



山东科技大学——测绘与空间信息学院

Python程序设计

地理信息科学系 刘洪强

J6-557 电话：86081170

2021年4月6日星期二

课程安排:

36个学时，其中授课24个学时，实验12个学时

成绩:

出勤5% + 实验报告25% + 考试70%

章节内容

第1章 认识Python

第2章 Python编程基础

第3章 函数、类、包和模块

第4章 文件操作

第5章 地图文档管理

第6章 数据链接查找与修复

第7章 地图制图与输出

第8章 地理处理工具的执行

第9章 地理处理工具的创建

第10章 数据查询与选择

第11章 数据访问模块

第12章 获取GIS数据的列表和描述

第10章 数据查询与选择

构造正确的属性查询语句

创建要素图层和表视图

使用Select Layer by Attribute选择要素

使用Select Layer by Location选择要素

结合空间查询和属性查询选择要素

10.1 构造正确的属性查询语句

Python中的查询基本上是由**SQL**语句和一些特定的语法规则组成的。如果对在ArcMap中如何构造查询语句比较熟悉，或者在用其它编程语言时，有过使用**SQL**语句的经验，那么构造查询语句就相对容易一些。在构造**SQL**语句的过程中，还需要知道一些具体的Python语法要求和不同数据类型之间的差别。对于不同的数据类型来说，**SQL**语句的格式会有细微的差别。

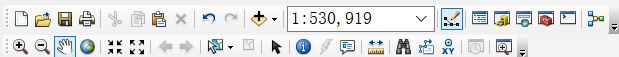


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Crime

C:\ArcpyBook\data\CityOfSanAntonio.gdb

☒ Burglaries in 2009☒ Crime Density by School District
CrimeDens

5.991641 - 53.502834

53.502835 - 147.060454

147.060455 - 287.346283

287.346284 - 605.255253

605.255254 - 772.318143

☒ Bexar County Boundary☐ Crime2009Table

Test_Performance

C:\ArcpyBook\data\CityOfSanAntonio.gdb

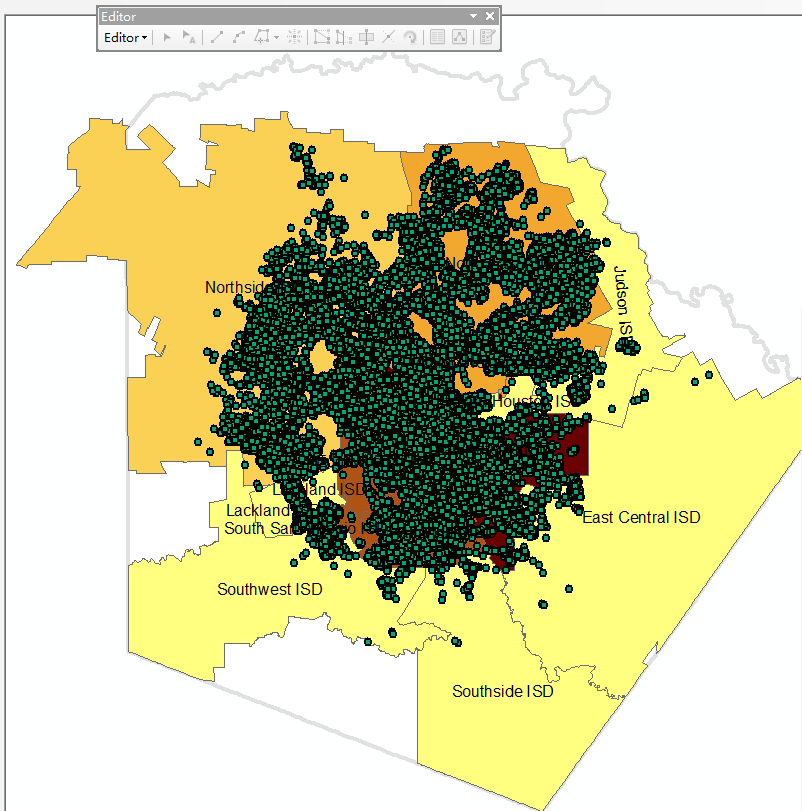
☒ Test Performance by School District

Test_Perf2

☒ Above Average☒ Average☒ Below Average☐ Not in Study☒ Bexar County Boundary

Inset_Map

C:\ArcpyBook\data\CityOfSanAntonio.gdb



Search

Local Search

ALL Maps Data Tools Images

Any Extent

Catalog

Location: Home - ArcpyBook\Ch7

Home - ArcpyBook\Ch7

Folder Connections

C:\

ArcToolbox

ArcToolbox

- 3D Analyst Tools
- Analysis Tools
- Cartography Tools
- Conversion Tools
- Data Interoperability Tools
- Data Management Tools
- Editing Tools
- Geocoding Tools
- Geostatistical Analyst Tools
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- Multidimension Tools
- Network Analyst Tools
- Parcel Fabric Tools
- Schematics Tools
- Server Tools
- Spatial Analyst Tools
- Spatial Statistics Tools
- Tracking Analyst Tools

Select by Attributes

Enter a WHERE clause to select records in the table window.

Method: Create a new selection

DIST
SVCAREA
SPLITDT
SPLITTM
HR
DOW

= <> Like
> >= And
< <= Or
_ % () Not
'Central'
'East'
'North'
'Prue'
'South'
'UNK'
'West'

Is Get Unique Values Go To:

SELECT * FROM Burglary WHERE:

SVCAREA = 'North'

Clear

Verify

Help

Load...

Save...

Apply

Close

- ☐ Below Average
☐ Not in Study
☒ Bexar County Boundary

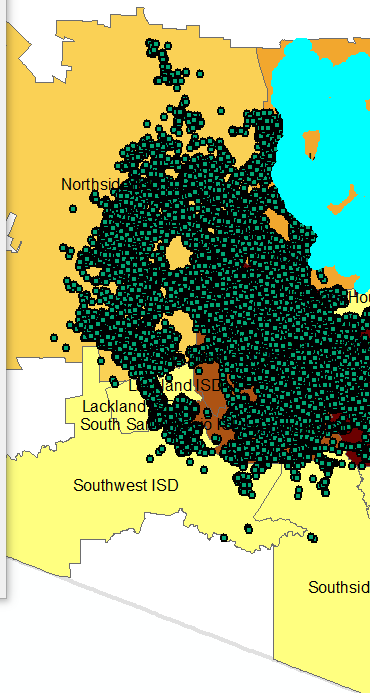
Inset Map

Number of features selected: 7520

Help

Editor

Editor



Table

Burglaries in 2009

	OBJECTID	Shape	CASE	LOCATION	DIS	SVCARE	SPLITD	SPLITTM	HR	DOW	SHIF	OFFCOD	OFFDESC	ARC
1	Point	9069434	1533	AUSTIN HWY	3320	North	2009/9/	0:00:00	0	Tue	C	220301	BURGL-FORCED ENT	YBUR
2	Point	9069844	4801	GUS ECKERT	7150	Prue	2009/9/	0:00:00	17	Tue	B	220001	BURGLARY	YBUR
3	Point	9069844	4002	BELLE GROV	7220	Prue	2009/9/	0:00:00	18	Tue	B	220201	BURGL-FORCED ENT	YBUR
4	Point	9069845	2313	NW MILITAR	7230	Prue	2009/9/	0:00:00	18	Tue	B	220001	BURGLARY	YBUR
5	Point	9069846	4070	SUNRISE PA	4180	East	2009/9/	0:00:00	13	Tue	A	220201	BURGL-FORCED ENT	YBUR
6	Point	9069847	9904	ARDASH LN	7110	Prue	2009/9/	0:00:00	18	Tue	B	220201	BURGL-FORCED ENT	YBUR
7	Point	9069849	3301	CATO BLVD	6230	South	2009/9/	0:00:00	13	Tue	A	220301	BURGL-FORCED ENT	YBUR
8	Point	9069849	826	RIVAS ST	2310	Central	2009/9/	0:00:00	16	Tue	B	220201	BURGL-FORCED ENT	YBUR
9	Point	9069852	314	CRAVENS AV	4240	East	2009/9/	0:00:00	13	Tue	A	220201	BURGL-FORCED ENT	YBUR
10	Point	9069854	2334	AUSTIN HWY	3330	North	2009/9/	0:00:00	15	Tue	B	220201	BURGL-FORCED ENT	YBUR
11	Point	9069861	134	TWILIGHT T	3260	North	2009/9/	0:00:00	19	Tue	B	220001	BURGLARY	YBUR
12	Point	9069868	308	CORONADO S	5110	West	2009/9/	0:00:00	15	Tue	B	220401	BURGL-NO FORCED	YBUR
13	Point	9069868	7300	JONES MALT	3310	North	2009/9/	0:00:00	19	Tue	B	220001	BURGLARY	YBUR
14	Point	9069874	4023	SUNRISE CO	4180	East	2009/9/	0:00:00	19	Tue	B	220001	BURGLARY	YBUR
15	Point	9069874	10362	SAHARA DR	3110	North	2009/9/	0:00:00	20	Tue	B	220201	BURGL-FORCED ENT	YBUR
16	Point	9069875	100	MILITARY D	6260	South	2009/9/	0:00:00	16	Tue	B	220001	BURGLARY	YBUR
17	Point	9069877	0	LOOP 410 N	7270	Prue	2009/9/	0:00:00	17	Tue	B	220001	BURGLARY	YBUR
18	Point	9069878	13730	US 281 N	3140	North	2009/9/	0:00:00	18	Tue	B	220001	BURGLARY	YBUR
19	Point	9069879	820	MILITARY D	6260	South	2009/9/	0:00:00	20	Tue	B	220001	BURGLARY	YBUR
20	Point	9069880	601	SANTA ROSA	2110	Central	2009/9/	0:00:00	18	Tue	B	220001	BURGLARY	YBUR
21	Point	9069880	3501	PIN OAK DR	7180	Prue	2009/9/	0:00:00	13	Tue	A	220201	BURGL-FORCED ENT	YBUR
22	Point	9069884	1106	HILTON AV	6160	South	2009/9/	0:00:00	18	Tue	B	220201	BURGL-FORCED ENT	YBUR
23	Point	9075346	1727	THOMPSON P	5140	West	2009/10	0:00:00	7	Mon	A	220001	BURGLARY	YBUR
24	Point	9075339	15403	WALNUT CRE	3150	North	2009/10	0:00:00	6	Mon	A	220001	BURGLARY	YBUR
25	Point	9075343	1034	SHADWELL D	5280	West	2009/10	0:00:00	1	Mon	C	220001	BURGLARY	YBUR
26	Point	9075348	8315	VANDIVER R	3310	North	2009/10	0:00:00	7	Mon	A	220001	BURGLARY	YBUR
27	Point	9075351	10718	POTRANCO R	5360	West	2009/10	0:00:00	16	Sun	B	220001	BURGLARY	YBUR
28	Point	9075352	2022	ANNON DR N	7290	Prue	2009/10	0:00:00	2	Mon	C	220001	BURGLARY	YBUR
29	Point	9075226	2227	FAWN FIELD	7210	Prue	2009/10	0:00:00	4	Sun	C	220001	BURGLARY	YBUR

