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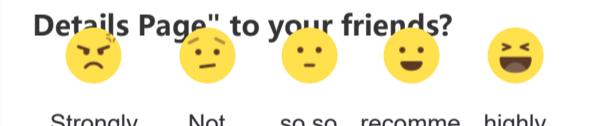
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```

3 ...
4 =====
5 Author: DalNur
6 Email: liyang@alu.hit.edu.cn
7 =====
8 ...
9 ...

10 import win32com.client
11 import pythoncom
12
13 acad = win32com.client.Dispatch("AutoCAD.Application.19")
14 # AutoCAD.Application.19为 ProgID
15 doc = acad.ActiveDocument
16 doc.Utility.Prompt("Hello AutoCAD\n")
17 mp = doc.ModelSpace
18 print(doc.Name)
19

```

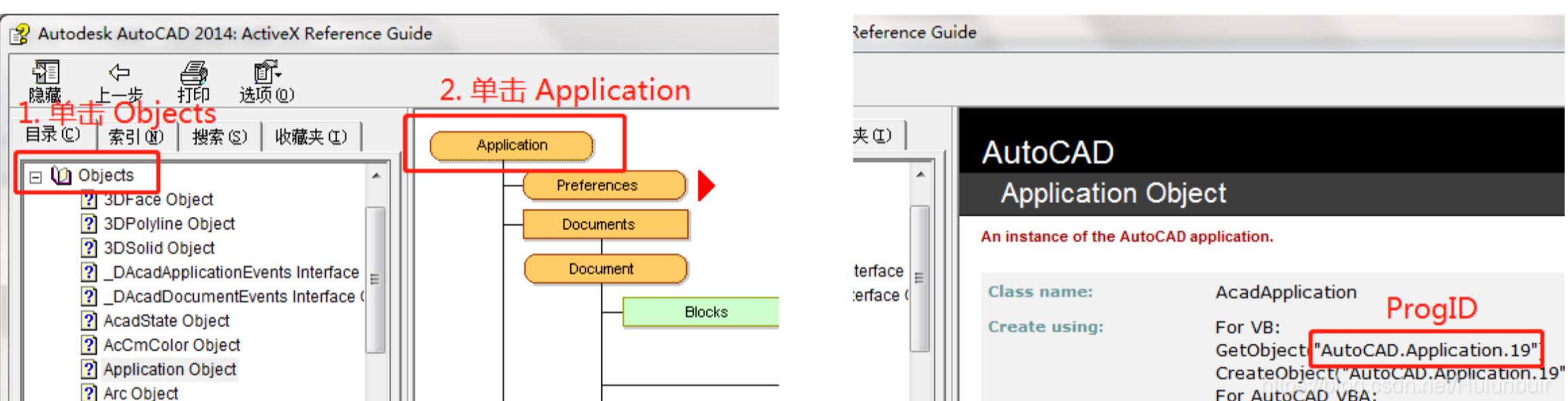
**2.1. ProgID**

Depending on the CAD version, ProgID may change. The ProgID of some versions of CAD is as follows:

| AutoCAD version | ProgID                 |
|-----------------|------------------------|
| 2010            | AutoCAD.Application.18 |
| 2014            | AutoCAD.Application.19 |

For the ProgID of common versions of CAD, please refer to the blog post: autocad application version .

The ProgID of other versions of CAD can be viewed in the official secondary development help document. The specific search location is shown in the figure below.



For details on how to obtain the official secondary development help documents, please refer to the blog post: Introduction to the Use of Python pyautocad Library Frontier Part.

**Three, data conversion**

Note: I am not a computer professional. Some of the expressions in the article may not be rigorous or even wrong. Please forgive me.

There are fewer data types in Python, and the requirements for the data itself are relatively loose. For example, each element in a list can belong to different data types. Although this is helpful to reduce the difficulty of programming, it is also a secondary problem for CAD. Development has caused some unnecessary troubles.

