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Remembering lists of values
lists

Microsoft

Susan Ibach | Technical Evangelist
Christopher Harrison | Content Developer

Sometimes you have to remember lists of values

- I want to remember the names of everyone coming to a party
- I want to remember the scores I got in all my courses
- I want to remember the directions to get to my doctor appointment

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Multiple values

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Lists allow you to store multiple values

```
guests = ['Christopher','Susan','Bill','Satya']

scores = [78,85,62,49,98]
```

You can create an empty list and add values later

```
guests = []

scores = []
```

You can reference any value in the list by specifying it's position in the list

```
guests = ['Christopher','Susan','Bill','Satya']

#print the first guest
#the first value is in position 0
print(guests[0])

scores = [78,85,62,49,98]
#Print the fourth score
print(scores[3])
```

Geek Tip

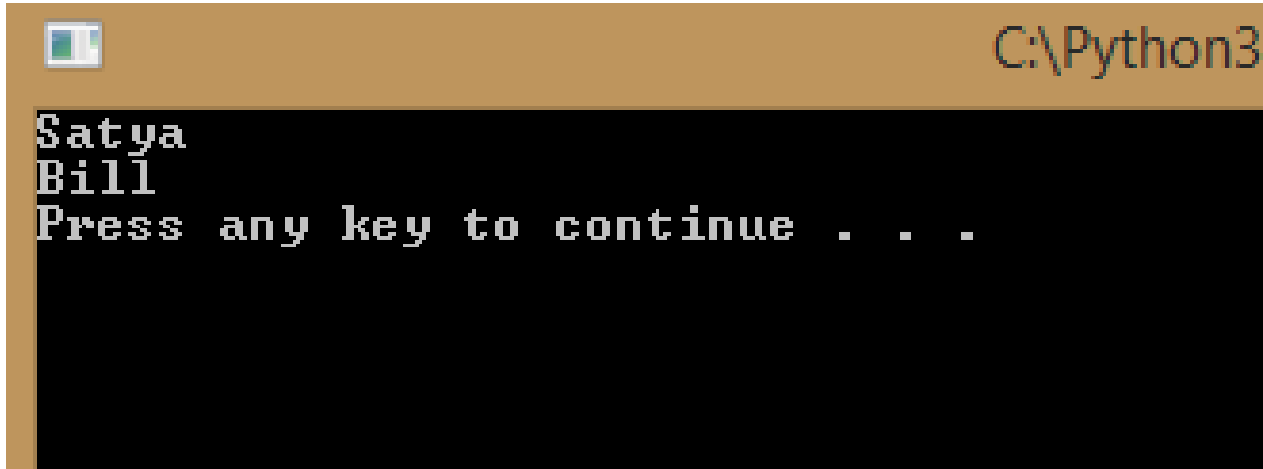
- We call the position of an item in the list the index

You can even count backwards

```
guests = ['Christopher','Susan','Bill','Satya']

#print the last entry in the list
print(guests[-1])

#print the second last entry in the list
print(guests[-2])
```



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Creating and populating a list