Burglaries in 2009

(7520 out of 39244 Selected)

10.1 构造正确的属性查询语句

- `qry = SVCAREA = 'North'`
- `qry = "SVCAREA" = 'North'`
- `qry = "SVCAREA" = \'North\'`

10.1 构造正确的属性查询语句

➤ `qry = "SVCAREA" = \'North\'`

根据语法规则，查询中使用的每个字段名称都需要用**双引号**引起来。
当在**shapefile**文件、文件地理数据库或者**ArcSDE**地理数据库中使用字段名称时，也需要用**双引号**引起来。

如果是在**个人地理数据库**中，字段名称需要使用**方括号**而不是双引号引起来。

➤ `qry = [SVCAREA] = \'North\'`

10.1 构造正确的属性查询语句

➤ `qry = \"SVCAREA\" = \'North\'`

完整的查询语句应该用**单引号**引起来。

除了用来测试相等的等号(==)外，还有其他一些其他的运算符可供字符串和数值型数据使用，如不等于(<>)、大于(>)、大于等于(>=)、小于(<)和小于等于(<=)等。

10.1 构造正确的属性查询语句

➤ 通配符%

通配符也可用于 shapefile 文件、文件地理数据库和 ArcSDE 地理数据库等。**%**表示**任意数量**的字符。**Like**运算符通常与通配符一起使用，用于**匹配部分字符串**。

10.1 构造正确的属性查询语句

➤ LIKE运算符

%表示任意数量的字符。**Like**运算符通常与通配符一起使用，用于匹配部分字符串。

➤ `qry = \"SV CAREA\" LIKE \'N%\'`

找到所有以'N'开头的服务区域记录，字母'N'后可以有任意数量的字符。

10.1 构造正确的属性查询语句

➤通配符_

下划线字符(_)表示单个字符。但是在个人地理数据库中，星号(*)表示任意数量的字符，问号(?)表示单个字符。

10.1 构造正确的属性查询语句

➤ NULL

“NULL”值与“0”值是不一样的。“NULL”值表明数据为空，而“0”值表明数据的值为0。“NULL”运算符包括“IS NULL”和“IS NOT NULL”

➤ qry = ' "SVCAREA" IS NULL '

找到“SVCAREA”字段中数据为空的所有记录。

10.1 构造正确的属性查询语句

➤ **AND和OR运算符**

用于结合两个或多个满足查询条件的表达式。“AND”运算符要求两个查询条件的结果均为真，才会选择记录。

“OR”运算符要求至少有一个查询条件的结果为真即可。

10.1 构造正确的属性查询语句

➤ 总结

除了个人地理数据库以外，其他数据库和数据格式均使用“%”字符代替多个字符，使用“_”字符代替单个字符。

在个人地理数据库中，使用“*”字符代替多个字符，用“?”字符代替单个字符。

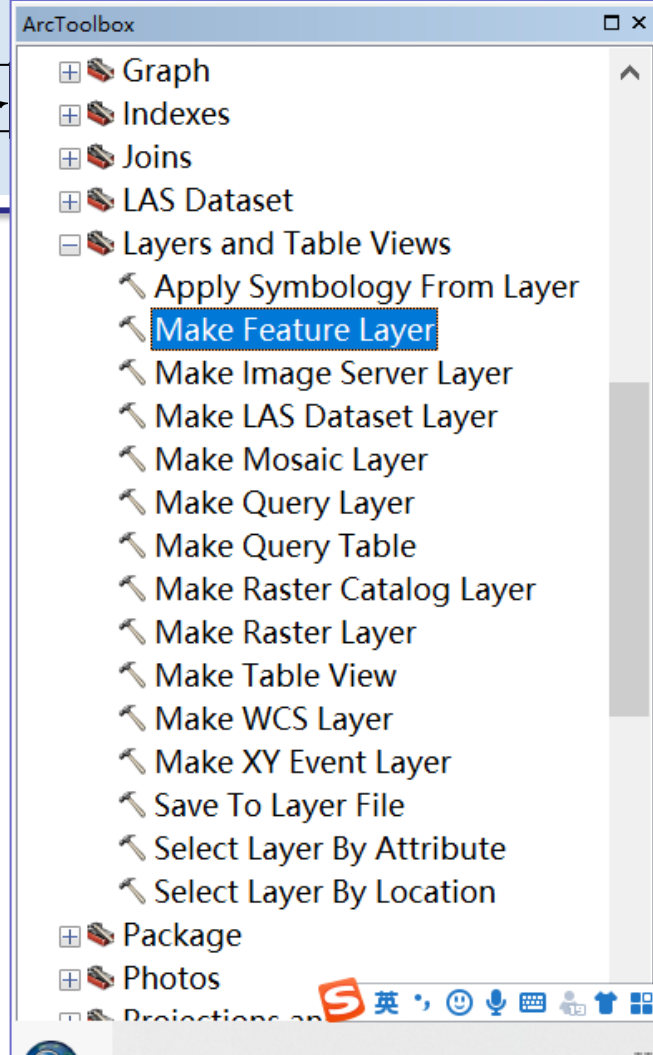
10.2 创建要素图层和表视图

在使用工具，特别是“Select Layer by Location”和“Select Layer by Attribute”等工具时，要将要素图层和表视图作为**中间数据集**存储在内存中。即，必须在Python脚本中单独创建要素图层和表示。

10.2 创建要素图层和表视图

“Make Feature Layer”（“Make Table View”）工具用于生成要素类（表）的内存副本，生成的临时要素图层（内存副本）可以用来构造查询、选择集和连接表等。

10.2 创建要素图



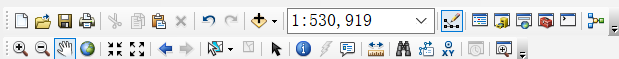


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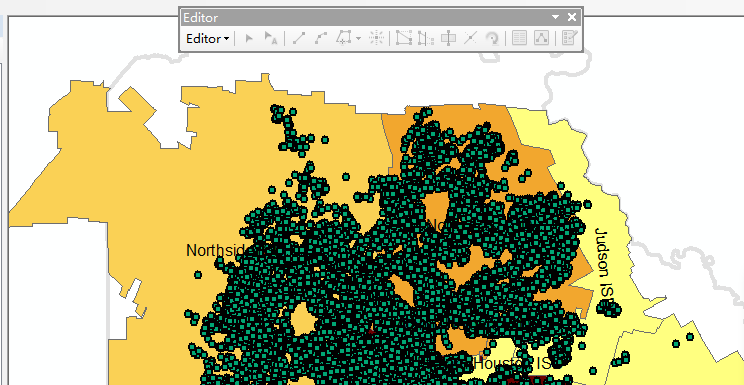
☒ Bexar County Boundary☐ Crime2009Table

Test_Performance

C:\ArcpyBook\data

☒ Test_Performance

Test_Perf2

☒ Above Average☒ Average☒ Below Average☐ Not in Study☒ Bexar County Boundary☐ Crime2009Table☐ Crime2009Table☐ Crime2009Table☐ Crime2009Table☐ Crime2009Table☐ Crime2009Table☐ Crime2009Table☐ Crime2009Table☐ Crime2009TableEditor
Editor

Python

```
>>> import arcpy
... arcpy.env.workspace = "c:/ArcpyBook/data/CityOfSanAntonio.gdb"
... try:
...     flayer = arcpy.MakeFeatureLayer_management
...     ("Burglary", "Burglary_Layer")
... except Exception as e:
...     print e.message
... 
```

Inset Map

☐ Inset Map☐ Inset Map☐ Inset Map

Search

Local Search

ALL Maps Data Tools Images

Any Extent

Catalog

Location: Home - ArcpyBook\Ch7

Home - ArcpyBook\Ch7

Layer Properties

General	Source	Joins & Relates	Selection	Display	Time	Symbology	Fields	Def
---------	--------	-----------------	-----------	---------	------	-----------	--------	-----

Extent

Left: -103.518030 dd	Top: 29.676404 dd	Right: -98.243208 dd
Bottom: -6.145758 dd		

Data Source

Data Type:	File Geodatabase Feature Class
Database:	C:\ArcpyBook\data\CityOfSanAntonio.gdb
Feature Class:	Burglary
Feature Type:	Simple
Geometry Type:	Point
Coordinates have Z values:	No
Coordinates have measures:	No
Geographic Coordinate System:	GCS_WGS_1984
Datum:	D_WGS_1984

Set Data Source...

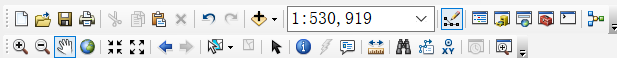


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Burglary_Layer

Burglaries in 2009

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CrimeDens

5.991641 - 53.502834

53.502835 - 147.060454

147.060455 - 287.346283

287.346284 - 605.255254

Bexar County B

Crime2009Tabl

Test_Performance

c:\ArcpyBook\data

Test Performan

Test_Perf2

Above Averag

Average

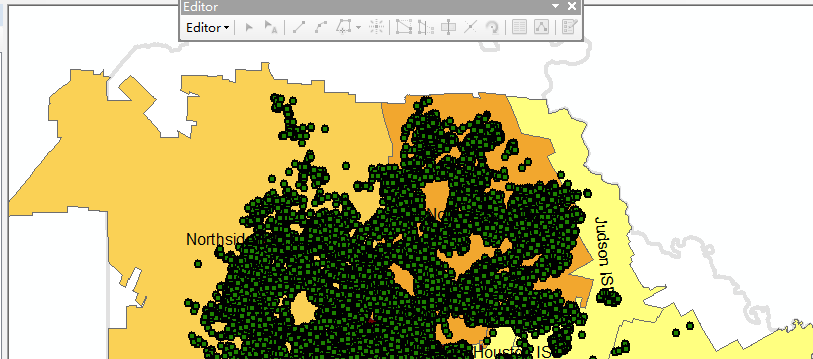
Below Averag

Not in Study

Bexar County B

Editor

Editor



Search

Local Search

ALL Maps Data Tools Images

Any Extent

Catalog

Location: CityOfSanAntonio.gdb

- data
 - TravisCounty
 - Wildfires
 - WildlandFires.mdb
 - FireIncidents
 - RealTimeFires
 - TEST
- daysFireIncidents
- daysFireIncidents2
- daysFireIncidents3
- AmericaWildfires_2007275.txt
- andFires.shp
- nAntonio.gdb
- rCountyBoundaries
- ary
- oundaries
- s2009Table
- ss2009
- ssBySchoolDistrict
- sSurface
- olDistricts
- i_Counties_LowRes
- EAST_NW.sid
- 996.csv
- _Permits.shp
- ss_2009.shp
- ssNoForcedEntry.lyr
- _Tracts.shp
- _Tracts.shp
- _Tracts.shp
- _Tracts.shp
- Tracts.shp
- Tracts.shn