In the process of CAD secondary development, many function/method parameters require the input data type to be **Variant (array of objects)**, but there does not seem to be a data type directly corresponding to it in Python. If you use **list** instead of **Variant**, Then the program cannot be executed smoothly, and the error is "**Invalid object array**". Therefore, a certain conversion method is needed to convert the variables defined in Python to the data type **Variant** that can be recognized by CAD .

The VARIANT structure is mainly used in COM (Component Object Model) for passing parameters. Its existence is mainly to maintain the unity of the COM parameter passing method. It almost contains the transfer of all common common types of data types. , Such as integer, floating point, boolean, etc., and the corresponding type of pointer type, such as integer pointer. [3]

The corresponding relationship between some types and variables is as follows:

| Member name | Description                               | report |
|-------------|---|--------|
| VT_EMPTY    | Indicates that a value was not specified. |        |

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VT\_DISPATCH  
Indicates an IDispatch pointer.

In addition, NumPy arrays can be passed as VARIANT arrays arguments. The array is converted to a SAFEARRAY according to its type.<sup>[4]</sup> (This is the original text of the comtypes library help document. I have limited knowledge of computers. In order not to misinterpret the original text, I will not Do translation), part of the correspondence is as follows:

| NumPy type             | VARIANT type |
|------------------------|--------------|
| int32, int, intc, int_ | VT_I4        |
| uint32, uint, uintc    | VT_UI4       |
| float64, float_        | VT_R8        |

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comtypes 是一个轻量级的 python com 包，其中文网站详见: <https://www.cnpython.com/pypi/comtypes>; 官方文档详见: [comtypes 1.1.3 documentation](#)。

NumPy 是用 Python 进行科学计算的基础软件包，其官方的中文文档详见网站：[Numpy 中文网](#)。

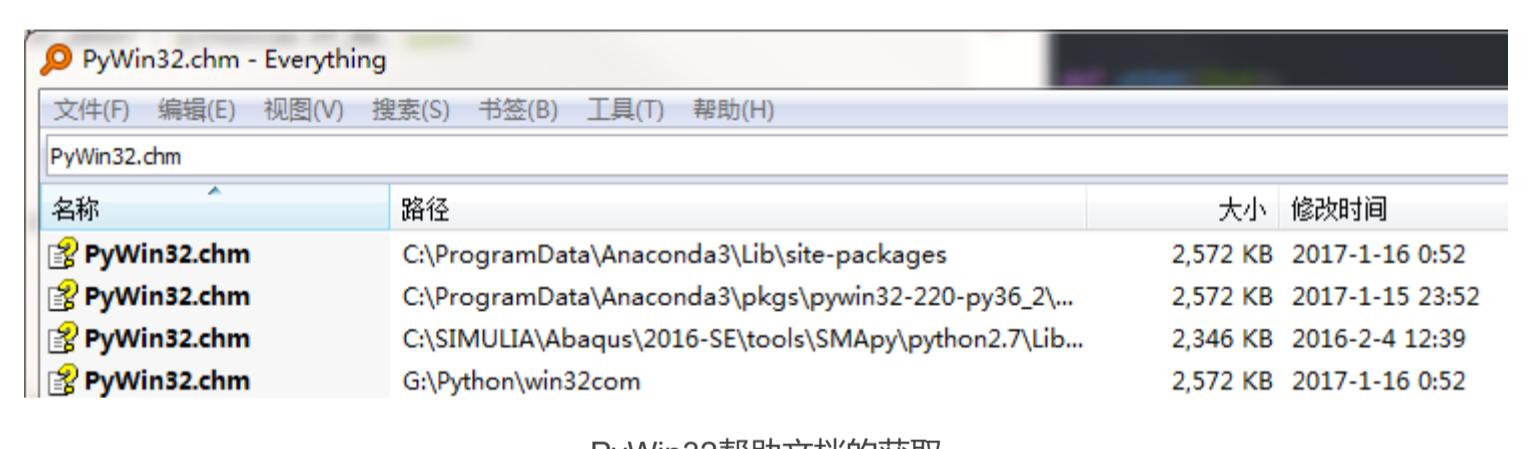
本文用到的数据转化函数代码如下：

