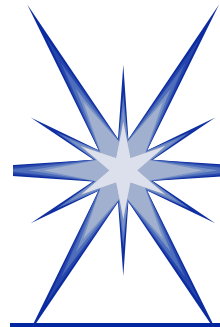


Introduction to Software Development

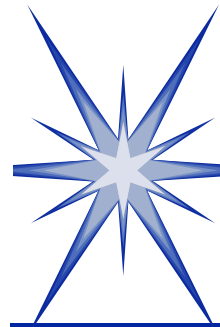
by Dr Derek Peacock

<http://www.valerianweb.com/tutor/>



Dr Derek Peacock

- PhD: Formate Dehydrogenase of the Leguminosae
- Programming 50 years – Research, Administration, Teaching and Games
- Teaching 45 Years Universities & FE Colleges
- BSc Degree in ??



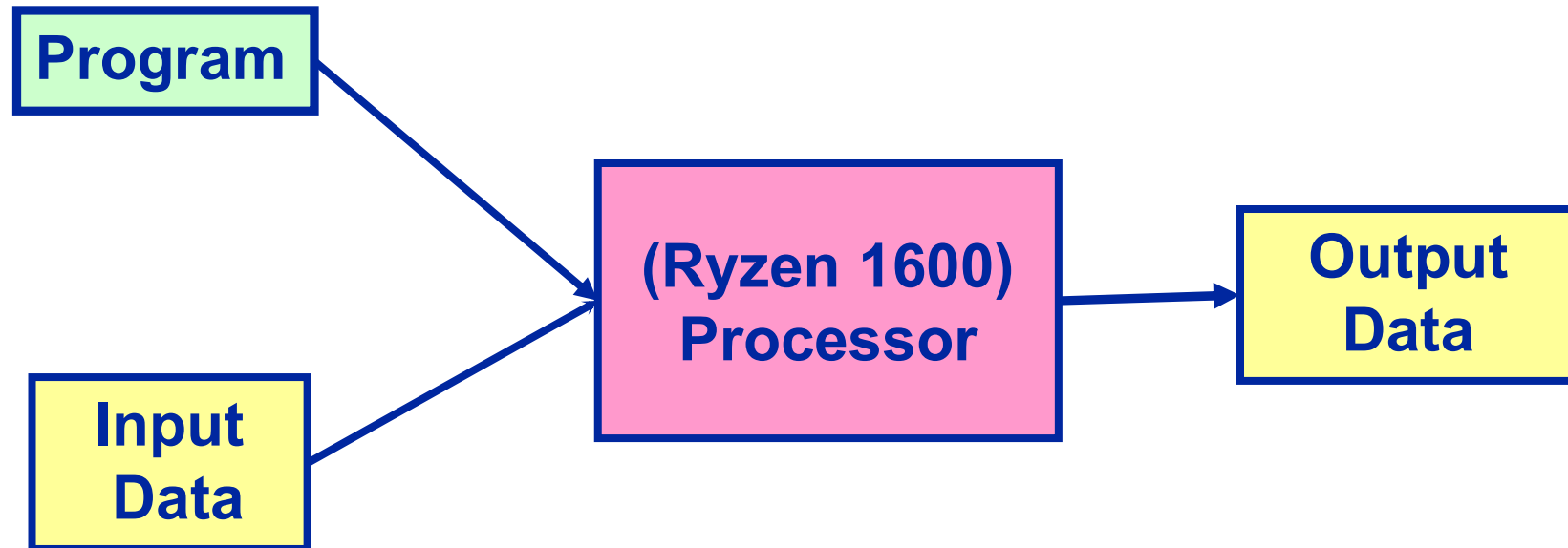
What is a Computer ?

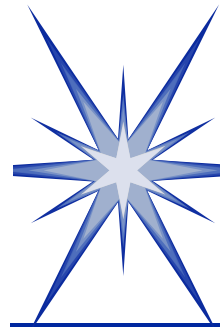
- Electronic
- Information
- Processing
- Machine





Basic System



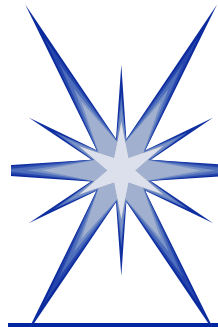


Computer Programs

- A sequence of **coded instructions** used by a computer perform a particular task. (an algorithm)

Program = Set of cooperating Classes/Objects

Class/Object = Operations and Data



Similar Names

- Operations
- Methods
- Functions
- Procedures
- Actions
- Process

- Data
- Attributes
- Properties
- Variables
- Fields
- Information

What type of word should be used to name operations?