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Updating lists

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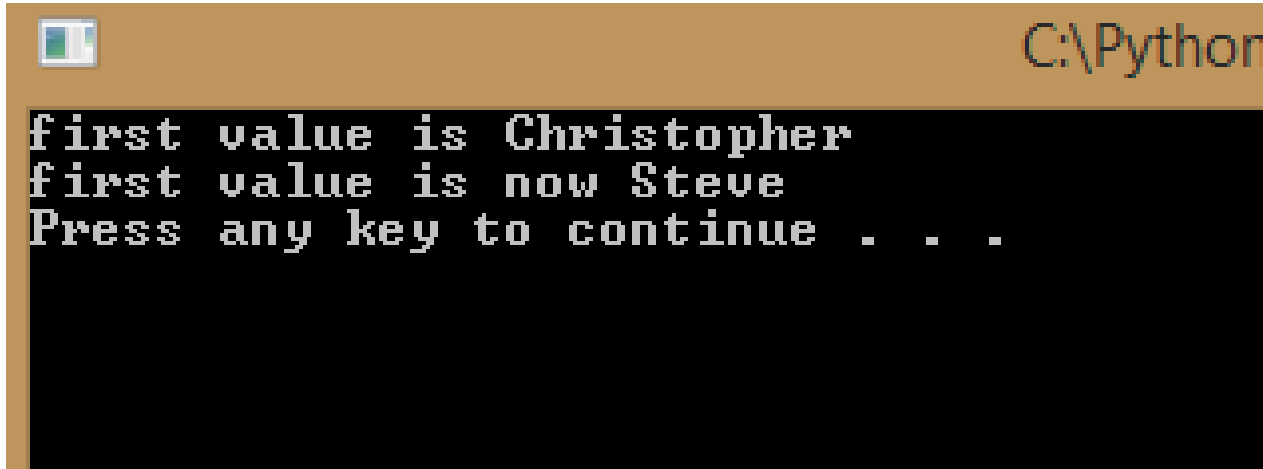
You can change a value in a list

```
guests = ['Christopher','Susan','Bill','Satya']
print("first value is " + guests[0])

#change the first value in the list to Steve
guests[0] = 'Steve'
print("first value is now " + guests[0])
```

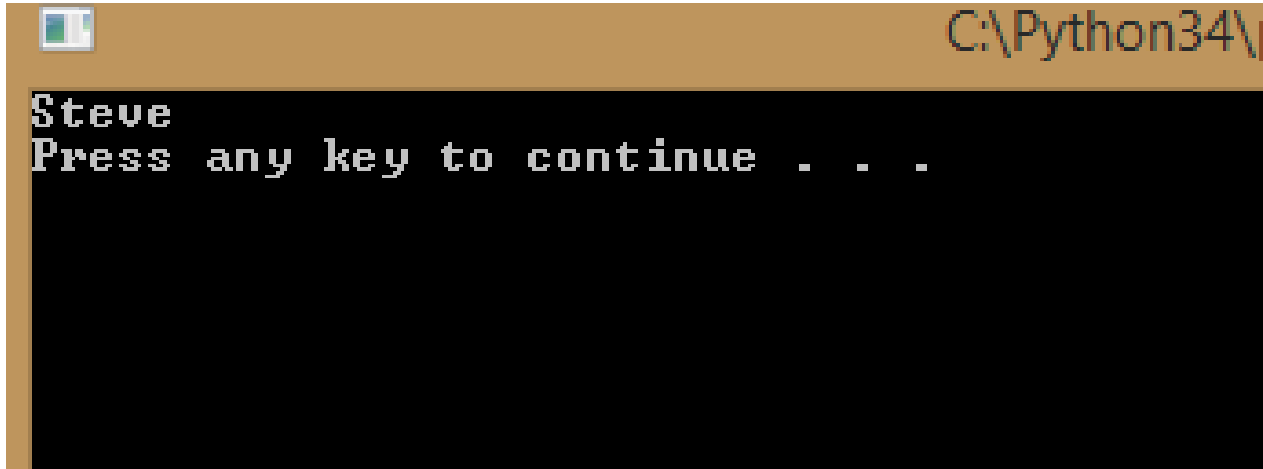


You can add a value to a list with append()

```
guests = ['Christopher','Susan','Bill','Satya']

#add a new value to the end of the list
guests.append('Steve')

#display the last value in the list
print(guests[-1])
```

