

What is it?

½ c. butter
½ c. cream
2 ½ c. flour
1 t. salt
1 T. sugar
4 c. riced potatoes

Be sure all ingredients are cold before adding flour

Mix all ingredients

Knead thoroughly

Form into 20 balls

For each ball:

Spread flour on cloth.

Roll ball into a circle with a grooved rolling pin

Fry on griddle until brown spots appear

turn over and fry other side



Features

- A fixed vocabulary of words, abbreviations, and symbols
- Rules about what can be said, and where → their *syntax*
- A sequence of operations to be performed in order
- Sometimes, a repetition of some operation, such as the method for frying each piece of lefse
- Sometimes, a *reference* to another sequence of operation (*function*).



Real Program

```
for countdown in 5,4,3,2,1, "hey"!:  
    print(countdown)
```

What does this do?



Computer

- Computers can be programmed
 - Designed to do any job that a program tells them to
- Program
 - set of instructions that a computer follows to perform a task
 - Commonly referred to as Software
- Programmer
 - person who can design, create, and test computer programs
 - Also known as software developer



Program

- CPU designed to perform simple operations on pieces of data
 - Examples: reading data, adding, subtracting, multiplying, and dividing numbers
 - Understands instructions written in machine language and included in its instruction set
 - Each brand of CPU has its own instruction set
- To carry out meaningful calculation, CPU must perform many operations



Program (Cont..)

- Program must be copied from secondary memory to RAM each time CPU executes it
- CPU executes program in cycle:
 - Fetch: read the next instruction from memory into CPU
 - Decode: CPU decodes fetched instruction to determine which operation to perform
 - Execute: perform the operation



Language

- Impractical for people to write in machine language
- Assembly language
 - uses short words (mnemonics) for instructions instead of binary numbers
 - Easier for programmers to work with
- Assembler
 - translates assembly language to machine language for execution by CPU
- Low-level language
 - close in nature to machine language
 - Example: assembly language
- High-Level language: allows simple creation of powerful and complex programs
 - No need to know how CPU works or write large number of instructions
 - More intuitive to understand



Something...

- Key words
 - predefined words used to write program in high-level language
 - Each key word has specific meaning
- Operators
 - perform operations on data
 - Example: math operators to perform arithmetic
- Syntax
 - set of rules to be followed when writing program
- Statement
 - individual instruction used in high-level language



Compilers and Interpreters

- Programs written in high-level languages must be translated into machine language to be executed
- Compiler
 - translates high-level language program into separate machine language program
 - Machine language program can be executed at any time

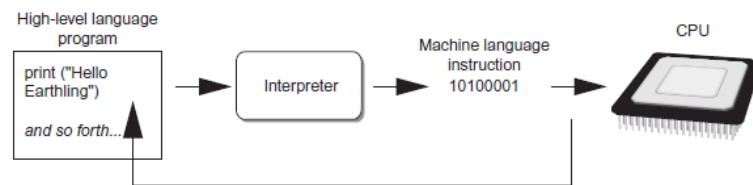


Compilers and Interpreters

- Interpreter
 - translates and executes instructions in high-level language program
 - Used by Python language
 - Interprets one instruction at a time
- Source code
 - statements written by programmer
 - Syntax error: prevents code from being translated



Compilers and Interpreters



The interpreter translates each high-level instruction to its equivalent machine language instructions and immediately executes them.

This process is repeated for each high-level instruction.



What is Data Science?







25 Best Jobs in America

17k Shares

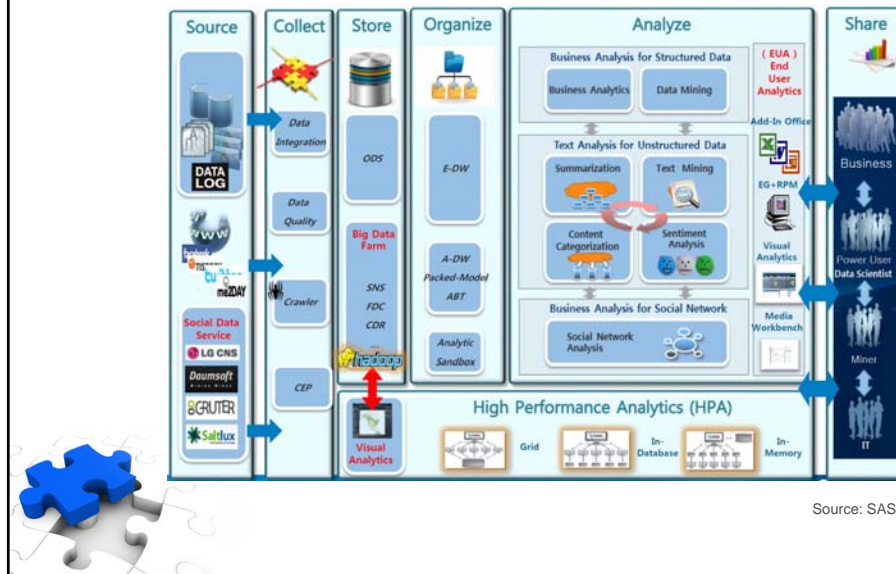
Want a new job? Glassdoor is here to help, identifying the 25 Best Jobs in America for 2016. The jobs that make this list have the highest overall Glassdoor Job Score, determined by combining three key factors – number of job openings, salary and career opportunities rating. These jobs stand out across all three categories.

United States 2016

1		Data Scientist Job Openings: 1,736 Median Base Salary: \$116,840 Career Opportunity: 4.1 Job Score: 4.7
2		Mobile Developer Job Openings: 2,281 Median Base Salary: \$90,000 Career Opportunity: 3.8 Job Score: 4.6
3		Software Engineer Job Openings: 49,270 Median Base Salary: \$85,000 Career Opportunity: 3.3 Job Score: 4.5
10		Analytics Manager Job Openings: 982 Median Base Salary: \$105,000 Career Opportunity: 3.7 Job Score: 4.5

Sources: <http://www.glassdoor.com/blog/jobs-america>

Data Analytic Framework



Programming for Data Science

- How important for data science is the ability to program?
 - Programming is vital to data science
 - Data science involves exploration
 - Data science provides new insights
 - Data science deals with various forms of data



R Scripting

- Integrated Development Environment (IDE)
 - Rstudio
 - Install R
 - before installing Rstudio
 - download: <https://www.r-project.org/>
 - Install RStudio
 - <https://www.rstudio.com/home/>