Tools

Make Feature Layer

Python

```
>>> import arcpy
... arcpy.env.workspace = "c:/ArcpyBook/data/CityOfSanAntonio.gdb"
... try:
...     flayer = arcpy.MakeFeatureLayer_management
...     ("Burglary", "Burglary_Layer")
... except Exception as e:
...     print e.message
... 
```

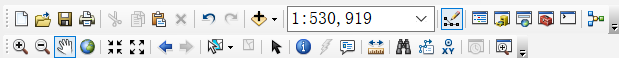


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147.060455 - 287.346283

287.346284 - 605.255254

605.255254 - 1211.710508

Bexar County B

Crime2009Table

Test_Performance

c:\ArcpyBook\data

Test_Performance

Test_Perf2

Above Average

Average

Below Average

Not in Study

Bexar County B

Python

```
>>> import arcpy
... arcpy:
... try:
...     fl
... except:
...     pr
... import arc
... try:
...     fl
... except:
...     pr
...>>>
```

Layer Properties

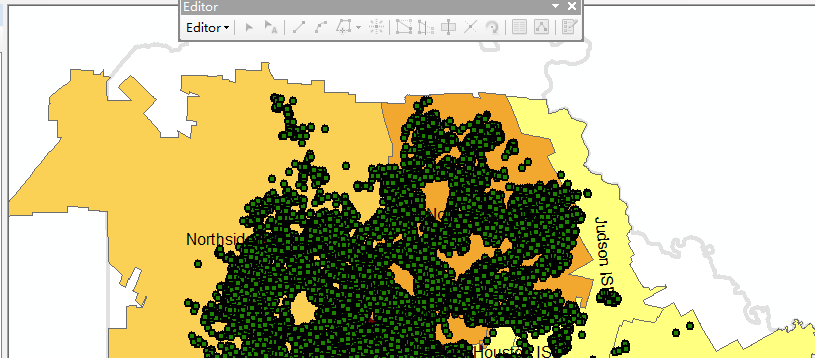
Joins & Relates		Time		HTML Popup			
General	Source	Selection	Display	Symbology	Fields	Definition Query	Labels

Extent

Top: 29.676404 dd
Left: -103.518030 dd Right: -98.243208 dd
Bottom: -6.145758 dd

Data Source

Data Type:	File Geodatabase Feature Class
Database:	C:\ArcpyBook\data\CityOfSanAntonio.gdb
Feature Class:	Burglary
Feature Type:	Simple
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Coordinates have Z values:	No
Coordinates have measures:	No
Geographic Coordinate System:	GCS_WGS_1984
Datum:	D_WGS_1984

Editor
Editor

Search

Local Search

ALL Maps Data Tools Images

Any Extent

Catalog

Location: CityOfSanAntonio.gdb

- data
 - TravisCounty
 - Wildfires
 - WildlandFires.mdb
 - FireIncidents
 - RealTimeFires
 - TEST
 - Today'sFireIncidents
 - Today'sFireIncidents2
 - Today'sFireIncidents3
 - NorthAmericaWildfires_2007275.txt
 - WildlandFires.shp
 - CityOfSanAntonio.gdb
 - BexarCountyBoundaries
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 - CrimeSurface
 - SchoolDistricts
 - Texas_Counties_LowRes
 - AUSTIN_EAST_NW.sid
 - bc_pop1996.csv
 - Building_Permits.shp
 - Burglaries_2009.shp
 - BurglariesNoForcedEntry.lyr
 - County1_Tracts.shp
 - County2_Tracts.shp
 - County3_Tracts.shp
 - County4_Tracts.shp
 - County5_Tracts.shp

NONE; YNAD83
YNAD83
VISIBLE
NONE"

Tools

13748741.437 Feet

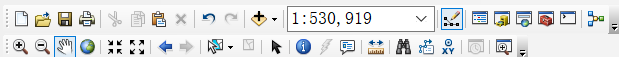


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Python

Bexar County Boundary

Crime2009Table

Crime2009TVIEW

Test_Performance

c:\ArcpyBook\data\CityOf

Test Performance by Sch

Test_Perf2

Above Average

Average

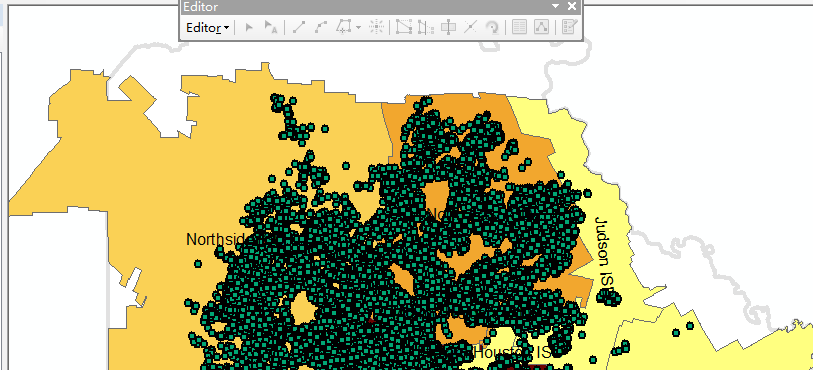
Below Average

Not in Study

Bexar County Boundary

Editor

Editor



Search

Local Search

ALL Maps Data Tools Images

Any Extent

Catalog

Location: CityOfSanAntonio.gdb

data

TravisCounty

Wildfires

WildlandFires.mdb

FireIncidents

RealTimeFires

TEST

TodaysFireIncidents

TodaysFireIncidents2

TodaysFireIncidents3

NorthAmericaWildfires_2007275.txt

WildlandFires.shp

fSanAntonio.gdb

BexarCountyBoundaries

Burglary

Crime2009Table

Crime2009TVIEW

CrimeDens

CrimeDens

CrimeDens

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CrimeDens

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CrimeDens

CrimeDens

CrimeDens

CrimeDens

CrimeDens

CrimeDens

CrimeDens

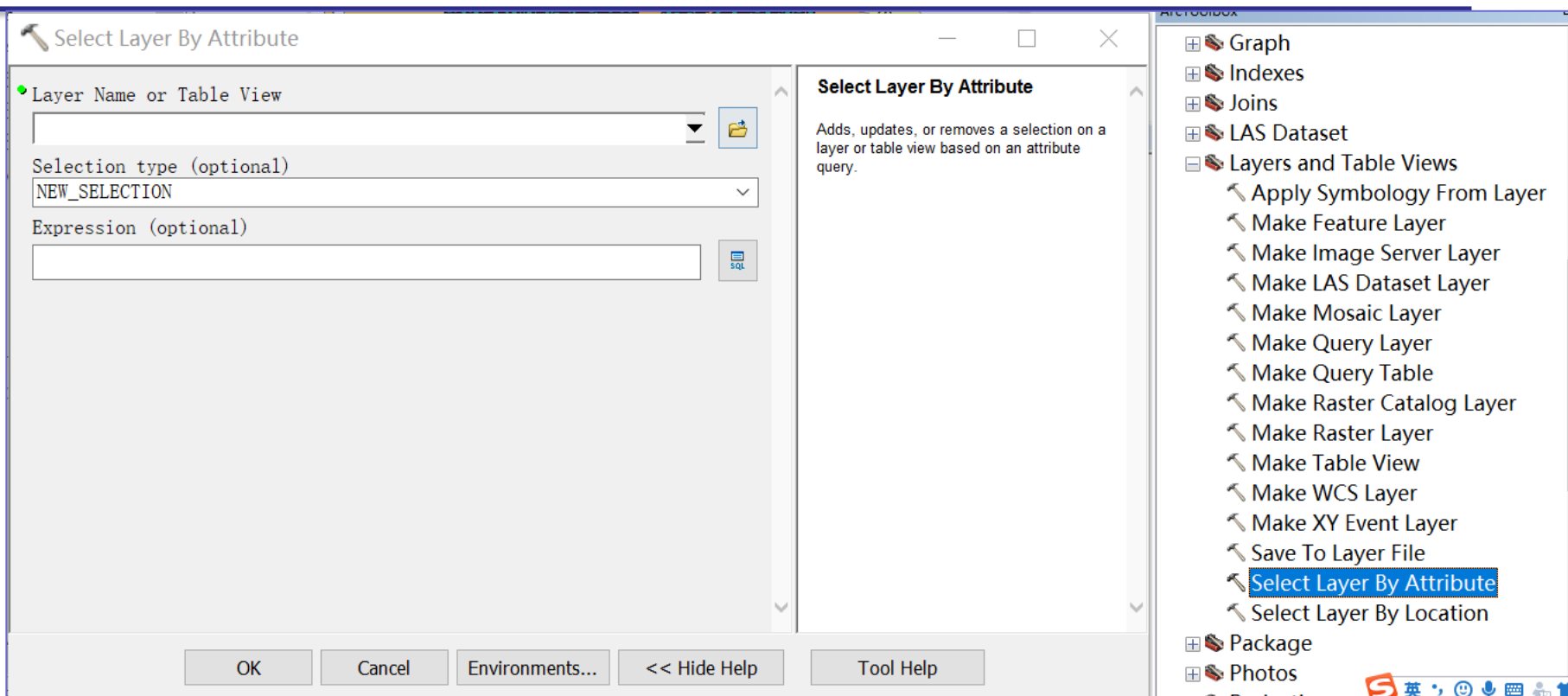
CrimeDens

CrimeDens

```
>>> import arcpy
... arcpy.env.workspace = "c:/ArcpyBook/data/CityOfSanAntonio.gdb"
... try:
...     tView = arcpy.MakeTableView_management
...         ("Crime2009Table", "Crime2009TVIEW")
... except Exception as e:
...     print e.message
>>>
```

```
NONE;OFFDES
C OFFDESC
VISIBLE
NONE;ARCCOD
E ARCCODE
VISIBLE
NONE;ARCCOD
E2 ARCCODE2
VISIBLE
NONE;ARCTYP
E ARCTYPE
VISIBLE
NONE;XNAD83
XNAD83
VISIBLE
NONE;YNAD83
YNAD83
VISIBLE
NONE;Test
Test
VISIBLE
NONE;
```