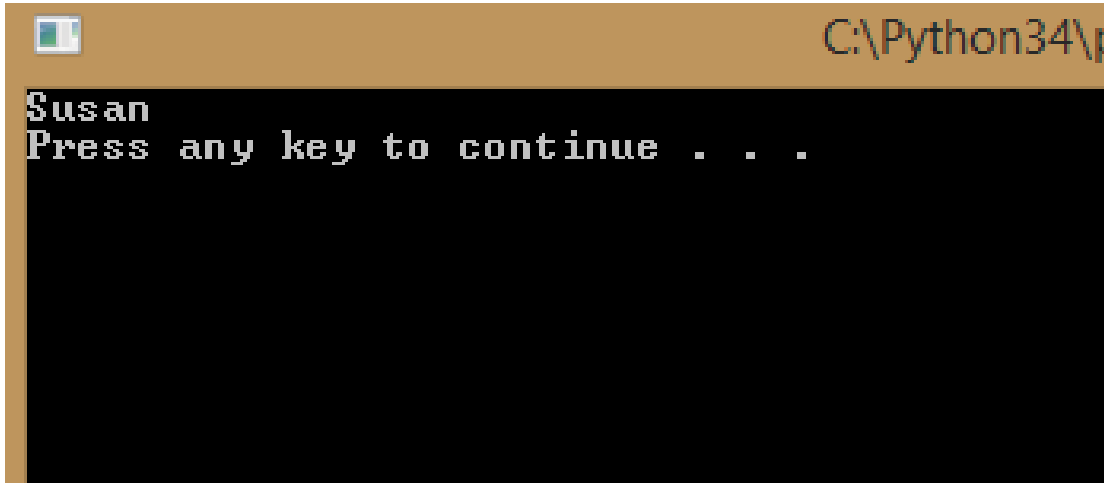


You can remove a value from a list with remove()

```
guests = ['Christopher','Susan','Bill','Satya']

#add a new value to the end of the list
guests.remove('Christopher')

#display the last value in the list
print(guests[0])
```

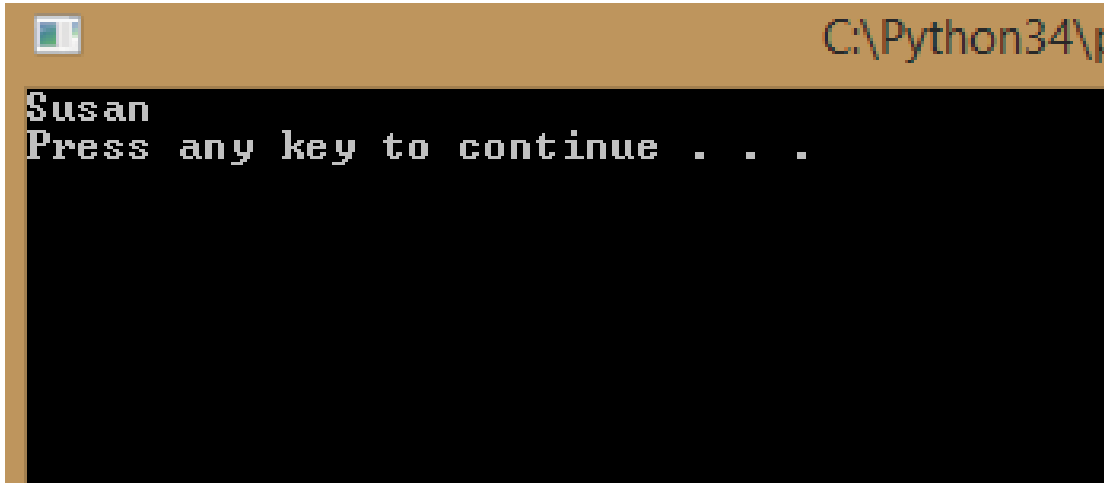


You can use the del command to delete an entry

```
guests = ['Christopher','Susan','Bill','Satya']

#delete the first item in the list
del guests[0]

#print the first item in the list
print(guests[0])
```



