Expressions
- an expression is a combination of one or more constants, variables, operators and functions

Constructs
Sequence
- A set of instructions that are in order and execute one after the other

Selection
- When a question is asked and depending on the answer may have more than one outcome. AKA an If Statement

Iteration
- A loop that goes through a set of instructions which execute over and over again.
  Ie While loop & do while loop

Predefined Functions
- A set of routines that are carried out to perform a function/action.
  ie: concat() or System.out.println()

File Handling
- Files allow you to save/store/write data. (ie text, images, etc)
- File extensions (ie .txt, .AB, .js) tell the computer what program to use to read the file.

Data types

String

- A string can contain letters, numbers and other characters so long as it's placed between quotes. ie "123 Central Ave"

Integer

- Is a numeric value without a decimal. Integers are whole numbers, can be positive or negative ie (1, 46, -6)

Float

- Refers to the floating point, you can control where the point is located. ie (117.28)

Boolean

- Datatype that can only represent two values - True & false

eg - 5 == 7 => false

4 > 2 => True

Data structures

Array

- Is a collection of objects, Any that are indexed

ie array = ["foo", "bar", 2]

index 0 1 2

Hashes

- Is a collection of key value pairs. Indexing is done via the keys. Attempts to access non existant keys returns a nil/undefined key: value ie "name": "Jane

Algorithms

- An algorithm is a set of steps for a computer program to accomplish a task. Two most important criteria for an algorithm, that it solves a problem and does so efficiently

Testing

Static testing

- Software testing that involves examination of the program's code and documentation. Does not require the program to be executed. Types of static testing - code analysis, inspection, code reviews and walk throughs

Dynamic testing

- Asseses feasibility of code by giving input and assessing/examining output. Requires code to be compiled and run. Types of dynamic testing, unit testing, integration testing, system testing and acceptance testing.

Black-box testing - BDD (Behavior Driven)

- Commonly used in tragl orgs that have testers as a separate department - provides external prospective
  + Efficient for large segments of code
  + Code access not required
  + Seperation between users and developers

  - Limited since only fraction of test scenarios performed
  - Inefficient testing due to tester's lack of knowledge on internals
  - Blind coverage since tester has limited knowledge about the application.

White box testing (clear box, glass box)
- looks inside of software being tested, but requires internal knowledge and programming skills.
Provides internal perspective of software under test

+ Efficient at finding errors and problems
+ Required knowledge of internals is beneficial for thorough testing.
+ Allows finding hidden errors
+ Programmers introspection
+ Helps optimize code
+ Due to internal knowledge of software, Max coverage is obtained.

- Might not find unimplemented or missing features
- Requires high level of knowledge of internals of the software under test
- Requires code access

* Often automated in form of unit tests and if done before dev takes form of TDD.

Conclusion Black box Vs White.
- Both are necessary for successful delivery.
In most cases Black box is done by dedicated testers and white box done by developers

Quality Checking (QC)
- focuses on identifying bugs/defects

Quality Assurance (QA) - Best method
- Tries to prevent bugs/defects via TDD/BDD

Software Testing Levels

- Unit Testing
  * Individual units of software are tested to validate that each unit performs as expected

- Integration Testing
  * Testing process where units are combined and tested as a group. This testing exposes faults in the interaction between integrated units.

- System Testing
  * Tests the complete integrated system, tests to see if the system meets the specific requirements

- Acceptance Testing
  * Tests the whole system for acceptability. Evaluates the systems compliance with business requirements and assess if its acceptable for delivery.

- Component Testing * (self read)
  * Tests a specific module or program. May be done in isolation from the rest of the system, depending on lifecycle model of application.

  Stub and Driver are used. Developer makes Y, you need to use stub and driver for X and Z

Test Data

- Normal: Data you would expect to work or be accepted and lies within range.
  ie on a test where score can be between 0-50 normal range would be: 2,4,5

Extreme: Data that lies on the upper and lower limits of a range - ie 0, 50

Exceptional: Data that should not be accepted by the prog - ie -7, Yavey

Errors

Syntax error

- Shows that code breaks a rule of the chosen language.

eg - Misspelling a keyword - pint instead of print
- Missing a character that is needed - brackets

Execution/Runtime error

- Occurs while program is running examples include dividing by zero or telling it to open a text file that's not on the system. The code will compile but break when it hits that point. ie divide by zero

Logic Error

- The program will run but perform unexpectedly.

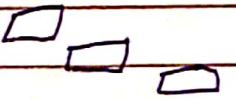
ie * lines of good code but in wrong place
* Calculations subtracting instead of adding.

Readable Code practices

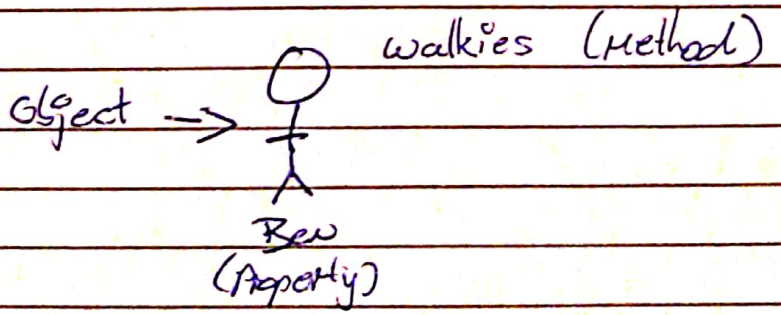
- Comments
- Good variable names
- indentation
- White space

OOP vs PP

Procedural Programming
- list of instructions to tell the computer what to do step by step. Imperative programming Top down.



Object Oriented Programming
- Approach where all problem solving computations are carried out using objects
- An object is a component that knows how to perform certain actions and how to interact with other elements of the program
ie



Event Driven Programming (EDP)
Used to structure a prog around various events such as user input on GUI and network requests from websites and other properties.