10.3 Select Layer by Attribute



- `NEW_SELECTION`: 这是默认的选择类型, 用于创建一个新的选择集 (生成的选择内容将替换任何现有选择内容)。
- `ADD_TO_SELECTION`: 基于查询将一个选择集添加到当前选择的记录中 (当存在一个选择内容时, 会将生成的选择内容添加到现有选择内容中。如果不存在选择内容, 该选项的作用同 `NEW_SELECTION` 选项)。
- `REMOVE_FROM_SELECTION`: 基于查询从当前选择集中移除所选的记录 (将生成的选择内容从现有选择内容中移除。如果不存在选择内容, 则该选项不起作用)。
- `SUBSET_SELECTION`: 结合现有的选择集, 选择两者共同的记录 (将生成的选择内容与现有选择内容进行组合。只有两者共同的记录才会被选取)。
- `SWITCH_SELECTION`: 切换选择内容, 选择当前没有被选择的记录 (将所选的所有记录从选择内容中移除, 将未选取的所有记录添加到选择内容中, 当指定该选项时将忽略表达式)。
- `CLEAR_SELECTION`: 清除选择集的当前所有记录 (清除或移除任何选择内容。当指定该选项时将忽略表达式)。

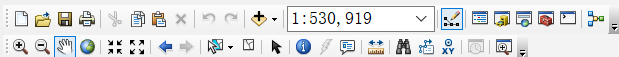


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Crime

C:\ArcpyBook\data\CityOfSanAntonio.gdb

Burglaries in 2009

Crime Density by School District

CrimeDens

5.991641 - 53.502834

53.502835 - 147.060455

147.060455 - 287.3462

287.346284 - 605.2552

605.255254 - 772.3181

Bexar County Boundary

Crime2009Table

Test Performance

C:\ArcpyBook\data\CityOfSanAntonio.gdb

Test Performance by School District

Test_Perf2

Above Average

Average

Below Average

Not in Study

Bexar County Boundary

Inset Map

C:\ArcpyBook\data\CityOfSanAntonio.gdb

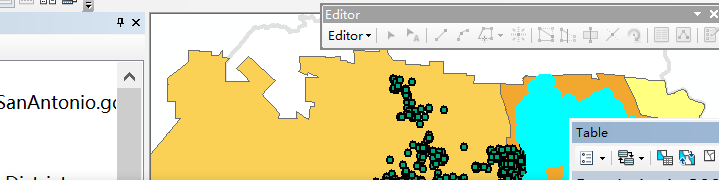
Burglaries in 2009

C:\ArcpyBook\data\CityOfSanAntonio.gdb

C:\ArcpyBook\data\CityOfSanAntonio.gdb

C:\ArcpyBook\data\CityOfSanAntonio.gdb

C:\ArcpyBook\data\CityOfSanAntonio.gdb



Select by Attributes

Enter a WHERE clause to select records in the table window.

Method: Create a new selection

OBJECTID

CASE

LOCATION

DIST

SVCAREA

SPLITDT

=

<>

>

<

%

()

Is

Like

>=

<=

And

Or

Not

'Central'

'East'

'North'

'Prue'

'South'

'UNK'

'West'

SELECT * FROM Burglary WHERE:

SVCAREA = 'North'

Clear

Verify

Help

Load...

Save...

Burglaries in 2009

OBJECTID	Shape	CASE	LOCATION	DIST	SVCAREA	SPLITDT	SPLITDT	HR	DOY	SHIF	OFFCOD	OFFDESC	ARCCOD	ARCCOD
1	Point	9069434	1533 AUSTIN HWY	3320	North	2009/9/	0:00:00	0	Tue	C	220301	BURGL-FORCED ENT	YBURGBL	BURGBL
2	Point	9069844	4801 GUS ECKERT	7150	Prue	2009/9/	0:00:00	17	Tue	B	220001	BURGLARY	YBURGVE	BURGVE
3	Point	9069844	4002 BELLE GROV	7220	Prue	2009/9/	0:00:00	18	Tue	B	220201	BURGL-FORCED ENT	YBURGHA	BURGHA
4	Point	9069845	2313 NW MILITAR	7230	Prue	2009/9/	0:00:00	18	Tue	B	220001	BURGLARY	YBURGVE	BURGVE
5	Point	9069846	4070 SUNRISE PA	4180	East	2009/9/	0:00:00	13	Tue	A	220201	BURGL-FORCED ENT	YBURGHA	BURGHA
6	Point	9069847	9904 ARDASH LN	7110	Prue	2009/9/	0:00:00	18	Tue	B	220201	BURGL-FORCED ENT	YBURGHA	BURGHA
7	Point	9069849	3301 CATO BLVD	6230	South	2009/9/	0:00:00	13	Tue	A	220301	BURGL-FORCED ENT	YBURGBL	BURGBL
8	Point	9069849	826 RIVAS ST	2310	Central	2009/9/	0:00:00	16	Tue	B	220201	BURGL-FORCED ENT	YBURGHA	BURGHA
9	Point	9069852	314 CRAVENS AV	4240	East	2009/9/	0:00:00	13	Tue	A	220201	BURGL-FORCED ENT	YBURGHA	BURGHA
10	Point	9069854	2334 AUSTIN HWY	3330	North	2009/9/	0:00:00	15	Tue	B	220201	BURGL-FORCED ENT	YBURGHA	BURGHA
11	Point	9069861	134 TWILIGHT T	3260	North	2009/9/	0:00:00	19	Tue	B	220001	BURGLARY	YBURGVE	BURGVE
12	Point	9069868	308 CORONADO S	5110	West	2009/9/	0:00:00	15	Tue	B	220401	BURGL-NO FORCED	YBURGHA	BURGHA
13	Point	9069868	7300 JONES MALT	3310	North	2009/9/	0:00:00	19	Tue	B	220001	BURGLARY	YBURGVE	BURGVE
14	Point	9069874	4023 SUNRISE CO	4180	East	2009/9/	0:00:00	19	Tue	B	220001	BURGLARY	YBURGVE	BURGVE
15	Point	9069874	10362 SAHARA DR	3110	North	2009/9/	0:00:00	20	Tue	B	220201	BURGL-FORCED ENT	YBURGHA	BURGHA
16	Point	9069875	100 MILITARY D	6260	South	2009/9/	0:00:00	16	Tue	B	220001	BURGLARY	YBURGVE	BURGVE
17	Point	9069877	0 LOOP 410 N	7270	Prue	2009/9/	0:00:00	17	Tue	B	220001	BURGLARY	YBURGVE	BURGVE
18	Point	9069878	13730 US 281 N	3140	North	2009/9/	0:00:00	18	Tue	B	220001	BURGLARY	YBURGVE	BURGVE
19	Point	9069879	820 MILITARY D	6260	South	2009/9/	0:00:00	20	Tue	B	220001	BURGLARY	YBURGVE	BURGVE
20	Point	9069880	601 SANTA ROSA	2110	Central	2009/9/	0:00:00	18	Tue	B	220001	BURGLARY	YBURGVE	BURGVE
21	Point	9069880	3501 PIN OAK DR	7180	Prue	2009/9/	0:00:00	13	Tue	A	220201	BURGL-FORCED ENT	YBURGHA	BURGHA
22	Point	9069884	1106 HILTON AV	6160	South	2009/9/	0:00:00	18	Tue	B	220201	BURGL-FORCED ENT	YBURGHA	BURGHA
23	Point	9075346	1727 THOMPSON P	5140	West	2009/10/	0:00:00	7	Mon	A	220001	BURGLARY	YBURGVE	BURGVE
24	Point	9075339	15403 WALNUT CRE	3150	North	2009/10/	0:00:00	6	Mon	A	220001	BURGLARY	YBURGVE	BURGVE
25	Point	9075343	1034 SHADWELL D	5280	West	2009/10/	0:00:00	1	Mon	C	220001	BURGLARY	YBURGVE	BURGVE
26	Point	9075348	8315 VANDIVER R	3310	North	2009/10/	0:00:00	7	Mon	A	220001	BURGLARY	YBURGVE	BURGVE
27	Point	9075351	10718 POTRANCO R	5360	West	2009/10/	0:00:00	16	Sun	B	220001	BURGLARY	YBURGVE	BURGVE
28	Point	9075352	2022 AMNON DR N	7290	Prue	2009/10/	0:00:00	2	Mon	C	220001	BURGLARY	YBURGVE	BURGVE
29	Point	9075226	2227 FAWN FIELD	7210	Prue	2009/10/	0:00:00	4	Sun	C	220001	BURGLARY	YBURGVE	BURGVE

1 (7520 out of 39244 Selected)

Burglaries in 2009

```
>>> arcpy.SelectLayerByAttribute_management(
```

```
SelectLayerByAttribute_management  
(in_layer_or_view, {selection_type},  
{where_clause})
```

Adds, updates, or removes a selection on a layer or table view based on an attribute query.

INPUTS:

in_layer_or_view (Table View / Raster Layer / Mosaic Layer):

The feature layer or table view to which the selection will be applied. The input can be a layer or table view in the ArcMap table of contents, or a layer or table view created in ArcCatalog or in scripts using the Make Feature Layer or Make Table View tools.

selection_type {String}:

Determines how the selection will be applied and what to do if a selection already exists.

* NEW_SELECTION—The resulting selection replaces any existing selection. This is the default.

* ADD_TO_SELECTION—The resulting selection is added to an existing selection if one exists. If no selection exists, this is the same as the NEW_SELECTION option.

* REMOVE_FROM_SELECTION—The resulting selection is removed from an existing selection. If no selection exists, this option has no effect.

* SUBSET_SELECTION—The resulting selection is combined

☒ Burglary Layer

5 991641 - 53 502834

Python

☒ Bexar County Boundaries ... try:

```
... 11
("Burglar
```

☒ Test Performance by S...