```

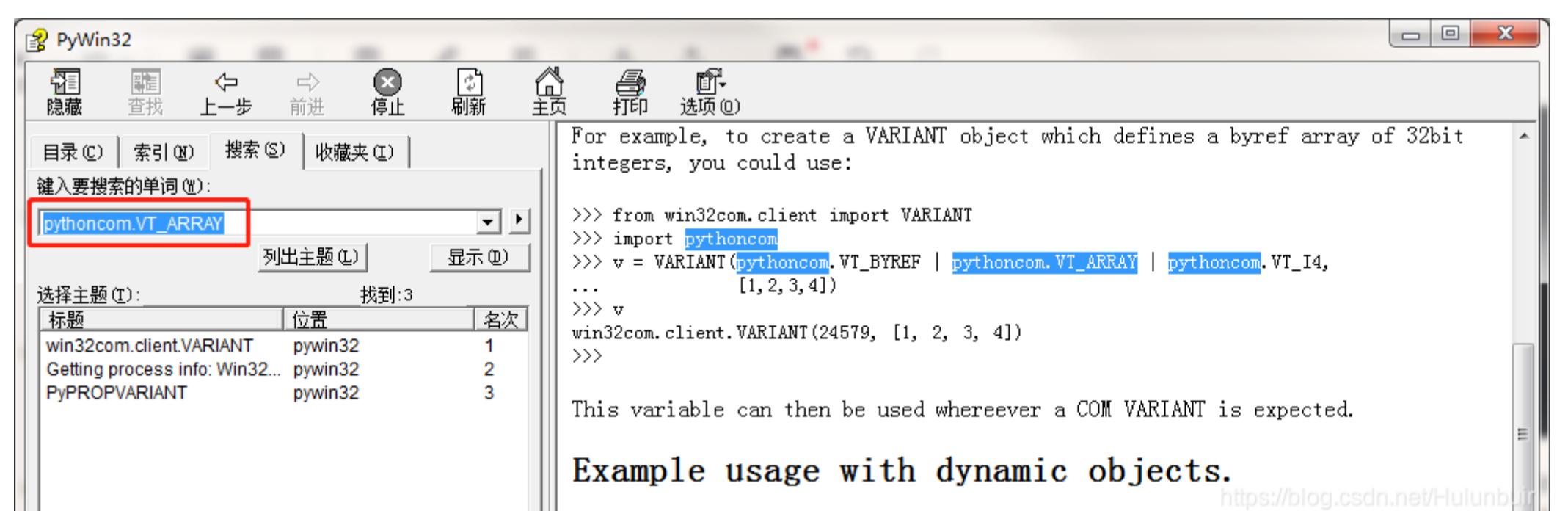
1 def vtptn(x, y, z=0):
2     """坐标点转化为浮点数"""
3     return win32com.client.VARIANT(pythoncom.VT_ARRAY | pythoncom.VT_R8, (x, y, z))
4
5 def vtobj(obj):
6     """转化为对象数组"""
7     return win32com.client.VARIANT(pythoncom.VT_ARRAY | pythoncom.VT_DISPATCH, obj)
8
9 def vtFloat(list):
10    """列表转化为浮点数"""
11    return win32com.client.VARIANT(pythoncom.VT_ARRAY | pythoncom.VT_R8, list)
12
13 def vtInt(list):
14    """列表转化为整数"""
15    return win32com.client.VARIANT(pythoncom.VT_ARRAY | pythoncom.VT_I2, list)
16
17 def vtVariant(list):
18    """列表转化为变体"""
19    return win32com.client.VARIANT(pythoncom.VT_ARRAY | pythoncom.VT_VARIANT, list)

```

其他数据类型的转化方式可查询 PyWin32 的官方帮助文档，它的获取方式如下：首先确保你已经成功安装了 pywin32 模块，然后在搜索神器 Everything 的搜索栏中输入 PyWin32.chm，便可得到其所在的路径，打开文件 PyWin32.chm，在搜索栏中输入 pythoncom.VT\_ARRAY，便可查看各种数据类型的转化。



PyWin32帮助文档的获取



VARIANT的查询

#### 四、创建测试图元

