

# Introducing Python





Python is a fantastic programming language for beginners but is also powerful enough to use in environments such as space engineering, science, technology and even the global stock market.

Python's unique ability to be simple to read but capable of coping with huge volumes of data makes it the ideal starting point. In this section, we'll ease you into the world of Python, and how to get it on to your computer ready to start learning.

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# Python in NUMBERS

There's a lot to like about Python, but don't just take our word for it. Here are some amazing facts and figures surrounding one of the most popular programming languages of recent years.

Python creator Guido Van Rossum named Python after reading scripts from Monty Python's Flying Circus.



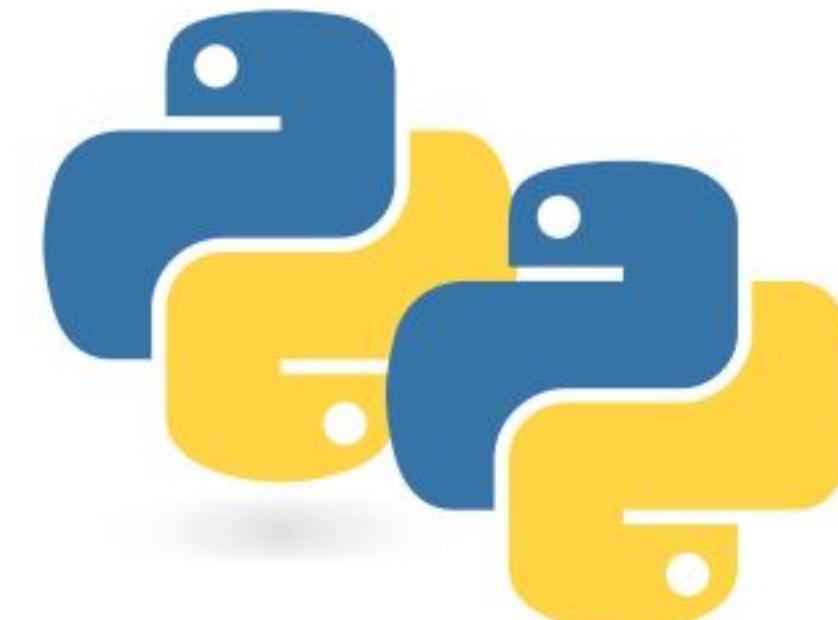
Alexa, Amazon's Virtual Personal Assistant, uses Python to help with speech recognition.



As of the end of 2018, Python was the most discussed language on the Internet.



• · · · · ·  
**PYTHON AND LINUX SKILLS ARE THE THIRD MOST POPULAR I.T. SKILLS IN THE UK.**



Data analysis and Machine Learning are the two most used Python examples.



Disney Pixar uses Python in its Renderman software to operate between other graphics packages.



OVER 75% OF RECOMMENDED CONTENT FROM NETFLIX IS GENERATED FROM MACHINE LEARNING – CODED BY PYTHON.