Operation: Frying an egg

Sequencing Instructions:

What is the correct order of these instructions?

1. Put pan on hob
2. Break egg
3. Get frying pan
4. Put oil in pan
5. Turn on hob
6. Hold egg over pan





Programming

- Sequencing instructions
- The sequence order is important
- Accuracy is important
- Detail is important



Operation: Frying an egg

1. Get frying pan
2. Put pan on hob
3. Turn on hob
4. Put oil in pan
5. Hold egg over pan
6. Break egg



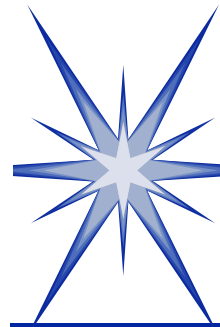


Operations

□ Procedures for the solution to a problem in a finite number of steps

1. **Input** the amount in British Pounds
2. **Input** the exchange rate
3. **Calculate** the equivalent in Euros
4. **Output** the result in Euros

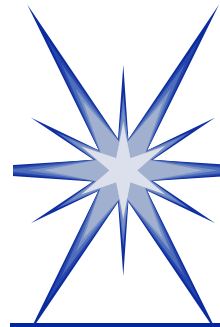
This is an example of typical **Sequence**
Input some data, **process** the data, **output** the results



Four Main Programming Concepts

Unchanged in 50 Years

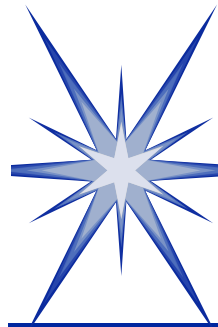
1. Sequence
2. Selection
3. Iteration (repetition)
4. Hierarchy (break down into parts)



Program Languages (I have used)

- Machine Code
- C, C++, C#
- VB and Basic * 3
- Java
- Pascal
- COBOL
- SQL
- Assembler
- PL/1
- Algol 60
- Algol 68
- JavaScript
- FORTRAN
- Delphi

Which one have I not used??



Machine Code (Low Level)

0E E8 D9 01

0E E8 45 02

B8 3E 01 1E

50 1E 50 B8

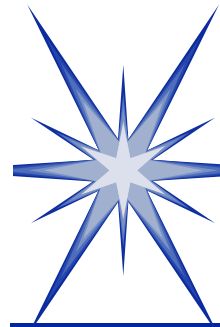
`Assembler

LD A, 01

LD B, 02

Add A, B

- Total Flexibility
- Very Fast
- Many Instructions
- Difficult to read
- Difficult to Debug



Operations in English

- **Input:** “Alexa, what is £100 in euros??”
- **Output:** €113.59

So now that we have Alexa, (other assistants are Available), what is the problem?



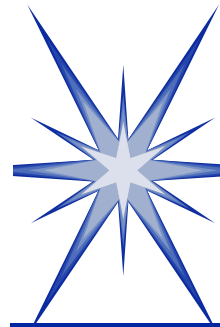
English

- Imprecise
- Ambiguous
- Very Large Dictionary
- Same word can have different meanings, in different contexts.
- The rules of English Grammar are complex and inconsistent



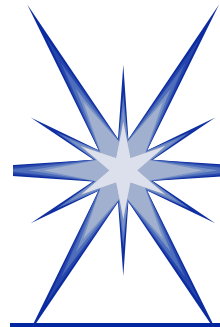
Python

- Agility
 - Scientific Data Analysis
 - Procedural/Object Oriented
 - Large selection of libraries
 - Dynamic Typing
- Python using other languages
 - Easy to learn
 - Can use interactively
 - Scientist use python notebooks



UK Programming Jobs

Language	Hemel (20miles)	UK
JavaScript	1278	3298
Java	1037	2286
C#	800	2433
Python	737	1485
C++	304	944
VB	82	319