... pr













☐ ☒ Bexar County Boundaries



```
>>> import arcpy
... arcpy.env.workspace = "c:/ArcpyBook/data/CityOfSanAntonio.gdb"
... try:
...     qry = '"SVCAREA" = \'North\''
...     flayer = arcpy.MakeFeatureLayer_management
...     ("Burglary", "Burglary_Layer")
...     arcpy.SelectLayerByAttribute_management(flayer, "NEW_SELECTION", qry)
...     cnt = arcpy.GetCount_management(flayer)
...     print "The number of selected records is: " + str(cnt)
... except Exception as e:
...     print e.message
...
The number of selected records is: 7520
>>>
```

```
The number of selected records is: 7520
```

ALL [Maps](#) [Data](#) [Tools](#) [Images](#)

Location: Home - ArcpyBook\Ch7

ver

"SVCAREA"	
-----------	--

Thu Apr 01
16:04:08

at Thu Apr		
------------	--	--

(Elapsed Time: 0.50)

GetCount

Sta



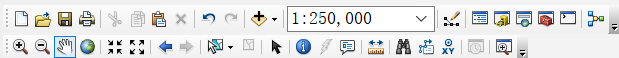
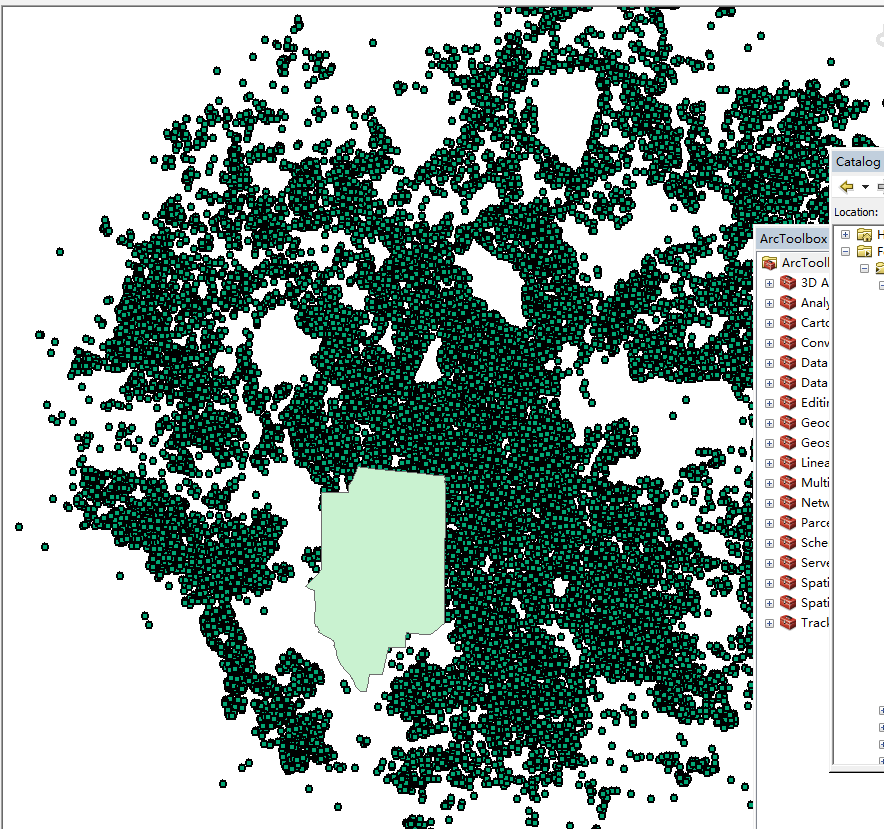


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 - 147.060455 - 287.346283
 - 287.346284 - 605.255253
 - 605.255254 - 772.318143
 - ☒ Bexar County Boundary
-
- ☒ Test_Performance
 - ☒ Test Performance by School District
Test_Perf2
 - Above Average
 - Average
 - Below Average
 - Not in Study
 - ☒ Bexar County Boundary
-
- ☒ Inset_Map
 - ☒ Bexar County Boundary



Search

Local Search

ALL Maps Data Tools Images

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Catalog

Location: EdgewoodSD.shp

Home - ArcpyBook\Ch7

Folder Connections

- C:\
- ArcpyBook
 - Appendix1
 - Appendix2
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 - Ch10
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 - PythonAddInTest
 - Unique.mdb
 - ch4Crime.sddraft
- Intel
- LenovoDrivers
- LenovoQMDownload
- OneDriveTemp

HOW???

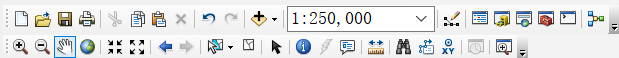


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 - 287.346284 - 605.255253
 - 605.255254 - 772.318143
- ☒ Bexar County Boundary

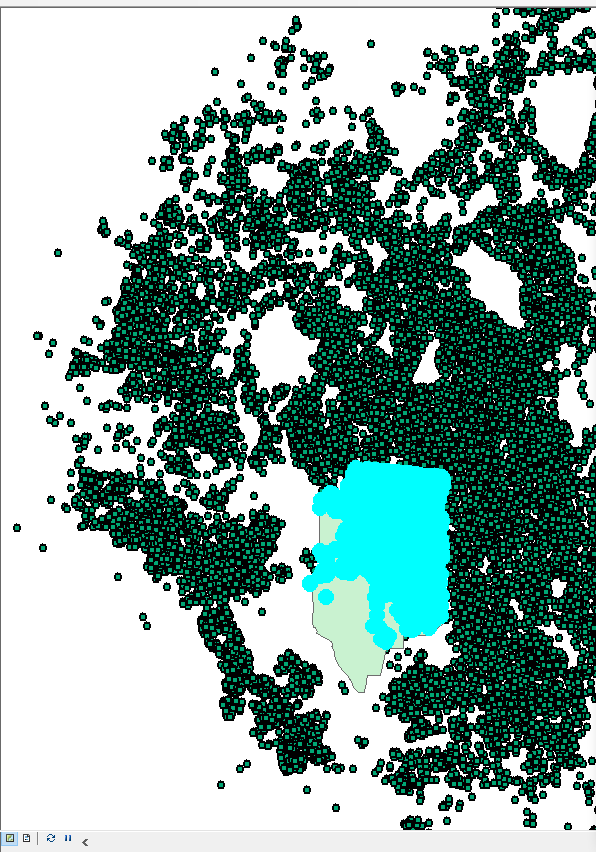
Test_Performance

- ☒ Test Performance by School District
 - Test_Perf2
 - Above Average
 - Average
 - Below Average
 - Not in Study
- ☒ Bexar County Boundary

Inset_Map

- ☒ Bexar County Boundary

Number of features selected: 1470



Select By Location

Select features from one or more target layers based on their location in relation to the features in the source layer.

Selection method:

select features from

Target layer(s):

- ☐ EdgewoodSD
- ☒ Burglaries in 2009
- ☐ Crime Density by School District
- ☐ Bexar County Boundary

☐ Only show selectable layers in this list

Source layer:

EdgewoodSD

☐ Use selected features (0 features selected)

Spatial selection method for target layer feature(s):

are within the source layer feature

☐ Apply a search distance

10000.000000

Feet

[About select by location](#)

OK

Apply

Close

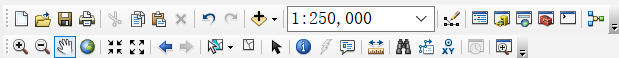


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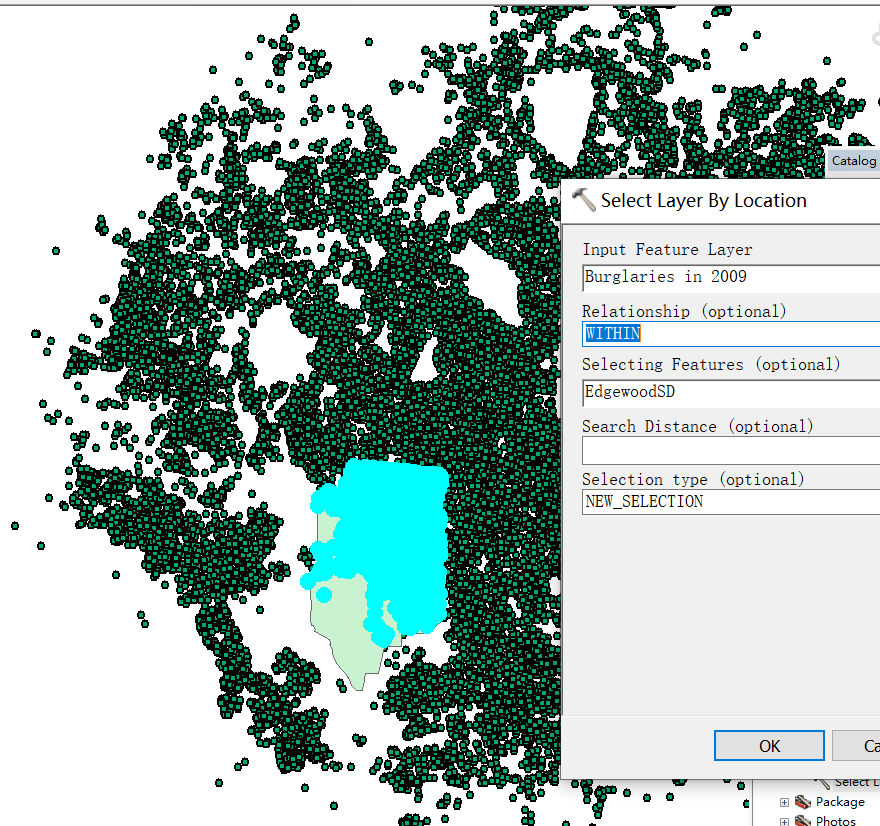
- ☒ EdgewoodSD
- ☒ Burglaries in 2009
- ☐ Crime Density by School District
CrimeDens
 - 5.991641 - 53.502834
 - 53.502835 - 147.060454
 - 147.060455 - 287.346283
 - 287.346284 - 605.255253
 - 605.255254 - 772.318143
- ☒ Bexar County Boundary

Test_Performance

- ☒ Test Performance by School District
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 - Average
 - Below Average
 - Not in Study
- ☒ Bexar County Boundary

Inset_Map

- ☒ Bexar County Boundary



Search

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Select Layer By Location

Input Feature Layer

Burglaries in 2009

Relationship (optional)

WITHIN

Selecting Features (optional)

EdgewoodSD

Search Distance (optional)

Feet

Selection type (optional)

NEW_SELECTION

OK

Cancel

Environments...