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Modifying list contents

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Finding values

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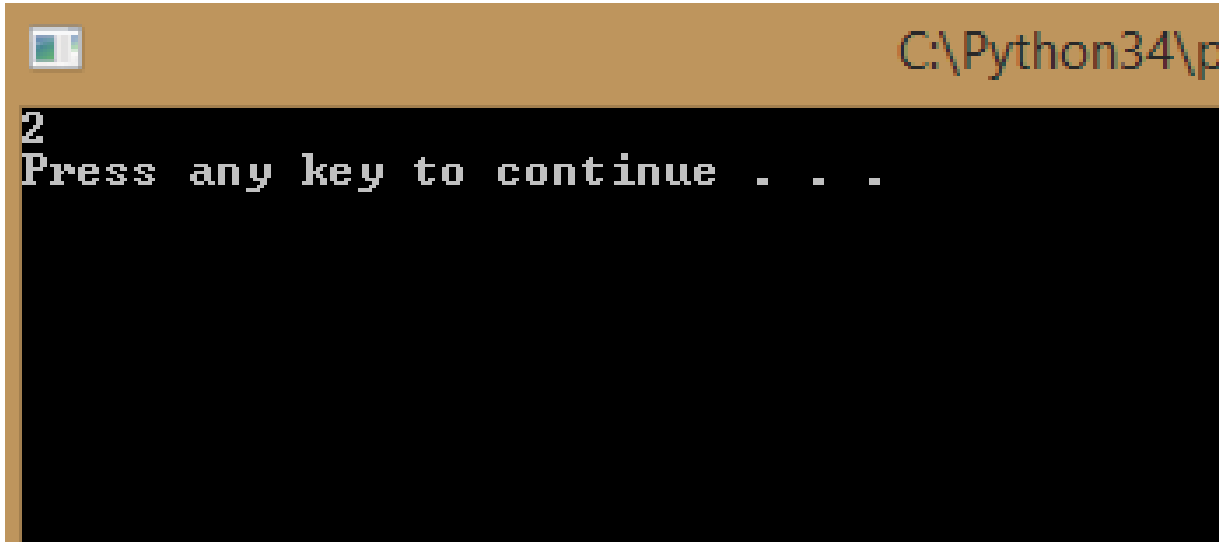
The index() function will search the list and return the index of the position where the value was found

```
guests = ['Christopher','Susan','Bill','Satya']

#this will return the index in the list
#where the name Bill is found
print(guests.index('Bill'))
```



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Searching a list

What do you think will happen if we search for a value that doesn't exist in the list?

```
guests = ['Christopher','Susan','Bill','Satya']

#this will return the index in the list
#where the name Steve is found
print(guests.index('Steve'))
```

The code crashes!
We need to add error handling
Or find another way to go through the list and find a value

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Displaying values

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Use a loop!

```
guests = ['Christopher','Susan','Bill','Satya']

#Create a loop that executes four times
#Since we have four values
for steps in range(4) :

    #Remember the value of steps goes up by one
    #Each time the loop executes
    print(guests[steps])
```

```
Christopher
Susan
Bill
Satya
Press any key to continue . . .
```

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Looping through all the values in a list

What if I don’t know how many values are in the list?

Use the len() function to find out how many entries are in your list

```
guests = ['Christopher','Susan','Bill','Satya']

#Find out how many entries are in the list
nbrEntries = len(guests)

#Create a loop that executes once for each entry
for steps in range(nbrEntries) :
     print(guests[steps])
```

```
Christopher
Susan
Bill
Satya
Press any key to continue . . .
```

Shhhh, don’t tell anyone but there is an even easier way to go through all the items in a list

You can just tell the for loop to go through your list!

```
guests = ['Christopher','Susan','Bill','Satya']

#specify the name of your list and a variable name
#to hold each entry as you go through the loop
for guest in guests :

    #the variable guest will contain the values
    #as we go through the loop
    print(guest)
```

```
Christopher
Susan
Bill
Satya
Press any key to continue . . .
```