CERN: LHC – Petabytes Data

- 34 Countries
- 100 Computing centres
- C++ -> Python

MB 1,000,000 bytes

GB 1,000 MB

TB 1,000 GB

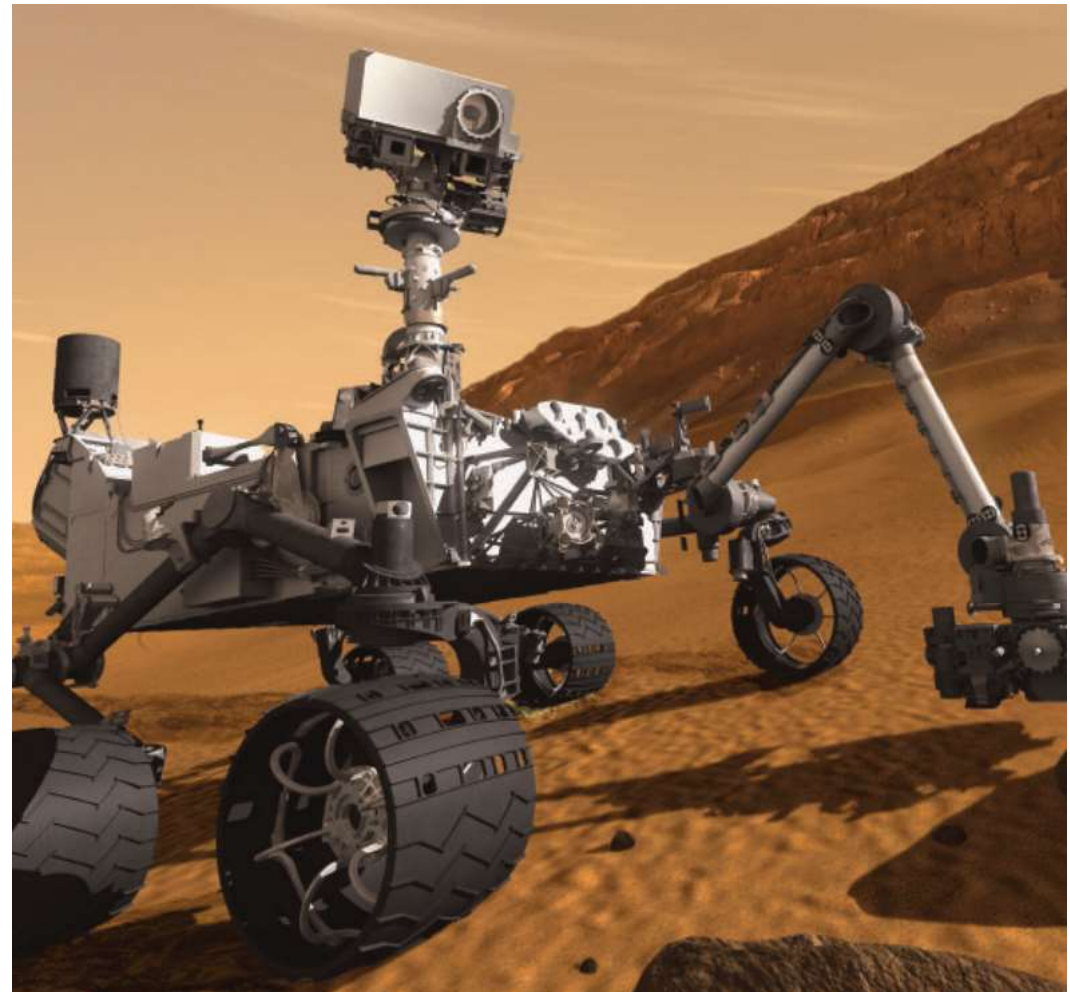
PB 1,000 TB (e15)

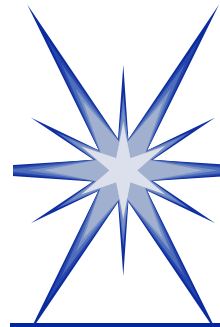


ESA: Life on Mars

Python scripting
automates C#.NET

Jython is a Java version
of Python using Java
libraries





ILM: Python in Directors Chair

Python used
to automate
animation
production