<< Hide Help

Tool Help

Relationship (optional)

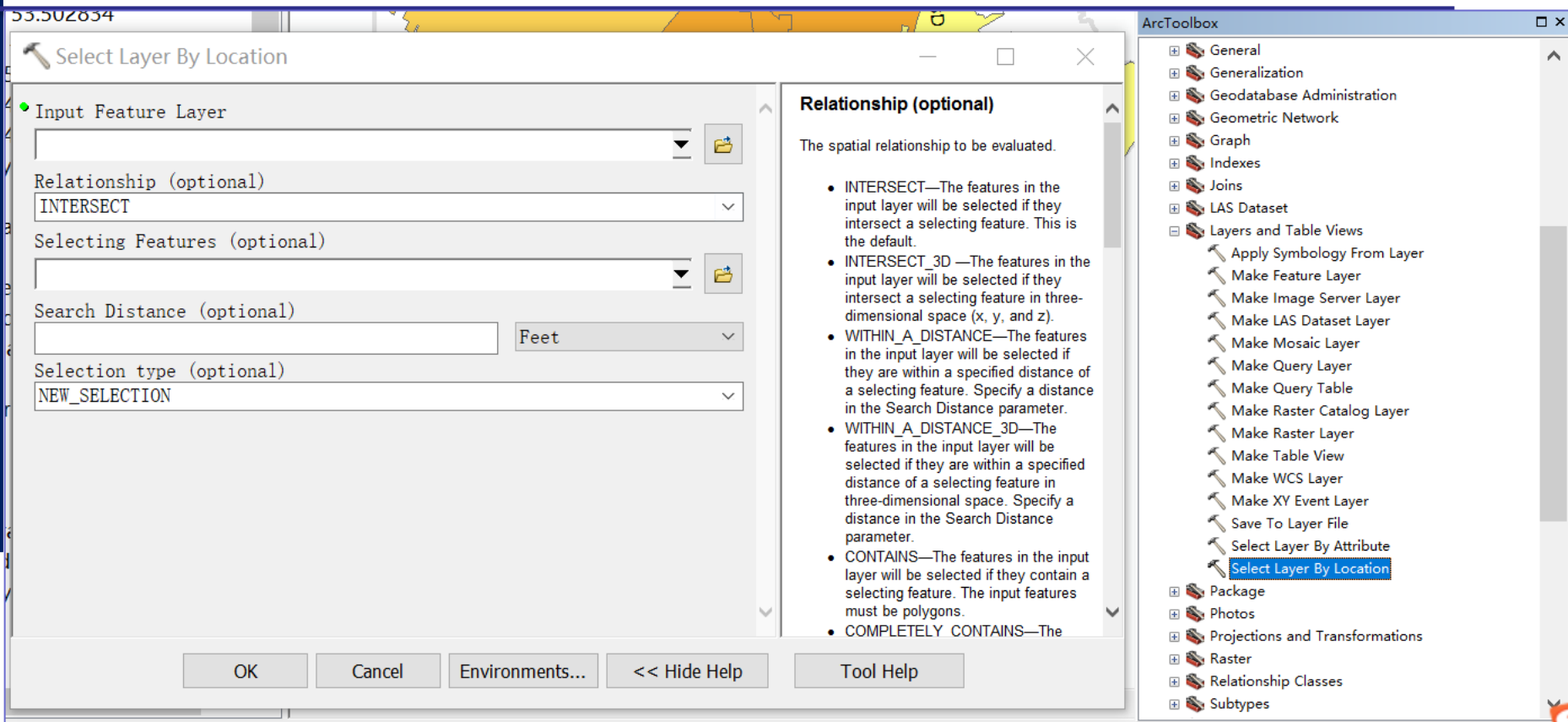
The spatial relationship to be evaluated

- INTERSECT—The features in the input layer will be selected if they intersect a selecting feature. This is the default.
- INTERSECT_3D—The features in the input layer will be selected if they intersect a selecting feature in three-dimensional space (x, y, and z).
- WITHIN_A_DISTANCE—The features in the input layer will be selected if they are within a specified distance of a selecting feature. Specify a distance in the Search Distance parameter.
- WITHIN_A_DISTANCE_3D—The features in the input layer will be selected if they are within a specified distance of a selecting feature in three-dimensional space. Specify a distance in the Search Distance parameter.
- CONTAINS—The features in the input layer will be selected if they completely contain a selecting feature. The input features must be polygons.
- COMPLETELY_CONTAINS—

Select Layer by Location

- Package
- Photos
- Projections and Transformations

10.4 Select Layer by Location



Select Layer By Location

Input Feature Layer

Relationship (optional)

INTERSECT

INTERSECT

INTERSECT_3D

WITHIN_A_DISTANCE

WITHIN_A_DISTANCE_3D

CONTAINS

COMPLETELY_CONTAINS

CONTAINS_CLEMENTINI

WITHIN

COMPLETELY_WITHIN

WITHIN_CLEMENTINI

ARE_IDENTICAL_TO

BOUNDARY_TOUCHES

SHARE_A_LINE_SEGMENT_WITH

CROSSED_BY_THE_OUTLINE_OF

HAVE_THEIR_CENTER_IN

Relationship (optional)

The spatial relationship to be evaluated.

- INTERSECT—The features in the input layer will be selected if they intersect a selecting feature. This is the default.
- INTERSECT_3D —The features in the input layer will be selected if they intersect a selecting feature in three-dimensional space (x, y, and z).
- WITHIN_A_DISTANCE—The features in the input layer will be selected if they are within a specified distance of a selecting feature. Specify a distance in the Search Distance parameter.
- WITHIN_A_DISTANCE_3D—The features in the input layer will be selected if they are within a specified distance of a selecting feature in three-dimensional space. Specify a distance in the Search Distance parameter.
- CONTAINS—The features in the input layer will be selected if they contain a selecting feature. The input features must be polygons.
- COMPLETELY_CONTAINS—The

OK

Cancel

Environments...

<< Hide Help

Tool Help

```
>>> import arcpy
>>> arcpy.SelectLayerByLocation_management(|
```

```
SelectLayerByLocation_management(in_layer,
{overlap_type}, {select_features}, {search_distance},
{selection_type})
```

Selects features in a layer based on a spatial relationship to features in another layer. Each feature in the Input Feature Layer is evaluated against the features in the Selecting Features layer or feature class; if the specified Relationship is met, the input feature is selected.

INPUTS:

in_layer (Feature Layer / Raster Catalog Layer / Mosaic Layer):

The layer containing the features that will be evaluated against the Selecting Features. The selection will be applied to this layer. The input can be a layer in the ArcMap table of contents, or a layer created in ArcCatalog or in scripts using the Make Feature Layer tool. The input cannot be the path to a feature class on disk.

overlap_type {String}:

The spatial relationship to be evaluated.

* **INTERSECT**—The features in the input layer will be selected if they intersect a selecting feature. This is the default.

* **INTERSECT_3D** —The features in the input layer will be selected if they intersect a selecting feature in three-dimensional space (x, y, and z).

* **WITHIN_A_DISTANCE**—The features in the input layer will be selected if they are within a specified distance of a selecting

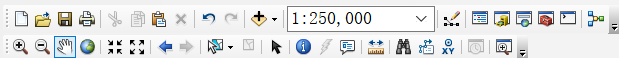
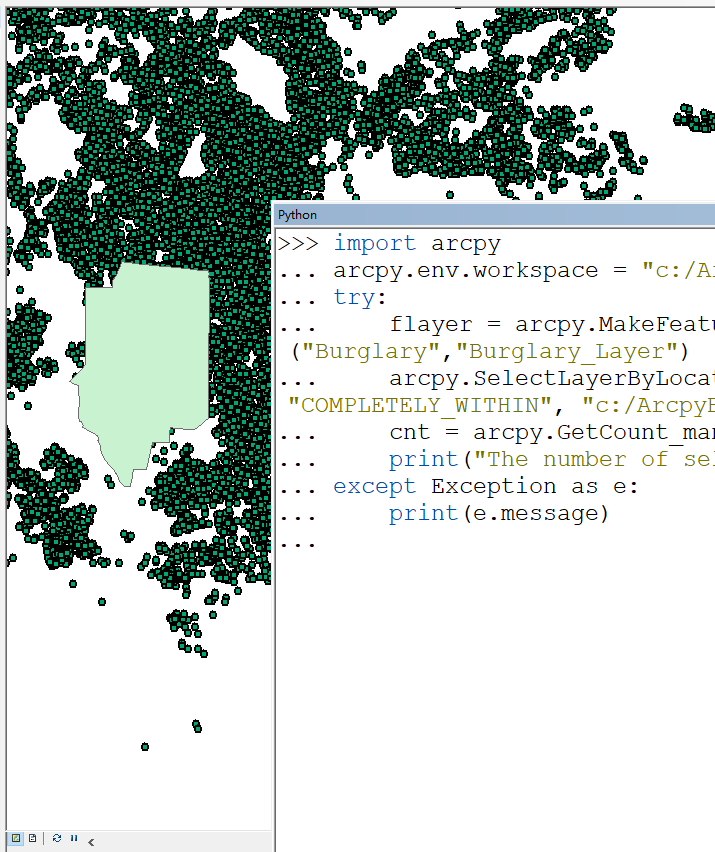


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- ☐ Inset_Map
- ☒ Bexar County Boundary



Search

Local Search

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Any Extent

Catalog

Python

```
>>> import arcpy
... arcpy.env.workspace = "c:/ArcpyBook/data/CityOfSanAntonio.gdb"
... try:
...     flayer = arcpy.MakeFeatureLayer_management
...     ("Burglary", "Burglary_Layer")
...     arcpy.SelectLayerByLocation_management(flayer,
...     "COMPLETELY_WITHIN", "c:/ArcpyBook/Ch7/EdgewoodSD.shp")
...     cnt = arcpy.GetCount_management(flayer)
...     print("The number of selected records is: " + str(cnt))
... except Exception as e:
...     print(e.message)
... 
```

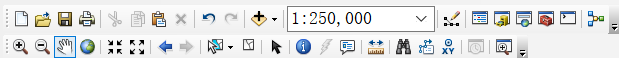


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☒ Burglary_Layer☒ EdgewoodSD☒ Burglaries in 2009☐ Crime Density by School District
CrimeDens