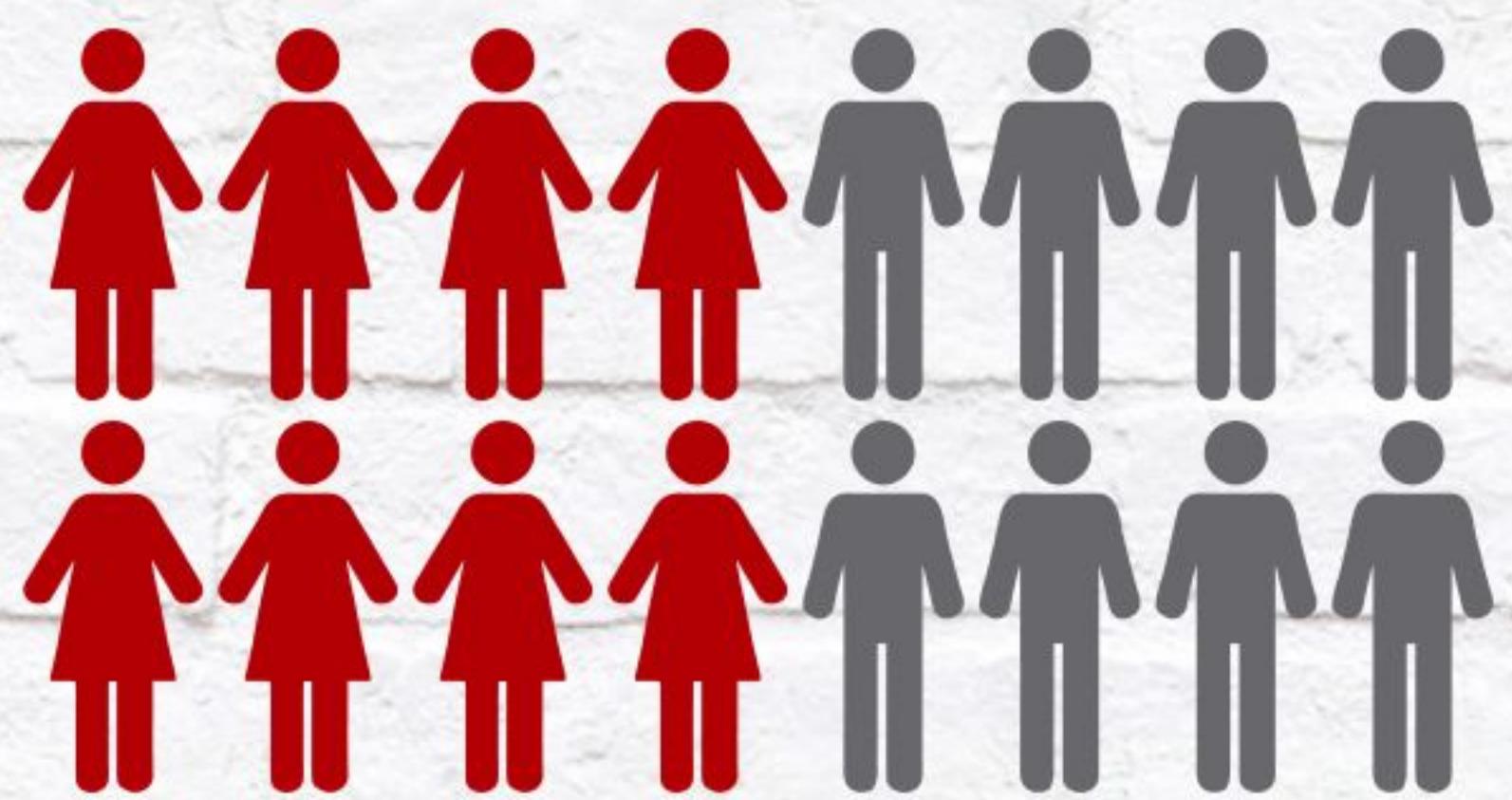


90% OF ALL FACEBOOK POSTS ARE FILTERED THROUGH PYTHON-CODED MACHINE LEARNING.



IT'S ESTIMATED THAT OVER 75% OF NASA'S WORKFLOW AUTOMATION SYSTEMS ON-BOARD THE I.S.S. USE PYTHON.

# 16,000



There are over 16,000 Python jobs posted every six months in the UK.

PYTHON SKILL-BASED POSITIONS ARE THE

# 16<sup>th</sup>

MOST SOUGHT-AFTER JOBS IN THE UK.



Python Data Science is thought to become the most sought-after job in the coming years.



Google is the top company for hiring Python developers, closely followed by Microsoft.



Data Science, Blockchain and Machine Learning are the fastest growing Python coding skills.



New York and San Francisco are the top Python developer cities in the world.



Python developers enjoy an average salary of

# £60,000



95% OF ALL BEGINNER CODERS START WITH AND STILL USE, PYTHON AS THEIR PRIMARY OR SECONDARY LANGUAGE.



75% OF ALL PYTHON DEVELOPERS USE PYTHON 3, WHEREAS 25% STILL USE THE OUTDATED PYTHON 2 VERSION.



79% OF ALL PROGRAMMERS USE PYTHON REGULARLY, 21% USE IT AS A SECONDARY LANGUAGE.



49% OF WINDOWS 10 DEVELOPERS USE PYTHON 3 AS THEIR MAIN PROGRAMMING LANGUAGE.



# Why Python?

There are many different programming languages available for the modern computer, and some still available for older 8 and 16-bit computers too. Some of these languages are designed for scientific work, others for mobile platforms and such. So why choose Python out of all the rest?

## PYTHON POWER

Ever since the earliest home computers were available, enthusiasts, users and professionals have toiled away until the wee hours, slaving over an overheating heap of circuitry to create something akin to magic.

These pioneers of programming carved their way into a new frontier, forging small routines that enabled the letter 'A' to scroll across the screen. It may not sound terribly exciting to a generation that's used to ultra high-definition graphics and open world, multi-player online gaming. However, forty-something years ago it was blindingly brilliant.

