygon. If it's a point shapefile, the script should find the mean center of the points, using the MeanCenter (stats) tool. Answer questions a)-g) pertaining to handleShapes.py.

1	*# handleShapes.py*
2	**import** arcpy
3	inputFile = sys.argv[1]
4	dsc = arcpy.env.Describe(inputFile)
5	count = arcpy.GetCount(inputFile)
6	**if** (dsc.dataType == 'ShapeFile' **and** dsc.shapeType == 'Polygon') **or** count > 50:
7	outputFile = inputFile + 'out.shp'
8	arcpy.FeatureToPoint_management (inputFile, outputFile, 'INSIDE')
9	**else** dsc.dataType == 'ShapeFile' **and** dsc.shapeType == 'Point'
10	arcpy.MeanCenter_management(inputFile, outputFile)
11	**print** "Mean center calculated for {0}".format(inputFile)

a) The Get Count tool is in the _____toolbox and the Mean Center

tool belongs to the _____toolbox.

b) Which (if any) ArcGIS environment settings does handleShapes.py set?

c) Line 6 has a logic error involving a compound conditional keyword. Describe the characteristics files for which this statement is true.

d) If the value of inputFile is 'C:/data/park.shp' and outputFile is set as shown on line 7, what is the value of outputFile?

e) If outputFile is set on line 7, what is the value of outputFile when the script reaches line 10?

f) If the rest of the script works, under what conditions would line 11 report that the mean center has been calculated?

g) Inside the box, show how to correct the 10 errors in this script.