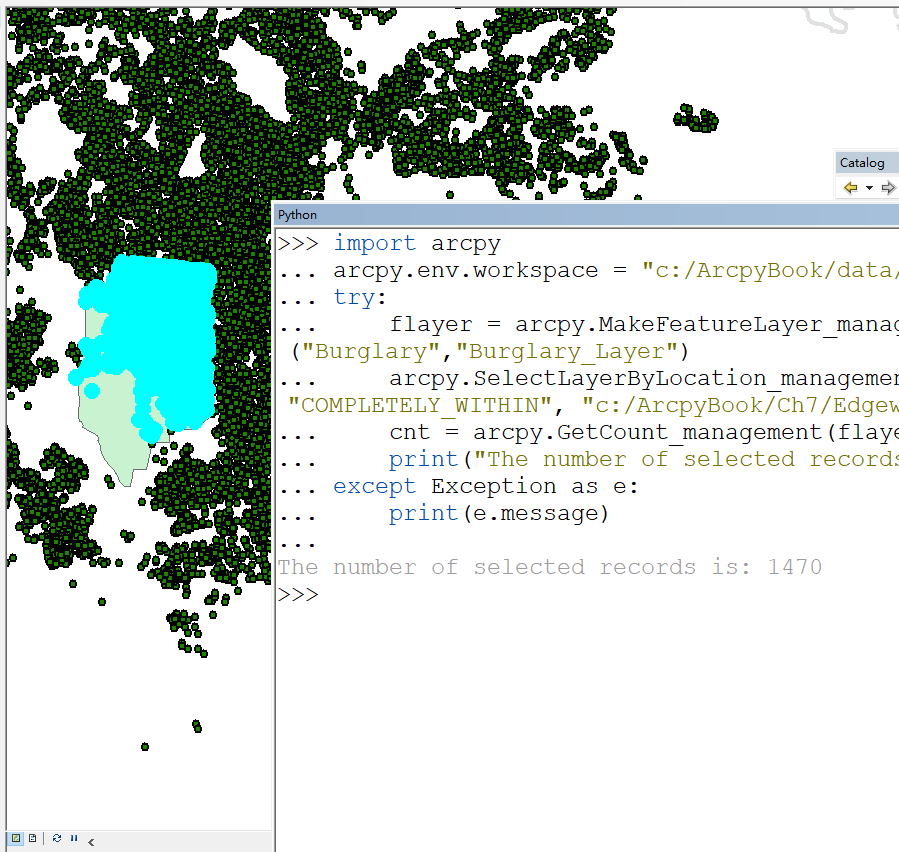
- 5.991641 - 53.502834
- 53.502835 - 147.060454
- 147.060455 - 287.346283
- 287.346284 - 605.255253
- 605.255254 - 772.318143

☒ Bexar County Boundary

Test_Performance

☒ Test Performance by School District
Test_Perf2☒ Above Average☒ Average☒ Below Average☐ Not in Study☒ Bexar County Boundary

Inset Map



Python

```
>>> import arcpy
... arcpy.env.workspace = "c:/ArcpyBook/data/CityOfSanAntonio.gdb"
... try:
...     flayer = arcpy.MakeFeatureLayer_management
...     ("Burglary", "Burglary_Layer")
...     arcpy.SelectLayerByLocation_management(flayer,
...     "COMPLETELY_WITHIN", "c:/ArcpyBook/Ch7/EdgewoodSD.shp")
...     cnt = arcpy.GetCount_management(flayer)
...     print("The number of selected records is: " + str(cnt))
... except Exception as e:
...     print(e.message)
... 
```

The number of selected records is: 1470

```
>>>
```

Search

Local Search

ALL Maps Data Tools Images

Any Extent

Catalog

```
Executing: MakeFeature
c:/ArcpyBook/data/City
\Burglary Burglary Lay
OBJECTID VISIBLE NONE;
NONE;CASE CASE VISIBLE
LOCATION VISIBLE NONE;
NONE;SVCAREA SVCAREA V
SPLITDT VISIBLE NONE;S
VISIBLE NONE;HR HR VIS
VISIBLE NONE;SHIFT SHI
NONE;OFFCODE OFFCODE V
OFFDESC VISIBLE NONE;A
VISIBLE NONE;ARCCODE2
NONE;ARCTYPE ARCTYPE V
XNAD83 VISIBLE NONE;YN
NONE"
Start Time: Thu Apr 01
Succeeded at Thu Apr 0
(Elapsed Time: 0.30 se
Executing: SelectLayer
Burglary_Layer COMPLET
c:/ArcpyBook/Ch7/Edgew
NEW SELECTION
```

```
Start Time: Thu Apr 0
Succeeded at Thu Apr 0
(Elapsed Time: 0.30 se
Executing: GetCount
Start Time: Thu Apr 01
```

```
>>> import arcpy
>>> arcpy.SelectLayerByLocation_management(|
```

```
SelectLayerByLocation_management(in_layer,
{overlap_type}, {select_features}, {search_distance},
{selection_type})
```

Selects features in a layer based on a spatial relationship to features in another layer. Each feature in the Input Feature Layer is evaluated against the features in the Selecting Features layer or feature class; if the specified Relationship is met, the input feature is selected.

INPUTS:

in_layer (Feature Layer / Raster Catalog Layer / Mosaic Layer):

The layer containing the features that will be evaluated against the Selecting Features. The selection will be applied to this layer. The input can be a layer in the ArcMap table of contents, or a layer created in ArcCatalog or in scripts using the Make Feature Layer tool. The input cannot be the path to a feature class on disk.

overlap_type {String}:

The spatial relationship to be evaluated.

* INTERSECT—The features in the input layer will be selected if they intersect a selecting feature. This is the default.

* INTERSECT_3D —The features in the input layer will be selected if they intersect a selecting feature in three-dimensional space (x, y, and z).

* WITHIN_A_DISTANCE—The features in the input layer will be selected if they are within a specified distance of a selecting

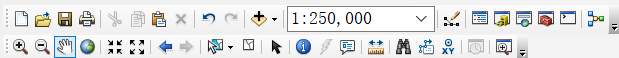
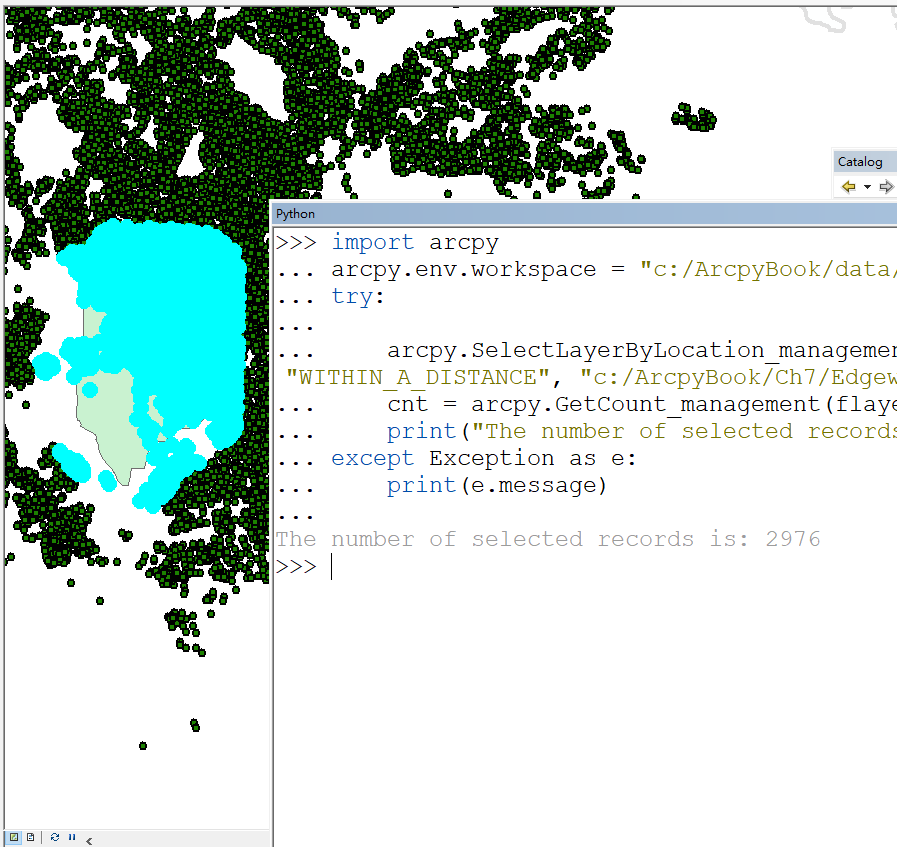


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 - 147.060455 - 287.346283
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 - 605.255254 - 772.318143
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-
- ☒ Test_Performance
 - ☒ Test Performance by School District
Test_Perf2
 - Above Average
 - Average
 - Below Average
 - Not in Study
 - ☒ Bexar County Boundary

Inset Map



Python

```
>>> import arcpy
... arcpy.env.workspace = "c:/ArcpyBook/data/CityOfSanAntonio.gdb"
... try:
...
...     arcpy.SelectLayerByLocation_management (flayer,
... "WITHIN_A_DISTANCE", "c:/ArcpyBook/Ch7/EdgewoodSD.shp", "1 MILES")
...     cnt = arcpy.GetCount_management(flayer)
...     print("The number of selected records is: " + str(cnt))
... except Exception as e:
...     print(e.message)
...
The number of selected records is: 2976
>>> |
```

Search

Local Search

ALL Maps Data Tools Images

Any Extent

Catalog

```
Executing: SelectLayer
Burglary_Layer WITHIN
c:/ArcpyBook/Ch7/Edgew
Miles" NEW_SELECTION
Succeeded at Thu Apr 0
(Elapsed Time: 1.02 se
Executing: GetCount Bu
Start Time: Thu Apr 01
Row Count = 2976
Succeeded at Thu Apr 0
(Elapsed Time: 0.00 se
```

Get Count

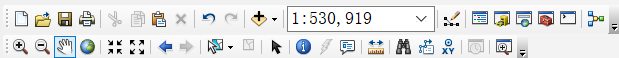


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Crime

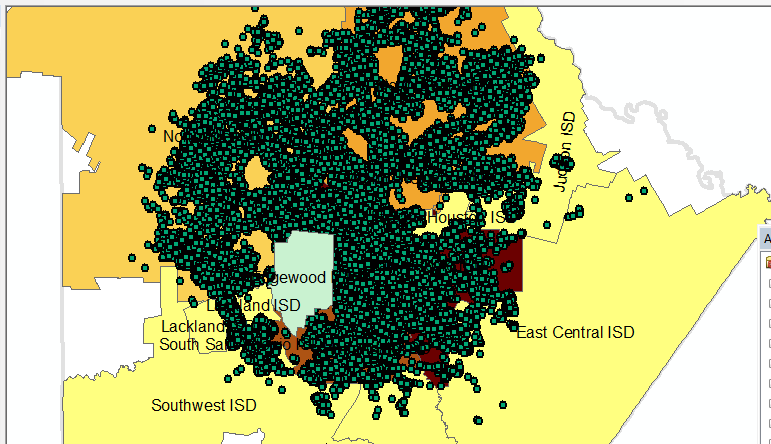
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Test_Perf2
 - Above Average
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 - Below Average
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Inset_Map