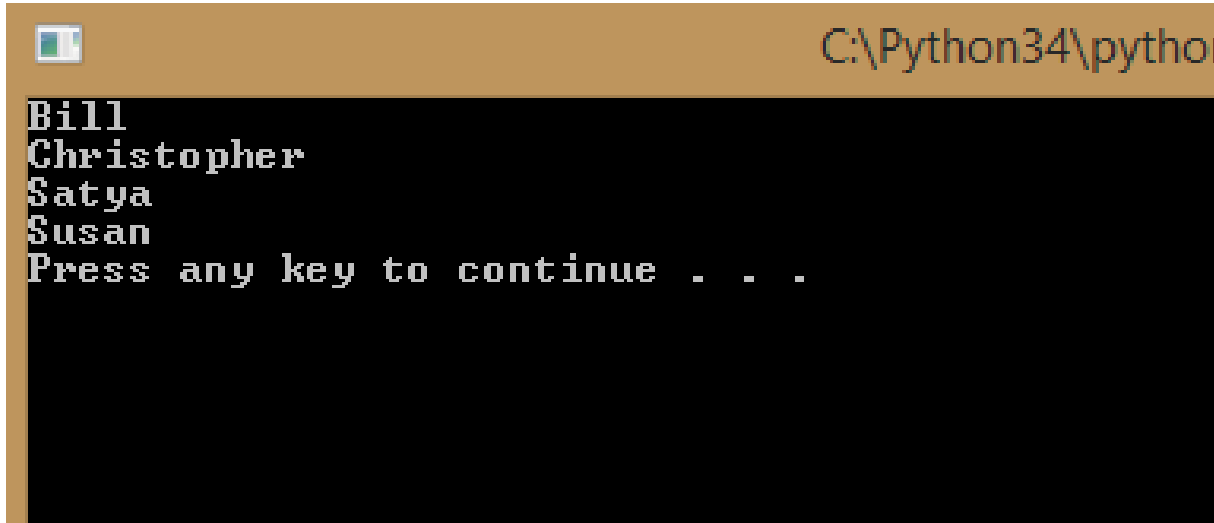
Want to sort your list?

You can sort your list with the sort() function

```
guests = ['Christopher','Susan','Bill','Satya']

#Sort the names in alphabetical order
guests.sort()

#print the list
for guest in guests :
     print(guest)
```



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Sort a list and print the results

Your challenge… Starting to get harder…

- Ask the user to enter the names of everyone attending a party
- Then return a list of the party guests in alphabetical order
- This will require pulling together everything we have learned so far, so let’s walk through the thought process of idea to code

Break the problem into steps

1. Ask the users to enter the names of everyone attending a party
2. Put those values in a list
3. Sort the list
4. Print the sorted list

1. Ask the user to enter the names of everyone attending a party

- What command do we use to ask a user for a value?
  - input function
- What type of variable will we need to store all the names?
  - A list
- How can I ask the user for more than one name?
  - Use a loop

Should we use a for loop or while loop?

- Do you know how many names the user will enter?
  - No, that means we don’t know how many times the loop needs to execute, so we should use a while loop
- How will the loop know when to stop executing?
  - We could have user enter a special keyword when they are done (as long as we tell them to do it!)

2. Put those values in a list

- Declare an empty list
- Each time a new name is entered, add it to the list

3. Sort the list

- Once the values are in a list, use the sort function to sort the list alphabetically

4. Print the sorted list

- Use a loop to go through the values in the list
- For each value, print the name

So… something like this?

```
guests = []
name = "  "

while name != "DONE" :
     name = input("Enter guest name (enter DONE if no more names) : ")
     guests.append(name)

guests.sort()
for guest in guests :
     print(guest)
```

We are close but our code added the name DONE to our list of guests
How can we tell the program that if the name is “DONE” not to add it?

C:\Python34\python.exe

```
Enter guest name (enter DONE if no more names) : Susan
Enter guest name (enter DONE if no more names) : Bill
Enter guest name (enter DONE if no more names) : Steve
Enter guest name (enter DONE if no more names) : DONE
Bill
DONE
Steve
Susan
Press any key to continue . . .
```

Use an if statement. You are gradually building a toolkit to solve different problems!

```
guests = []
name = "  "

while name !="DONE" :
    name = input("Enter guest name (enter DONE if no more names) : ")
    if name.upper() != "DONE" :
        guests.append(name)

guests.sort()
for guest in guests :
     print(guest)
```

C:\Python34\python.exe

```
Enter guest name (enter DONE if no more names) : Susan
Enter guest name (enter DONE if no more names) : Bill
Enter guest name (enter DONE if no more names) : Steve
Enter guest name (enter DONE if no more names) : DONE
Bill
Steve
Susan
Press any key to continue . . .
```

Congratulations!

- You can now remember a list of different values
- You can search the list for a specific value
- You can sort the list
- You can read through all the values in the list