```

1 [pnt1, pnt2, pnt3, pnt4, pnt5, pnt6] = [vtptn(-40, -40), vtptn(500, 500), vtptn(300, 200),
2                                         vtptn(600, 200), vtptn(700, 200), vtptn(100, 0)]
3
4 LineObj = mp.AddLine(pnt1, pnt2)
5 CircleObj = mp.AddCircle(pnt3, 100)
6 ArcObj = mp.AddArc(pnt4, 50, 0, 1.57)

```

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## 五、创建选择集

创建名称为 SS1 的选择集。

```
1 | try:
2 |     doc.SelectionSets.Item("SS1").Delete()
3 | except:
4 |     print("Delete selection failed")
5 |
6 | slt = doc.SelectionSets.Add("SS1")
```

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## 六、常规选择

### 6.1. 屏幕拾取

```
1 | slt.SelectOnScreen()
2 | print("请在屏幕上拾取图元, 以Enter键结束")
3 | obj = slt[0]
4 | print(obj.ObjectID)
5 | print(slt)
```

### 6.2. 选择过定点图元

```
1 | pnt = APoint(0, 0)
2 | slt.SelectAtPoint(pnt)
3 | obj = slt[0]
4 | print(obj.StartPoint) # 当不止一个图元过点pnt时, slt中的元素也不止一个。
```

### 6.3. 多边形框选

多边形由给定各点依次连直线形成, 最终实现该多边形区域内的全选。

```
1 | pnts = [-50, -50, 0, -50, 550, 0, 550, 550, 0, 550, -50, 0, -50, -50, 0]
2 | pnts=vtFloat(pnts)
3 |
4 | slt.SelectByPolygon(6, pnts) # acSelectionSetWindowPolygon = 6
5 |
6 | obj = slt[0]
7 | print(obj.ObjectID)
8 | obj = slt[1]
9 | print(obj.ObjectID)
```

### 6.4. 全选