- ☒ Bexar County Boundary



Python

```
>>> import arcpy
... arcpy.env.workspace = "c:/ArcpyBook/data/CityOfSanAntonio.gdb"
... try:
...     layer = arcpy.MakeFeatureLayer_management
...     ("Burglary", "Burglary_Layer")
...     arcpy.SelectLayerByLocation_management (layer,
... "WITHIN_A_DISTANCE", "c:/ArcpyBook/Ch7/EdgewoodSD.shp", "1 MILES")
...     arcpy.CopyFeatures_management (layer,
... "c:/ArcpyBook/Ch7/EdgewoodBurglaries.shp")
...     ##cnt = arcpy.GetCount_management(layer)
...     ##print "The number of selected records is: " + str(cnt)
... except Exception as e:
...     print (e.message)
... 
```

Search

Local Search

ALL Maps Data Tools Images

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Catalog

Location: EdgewoodSD.shp

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 - Ch7
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 - EdgewoodSD.shp
 - Ch8
 - Ch9
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 - data
 - GenerateRandomPoints
 - New_Data
 - PythonAddInTest
 - Unique.mdb
 - ch4Crime.sddraft
 - Intel
 - LenovoDrivers
 - LenovoQMDDownload
 - OneDriveTemp

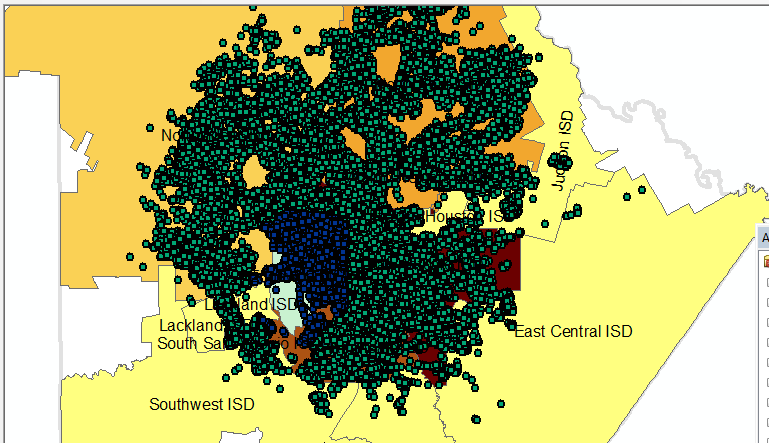
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Test Performance

- ☒ Test Performance by School District
- Test_Perf2
 - Above Average
 - Average
 - Below Average
 - Not in Study
- ☒ Bexar County Boundary



Python

```
>>> import arcpy
... arcpy.env.workspace = "c:/ArcpyBook/data/CityOfSanAntonio.gdb"
... try:
...     flayer = arcpy.MakeFeatureLayer_management
...     ("Burglary", "Burglary_Layer")
...     arcpy.SelectLayerByLocation_management (flayer,
... "WITHIN_A_DISTANCE", "c:/ArcpyBook/Ch7/EdgewoodSD.shp", "1 MILES")
...     arcpy.CopyFeatures_management (flayer,
... "c:/ArcpyBook/Ch7/EdgewoodBurglaries.shp")
...     ##cnt = arcpy.GetCount_management (flayer)
...     ##print "The number of selected records is: " + str(cnt)
... except Exception as e:
...     print (e.message)
>>>
```

ArcToolbox

- ArcTool
- 3D A
- Analy
- Carto
- Conv
- Data
- Data
- Edit
- Geoc
- Geos

Catalog

Location: EdgewoodBurglaries.shp

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 - GenerateRandomPoints
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 - PythonAddInTest
 - Unique.mdb
 - ch4Crime.sddraft
- Intel
- LenovoDrivers
- LenovoOMDownload

```
NONE;
VISIE
ARCTY
NONE;
VISIE
YNAD8
Start
16:51
Succes
16:51
Time:
Execu
Seleq
Burglary_Layer
WITHIN_A_DISTANCE
c:/ArcpyBook/Ch7/Edgewood
dSD.shp "1 Miles"
NEW_SELECTION
```



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☒ EdgewoodSD☒ Burglaries in 2009☒ Crime Density by School District

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147.060455 - 287.346283

287.346284 - 605.255253

605.255254 - 772.318143

☒ Bexar County Boundary

Test_Performance

☒ Test Performance by School District

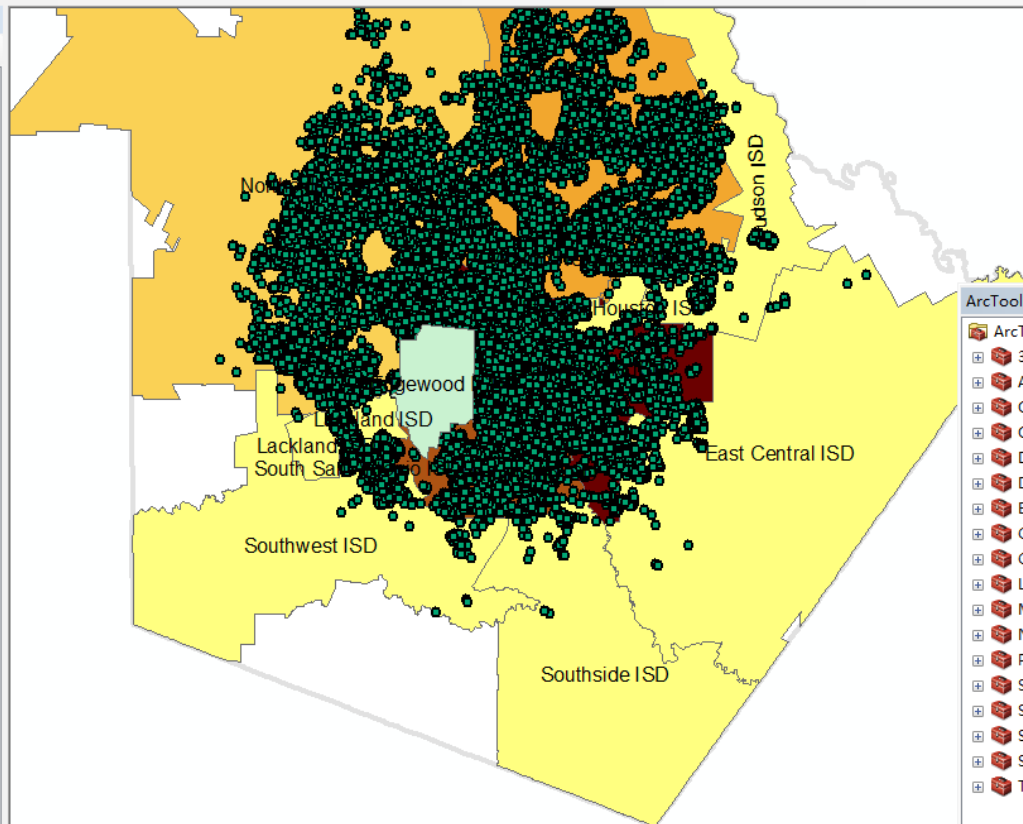
Test_Perf2

Above Average

Average

Below Average

Not in Study



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EdgewoodBurglaries.

EdgewoodSD.shp

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Ch9

code

data

GenerateRandomPoints

New_Data

PythonAddInTest

星期一Edgewood学校范围内
发生的所有盗窃案有哪些？

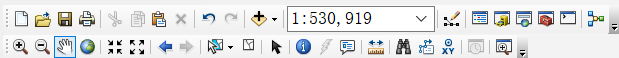


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[x] EdgewoodSD

[x] Burglaries in 2009

[x] Crime Density by School District

CrimeDens

5.991641 - 53.502834

53.502835 - 147.060454

147.060455 - 287.346283

287.346284 - 605.4

605.255254 - 772.1

[x] Bexar County Bound

Test_Performance

[x] Test Performance by

Test_Perf2

Above Average

Average

Below Average

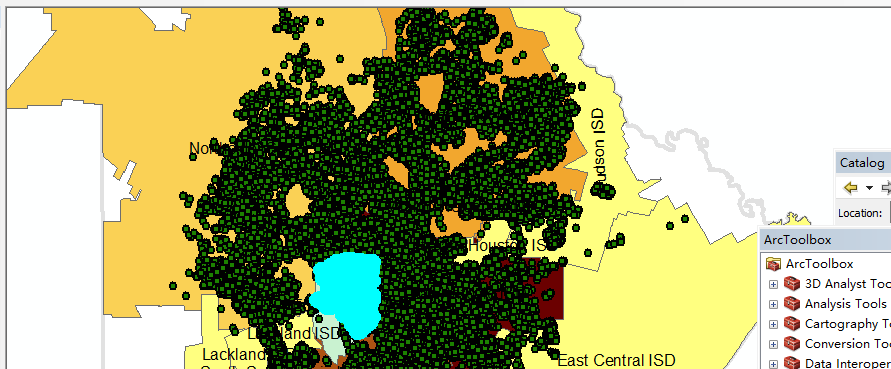
Not in Study

[x] Bexar Cou

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Burglaries

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Search

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ALL Maps Data Tools Images

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Catalog

Location: EdgewoodSD.shp

ArcToolbox

- ArcToolbox
- 3D Analyst Tools
- Analysis Tools
- Cartography Tools
- Conversion Tools
- Data Interoperability Tools

```
>>> import arcpy
... arcpy.env.workspace = "c:/ArcpyBook/data/CityOfSanAntonio.gdb"
... try:
...     qry = '"DOW" = \'Mon\''
...     flayer = arcpy.MakeFeatureLayer_management
...           ("Burglary", "Burglary_Layer")
...     arcpy.SelectLayerByLocation_management (flayer,
... "COMPLETELY_WITHIN", "c:/ArcpyBook/Ch7/EdgewoodSD.shp")
...     arcpy.SelectLayerByAttribute_management(flayer,
... "SUBSET_SELECTION", qry)
...     cnt = arcpy.GetCount_management(flayer)
...     print("The total number of selected records is: " + str(cnt))
... except Exception as e:
...     print(e.message)
...
The total number of selected records is: 197
>>>
```

```
17:10:47 2021
Succeeded at Thu Apr 01
17:10:48 2021 (Elapsed
Time: 0.32 seconds)
Executing:
SelectLayerByLocation
Burglary_Layer
COMPLETELY_WITHIN
c:/ArcpyBook/Ch7/Edgewo
dSD.shp # NEW_SELECTION
Start Time: Thu Apr 01
17:10:52 2021
Succeeded at Thu Apr 01
17:10:53 2021 (Elapsed
Time: 0.38 seconds)
Executing:
SelectLayerByAttribute
Burglary_Layer
SUBSET_SELECTION '"DOW"
= \'Mon\''
Start Time: Thu Apr 01
17:10:58 2021
```

The End

