

CLACINDIA Workshop

Lab Session

Part 2: Programming languages

Nikolay Koldunov

JNU
2014



KlimaCampus

Programming languages

A **Programming language** is an artificial language designed to express computations that can be performed by a machine, particularly a computer. Programming languages can be used to create programs that control the behavior of a machine.



“Hello world!” program

MATLAB

```
disp('hello world')
```

“Hello world!” program

MATLAB

```
disp('hello world')
```

FORTRAN 90

```
PROGRAM HelloWorld  
  WRITE(*,*) "Hello World!"  
END PROGRAM
```

“Hello world!” program

MATLAB

```
disp('hello world')
```

FORTAN 90

```
PROGRAM HelloWorld  
  WRITE(*,*) "Hello World!"  
END PROGRAM
```

C++

```
#include <iostream.h>  
main()  
{  
    cout << "Hello World!" << endl;  
    return 0;  
}
```

"Hello world!" program

BrainF**k

```
+++++++>|+++++>+++++++>++++<<<->|>+.+++++  
..+++>+<<<+++++++>+.+++.------.->+.
```

“Hello world!” program

BrainF**k

```
+++++++>|+++++>+++++++>+<<<->|+>+.+++++  
..+++>+<<+<+++++++>+.+++.-.----->+.
```

Bit

```
LINENUMBERZEROCODEPRINTZEROGOTOONELINENUMBERONECODEPRINTONEGOTOONEZEROLINENUMBE ←  
RONEZEROCODEPRINTZEROGOTOONEONELINENUMBERONEONECODEPRINTZEROGOTOONEZEROZEROLINE ←  
NUMBERONEZEROZEROCODEPRINTONEGOTOONEZEROONELINENUMBERONEZEROONECODEPRINTZEROGOT ←  
OONEONEZEROLINENUMBERONEONEZEROCODEPRINTZEROGOTOONEONEONELINENUMBERONEONEONECOD ←  
EPRINTZEROGOTOONEZEROZEROZEROLINENUMBERONEZEROZEROZEROCODEPRINTZEROGOTOONEZEROT ←  
EROONELINENUMBERONEZEROZEROONECODEPRINTONEGOTOONEZEROONEZEROLINENUMBERONEZERON ←
```

- Fortran (Mathematical **F**ormula **T**ranslating System)

Popular programming languages for the Earth Sciences

- Fortran (Mathematical **F**ormula **T**ranslating System)
- MATLAB (**M**atrix **L**aboratory)

Popular programming languages for the Earth Sciences

- Fortran (Mathematical **F**ormula **T**ranslating System)
- MATLAB (**M**atrix **L**aboratory)
- Python

Popular programming languages for the Earth Sciences

- Fortran (Mathematical **F**ormula **T**ranslating System)
- MATLAB (**M**atrix **L**aboratory)
- Python
- IDL (Interactive Data Language)

Popular programming languages for the Earth Sciences

- Fortran (Mathematical **F**ormula **T**ranslating System)
- MATLAB (**M**atrix **L**aboratory)
- Python
- IDL (Interactive Data Language)
- bash, csh

Popular programming languages for the Earth Sciences

- Fortran (Mathematical **F**ormula **T**ranslating System)
- MATLAB (**M**atrix **L**aboratory)
- Python
- IDL (Interactive Data Language)
- bash, csh
- NCL (NCAR Command Language)