```
1 | slt.Select(5) # acSelectionSetAll = 5
2 | obj = slt[0]
3 | print(obj.layer)
```

## 七、快速选择

### 7.1. 语法

- object.Select(**Mode**, **Point1**, **Point2**, **FilterType**, **FilterData**)
- **object**: SelectionSet. The object this method applies to。
- **Mode**: 选择模式, AcSelect enum, 具体含义下表。
- **Point1**: 3维坐标点。
- **Point2**: 3维坐标点。
- **FilterType**: A DXF group code specifying the type of filter to use。
- **FilterData**: The value to filter on。



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space and attempt to use the selection

| Mode                   | enum | Description  |
|------------------------|------|--|
| acSelectionSetWindow   | 0    | Selects all objects completely inside a rectangular area whose corners are defined by Point1 and Point2. |
| acSelectionSetCrossing | 1    | Selects objects within and crossing a rectangular area whose corners are defined by Point1 and Point2.   |

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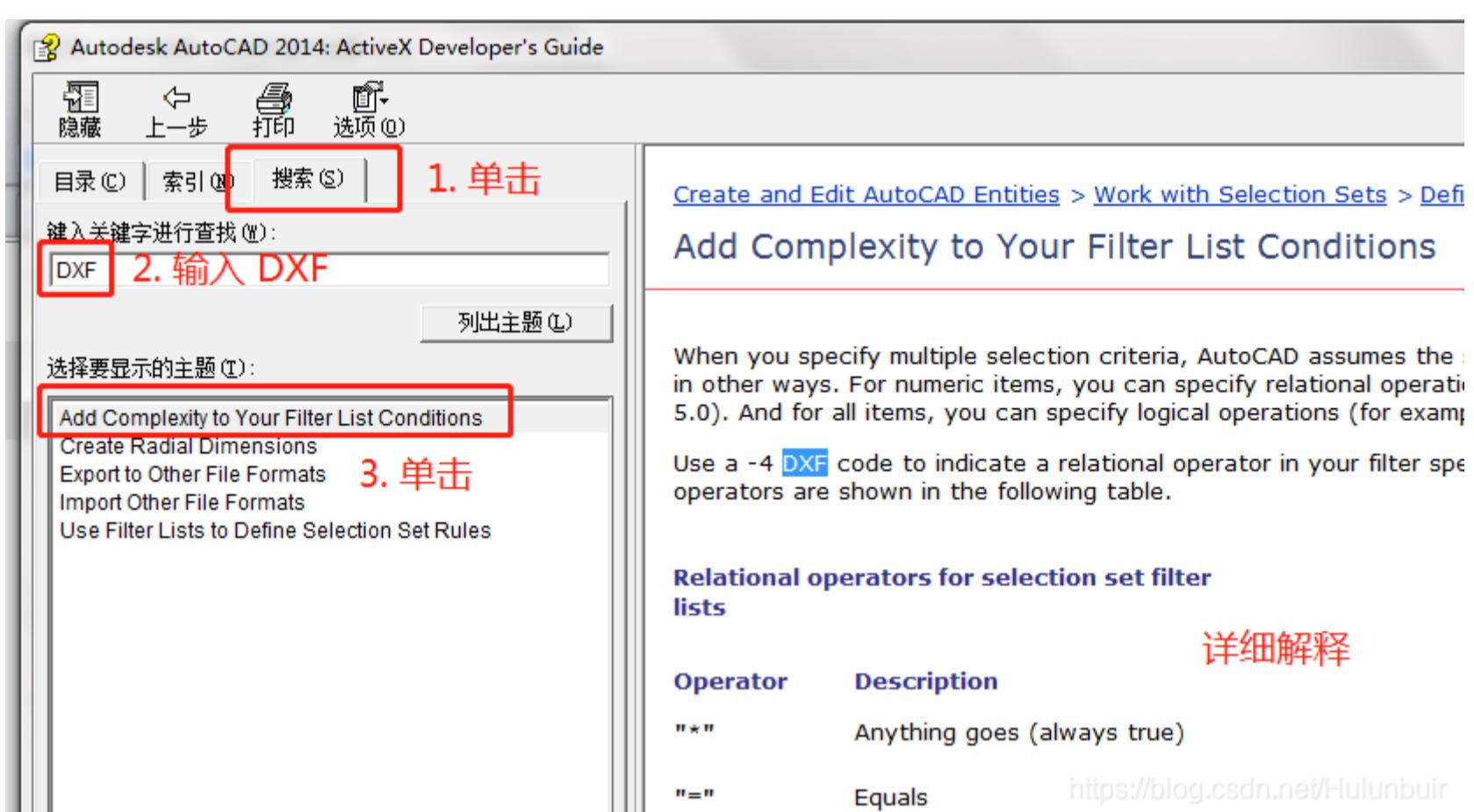
|                    |   |  |
|--------------------|---|--|
| acSelectionSetLast | 4 | Selects the most recently created visible objects. |
| acSelectionSetAll  | 5 | Selects all objects.                               |

**7.2. DXF组码**

详见：CADVBA中的选择集过滤及DXF组码表。

CAD中的选择集过滤----有条件选择AutoCAD实体（二）。

此外，在二次开发帮助文档 ActiveX Developer's Guide 中，搜索 DXF，便可得到官方的权威解释，操作如下：

**详细解释**

| Operator | Description                 |
|----------|-----------------------------|
| "*"      | Anything goes (always true) |
| "=="     | Equals                      |

<https://blog.csdn.net/hulunbuir>

**7.3. 实例**

选择 0 图层上所有半径大于 5 的圆并删除，代码如下：