Naturally these bedroom coders helped form the foundations for every piece of digital technology we use today. Some went on to become chief developers for top software companies, whereas others pushed the available hardware to its limits and founded the billion pound gaming empire that continually amazes us.

Regardless of whether you use an Android device, iOS device, PC, Mac, Linux, Smart TV, games console, MP3 player, GPS device built-in to a car, set-top box or a thousand other connected and 'smart' appliances, behind them all is programming.

All those aforementioned digital devices need instructions to tell them what to do, and allow them to be interacted with. These instructions form the programming core of the device and that core can be built using a variety of programming languages.

The languages in use today differ depending on the situation, the platform, the device's use and how the device will interact with its

```
Bombs - GUI - TheIDE - [d:\uppsrc\CtrlLib\ArrayCtrl.cpp windows-1252] { examples }

File Edit Macro Project Build Debug Assist Setup
GUI MSC71cdb Debug
Ln 639, Col 45

Bombs
CtrlLib
CtrlCore
RichText
PdfDraw
Draw
Core

EditCtrl.h
EditField.cpp
TextEdit.h
Text.cpp
LineEdit.cpp
DocEdit.cpp
ScrollBar.h
HeaderCtrl.h
HeaderCtrl.cpp
ArrayCtrl.h
ArrayCtrl.cpp
DropChoice.h
DropBox.cpp
DropList.cpp
DropPusher.cpp
DropChoice.cpp
StaticCtrl.h
Static.cpp
Splitter.h
Splitter.cpp
FrameSplitter.cpp
SliderCtrl.h
SliderCtrl.cpp
ColumnList.h
ColumnList.cpp
Progress.h
Progress.cpp
AKeys.h

plugin\ bmp
plugin\ z
plugin\ png
<prj-aux>
<ide-aux>
<temp-aux>

AKeys.cpp
RichText.h
RichText View.cpp
Prompt.cpp
Help.cpp
DateTimeCtrl.h
DateTimeCtrl.cpp
Bar.h
Bar.cpp
MenuBar.cpp
ToolBar.cpp
ToolTip.cpp
StatusBar.h
StatusBar.cpp
TabCtrl.h
TabCtrl.cpp
TreeCtrl.h
TreeCtrl.cpp
DlgColor.h
DlgColor.cpp
ColorPopup.cpp
ColorPusher.cpp
FileSel.h
FileSel.cpp
FileDialog.cpp

SetCursor(p.y);
Ctrl::ChildGotFocus();

void ArrayCtrl::ChildLostFocus()
{
    if(cursor >= 0)
        RefreshRow(cursor);
    Ctrl::ChildLostFocus();
}

void ArrayCtrl::Paint(Draw& w) {
    LTIMING("Paint");
    Size size = GetSize();
    Rect r;
    r.bottom = 0;
    bool hasfocus = HasFocusDeep();
    int i = GetLineAt(sb);
    int xs = -header.GetScroll();
    int js;
    for(js = 0; js < column.GetCount(); js++) {
        int cw = header.GetTabWidth(js);
        if( (xs + cw - vertgrid + (js == column.GetCount() - 1)) >= 0)
            break;
        xs += cw;
    }
    Color fc = Blend(SColorDisabled, SColorPaper);
    if(!IsNull(i))
        while(i < GetCount()) {
            r.top = GetLineY(i) - sb;
            if(r.top > size.cy) break;
            r.bottom = r.top + GetLineCy(i);
            int x = xs;
            for(int j = js; j < column.GetCount(); j++) {
                int cw = header.GetTabWidth(j);
                int cm = column[j].margin;
                if(cm < 0)
                    cm = header.Tab(j).GetMargin();
                if(x > size.cx) break;
                r.left = x;
```

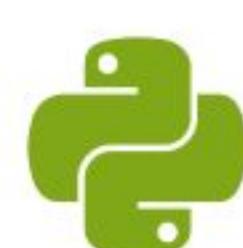
environment or users. Operating systems, such as Windows, macOS and such are usually a combination of C++, C#, assembly and some form of visual-based language. Games generally use C++ whilst web pages can use a plethora of available languages such as HTML, Java, Python and so on.

More general-purpose programming is used to create programs, apps, software or whatever else you want to call them. They're widely used across all hardware platforms and suit virtually every conceivable application. Some operate faster than others and some are easier to learn and use than others. Python is one such general-purpose language.

Python is what's known as a High-Level Language, in that it 'talks' to the hardware and operating system using a variety of arrays, variables, objects, arithmetic, subroutines, loops and countless more interactions. Whilst it's not as streamlined as a Low-Level Language, which can deal directly with memory addresses, call stacks and registers, its benefit is that it's universally accessible and easy to learn.

```

1 //file: Invoke.java
2 import java.lang.reflect.*;
3
4 class Invoke {
5     public static void main( String [] args ) {
6         try {
7             Class c = Class.forName( args[0] );
8             Method m = c.getMethod( args[1], new Class []
9                 { } );
10            Object ret = m.invoke( null, null );
11            System.out.println(
12                "Invoked static method: " + args[1]
13                + " of class: " + args[0]
14                + " with no args\nResults: " + ret );
15        } catch ( ClassNotFoundException e ) {
16            // Class.forName( ) can't find the class
17        } catch ( NoSuchMethodException e2 ) {
18            // that method doesn't exist
19        } catch ( IllegalAccessException e3 ) {
20            // we don't have permission to invoke that
21            // method
22        } catch ( InvocationTargetException e4 ) {
23            // an exception occurred while invoking that
24            // method
25            System.out.println(
26                "Method threw an: " + e4
27                getTargetException( ) );
28        }
29    }
30 }
```



**Java is a powerful language that's used in web pages, set-top boxes, TVs and even cars.**



Python was created over twenty six years ago and has evolved to become an ideal beginner's language for learning how to program a computer. It's perfect for the hobbyist, enthusiast, student, teacher and those who simply need to create their own unique interaction between either themselves or a piece of external hardware and the computer itself.

Python is free to download, install and use and is available for Linux, Windows, macOS, MS-DOS, OS/2, BeOS, IBM i-series machines, and even RISC OS. It has been voted one of the top five programming languages in the world and is continually evolving ahead of the hardware and Internet development curve.

So to answer the question: why Python? Simply put, it's free, easy to learn, exceptionally powerful, universally accepted, effective and a superb learning and educational tool.

```

40 LET PY=15
50 FOR w=1 TO 10
60 CLS
70 LET bY=INT (RND*28)
80 LET bX=0
90 FOR d=1 TO 20
100 PRINT AT Px,Py;" U "
110 PRINT AT bX,bY;" O "
120 IF INKEY$="P" THEN LET PY=PY+1
130 IF INKEY$="O" THEN LET PY=PY-1
135 FOR n=1 TO 100: NEXT n
140 IF PY<2 THEN LET PY=2
150 IF PY>27 THEN LET PY=27
160 LET bX=bX+1
165 PRINT AT bX-1,by;" "
170 NEXT d
180 IF (bY-1)=PY THEN LET s=s+1
190 PRINT AT 10,10;"score=";s
200 FOR v=1 TO 1000: NEXT v
210 NEXT w
220
230
240
250
260
270
280
290
300
310
320
330
340
350
360
370
380
390
400
410
420
430
440
450
460
470
480
490
500
510
520
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690
700
710
720
730
740
750
760
770
780
790
800
810
820
830
840
850
860
870
880
890
900
910
920
930
940
950
960
970
980
990
0 OK, 0:1
```



**BASIC was once the starter language that early 8-bit home computer users learned.**

```

print(HANGMAN[0])
attempts = len(HANGMAN) - 1

while (attempts != 0 and "_" in word_guessed):
    print("\nYou have {} attempts remaining".format(attempts))
    joined_word = ''.join(word_guessed)
    print(joined_word)

    try:
        player_guess = str(input("\nPlease select a letter between A-Z" + "\n> ")).upper()
    except: # check valid input
        print("That is not valid input. Please try again.")
        continue
    else:
        if not player_guess.isalpha(): # check the input is a letter. Also checks a
            print("That is not a letter. Please try again.")
            continue
        elif len(player_guess) > 1: # check the input is only one letter
            print("That is more than one letter. Please try again.")
            continue
        elif player_guess in guessed_letters: # check it letter hasn't been guessed
            print("You have already guessed that letter. Please try again.")
            continue
        else:
            pass

        guessed_letters.append(player_guess)

        for letter in range(len(chosen_word)):
            if player_guess == chosen_word[letter]:
                word_guessed[letter] = player_guess # replace all letters in the chosen

            if player_guess not in chosen_word:
```



**Python is a more modern take on BASIC, it's easy to learn and makes for an ideal beginner's programming language.**