```

1 filterType = [0, -4, 40, 8] # 定义过滤类型
2 filterData = ["Circle", ">", 5, "0"] # 设置过滤参数
3
4 filterType = vtInt(filterType) # 数据类型转化
5 filterData = vtVariant(filterData) # 数据类型转化
6
7 slt.Select(5, 0, 0, filterType, filterData) # 实现过滤
8
9 obj = slt[0]
10 print(obj.Diameter)
11
12 slt.Erase() # 删除符合条件的所有圆

```

**八、GetEntity**

AutoCAD  
GetEntity Method  
Gets an object interactively.

[See Also](#) | [Example](#)

**Signature**

```
object.GetEntity Object, PickedPoint [, Prompt]
```

**Object**  
Utility  
The objects this method applies to.

**Object**  
Object, output-only  
The picked object. Can be one of any of the Drawing Objects.

**PickedPoint**  
Variant (three-element array of doubles); output-only  
A 3D WCS coordinate specifying the point that was selected.

**Prompt**  
Variant (string); input-only; optional  
The text to display that prompts the user for input.

**Remarks**

This method requires the AutoCAD user to select an object by picking a point on the graphics screen. If an object is picked, it is returned in the first parameter and the second parameter will contain the point picked in WCS coordinates. If the pick point is not on an object, the method will fail.

The pick point returned by GetEntity does not necessarily lie on the selected object. The returned point represents the location of the crosshairs at the time of selection. The relationship between this point and the object varies depending on the size of the pickbox and the current zoom scale.

This method can retrieve an object even if it is not visible on the screen or if it is on a frozen layer.

以下代码实现将用户选择的图元的颜色更改为红色。

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```

3
4 print(rtnObj)
5
6 print("所选图元的ID: ", rtnObj[0].ObjectID)
7 print("鼠标单击处的坐标: ", rtnObj[1])
8
9 sltObject = doc.ObjectIdToObject(rtnObj[0].ObjectID) # 图元ID转化为对应的图元
10
11 clr = doc.Application.GetInterfaceObject("AutoCAD.AcxColor.19")
12 clr.SetRGB(255, 0, 0) # 创建红色
13 sltObject.TrueColor = clr # 指定颜色
14
15 doc.Application.Update()

```

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## 九、致谢

选择集功能的顺利实现离不开 ke1078 同学的大力支持，特此感谢！

## 十、尾声

以上，便是关于 AutoCAD 选择集的一些基本代码，因篇幅有限，某些非关键功能未做详细介绍，如有疑问，欢迎邮件来询。

In view of the relatively small number of relevant sample codes, this article features a summary of the phased learning for oneself on the one hand, and on the other hand, it provides a little more reference for those in need.

If you have implemented some functions not mentioned in this article, please present them in the comment area to provide more help for follow-up learners.

The Tibetan writing is full of thoughts, and there are poems and books in the belly. I hope you can wander happily in the pao of knowledge.

Because I am learning Python wildly and my level is really limited, it is inevitable that there are some omissions in the article. Please feel free to criticize and correct me.

Finally, I wish you all the siege lions, cherish life and protect the hairline!

Part of the content of this article originates from the Internet!

Welcome everyone to like, comment and reprint, please indicate the source!

Call me, it's better to call me money!

Remarks can be made to the mailbox, and I will give away all the Python source code of this series of blogs.



<https://blog.csdn.net/l-hulunbuir>

## 10. References

- [1]. The method of constructing selection set in AutoCAD . Mechanical drawing class.
- [2]. Based on Python AutoCAD ActiveX secondary development, pyautocad application technology . For the rise of China.
- [3]. How to use VARIANT . xinzhizhiyounizhiyouni.
- [4]. comtypes 1.1.3 documentation



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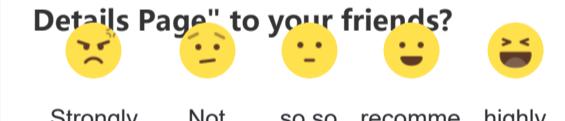
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