Glossary

abstraction

A technique or process that manages complexity in a program or computer system. Abstraction “hides” details or removes duplication, allowing the programmer to focus on high-level considerations and functions rather than the rules of a programming language.

algorithm

A set of steps to accomplish a task. An algorithm can be expressed in many kinds of notation, such as natural language, pseudocode, and flowcharts. Algorithms are essential to the way computers process data, because they contain the specific instructions for what a computer or program does.

API

An application programming interface is a set of program routines, protocols, and tools that facilitates communication with a client app that is designed specifically for the server. A client computer program can send instructions to the server and get data from the server through the API.

app

A software application, especially one that a user downloads to a mobile device.

append

To add an element to an existing list. In Python, append () is a method that will pass an object into an existing list.

argument

The values that a program provides to a function or subroutine. Sometimes coding professionals use the terms “argument” and “parameter” interchangeably. In this course, argument is a better choice because Python does not use the term parameter.

arithmetic operator

A symbol in code that tells a computer to perform a specific math operation, such as addition, subtraction, multiplication, or division. (+ ¬¬¬– × /).

artificial intelligence (AI)

Any program that analyzes its environment and is able to respond accordingly to achieve an end goal.

assignment

A statement that sets or stores a value in a variable.

assignment operator

A symbol in code that assigns values from the right side of an equation (called an operand) to what is on the left side of the equation. Assigning a value to a variable is a classic example that uses the “equal to” assignment operator. (Example: color = 255).

authenticate

To verify a user’s identity.

backlog

A sequential and prioritized list of what needs to be done to create the app the user wants. The list can be technical requirements or user centric in the form of user stories.

bash

A command processor that typically runs in a text window. Bash is a text-based way to manipulate a computer’s file structure and execute commands. Bash can also read commands from a file, called a script. In Cloud9, it is also called the Python Interactive Interpreter. (Bourne Again Shell)

best-so-far loop

A piece of code (loop) that contains a variable which stores the “best” value as defined by the programmer. Each time the code executes the loop, the program evaluates whether it finds a “better” value as defined by the programmer. If it finds one that is better, then it replaces that variable value with the new value and continues until it reaches the end of the list.

block

Any sequence of statements in Python that occur at the same indentation level.

block-based programming language

A means to create computer programs by manipulating elements graphically rather than using text. Also called visual programming language.

Boolean algebra

The basis of all modern computing, Boolean algebra is founded on the idea of conditionals and base 2 mathematics. In Python, the Boolean data type has only two possible conditions: True or False.

Boolean expression

A processing decision branch using comparison operators (= ≠ > <) that is defined to return a Boolean value (“true” or “false”). By using Boolean expression to ask questions, the program can determine what to do next.

Boolean value

One of two values, such as “true” or “false”, that allows a computer to know what step in the conditional statement process to execute next.

branch

An alternative path through a program, often occurring as the result of the evaluation of an expression in a conditional.

brute force attack

An attempt to discover passwords through trial and error. Attackers try as many passwords or phrases as possible hoping one of the guesses is correct.

call a procedure

To direct a program to execute or reference a certain procedure. A procedure is a subroutine that is stored only once, but can be called many times in a program to execute when needed.

CamelCase

A style of writing file names that avoids spaces and other characters and differentiates words based on capitalization. For example, LastnameFirstname. Many programming languages require no spaces in file names.

chained conditional statement

A series of conditionals that a computer moves through until it finds the one that is true.

characters

Anything you type on a keyboard that shows up on the screen.

class

A template for creating objects. A class is a grouping of functions and associated data into a cohesive unit. A class specifies the methods and attributes (also called properties) that are related to an object. When an object is created from a class, the resulting object is called “an instance of the class”.

cloud computing

The practice of using a network of remote servers hosted on the internet to store, manage, and process data, rather than a local server or a personal computer. A model for providing constantly available data processing power and storage to many users at once over the internet.

code

A set of program instructions.

CodeLens

A code editor that executes within a browser. In CodeLens, you can examine code line by line to gain understanding about how the code executes.

color saturation

A measure of how intense a color is, such as bright red or a more muted, dark red.

compiler

A program that converts code written in a high-level language by a person into machine code that can be read by a computer. A computer can only read 0s and 1s, so all instructions are compiled to the necessary level of abstraction for the computer to execute a program.

component

A function or artifact in an app that you can add in Design view of MIT App Inventor. Examples of components are: Canvas, Camera, Label, Slider, Sound, Horizontal arrangement, Button.

computer science

The science of creating artifacts and solving problems using the power of a computer. Areas of focus include software engineering, programming, data analysis, algorithms, graphics, and animation.

PLTW Developer's Journal

A physical location where you can document, store, draft, and reference your development process. The PLTW Developer's Journal. Artifacts you might capture in your journal include new vocabulary, new functions, pseudocode, flowcharts, project planning notes, and brainstorming ideas.

concatenation

A joining together of separate items —without changing them—into one place. For example, the concatenation of two strings such as "Hello" and "world!" would return "Hello world!".

conditional statement

A programming statement that evaluates Boolean conditionals as being either true or false to the path and next steps in a program. Conditional statements are often written as "if-then" or "if-else" statements.

container

A virtual environment in Cloud9 that is configured to run only a single application.

counted loop

A statement that keeps track of how many times a program has referenced and run through a loop. You can use a counted loop to count up or down based on the starting number, the incrementing math, and the ending criterion count value. A common use of a counted loop is to end its use. When the desired loop count number becomes the same as the specified condition to the end loop, the loop stops.

criterion

A condition that can be evaluated. A standard by which something can be judged or decided.

crowdsource

A method of obtaining information from a large number of people through the internet.

data type

A classification of data or “class type” that defines what a data item is or is not, such as integer, float, string, or Boolean.

debug, debugging

To identify errors or bugs in computer hardware or programs and fix them.

decompose

To break down a complex problem or system into smaller parts that are more manageable and easier to understand.

decomposition

An essential concept in computer science like abstraction, algorithms, and pattern recognition. Decomposition is the process of breaking a complex problem or system into parts that are easier to conceive, understand, program, and maintain.

Developed Program Code (DPC)

The final programming solution that your team develops in response to the problem that your team has outlined.

diameter

The distance of a straight line from one edge of a circle to the opposite side of the circle through the center of the circle.

Domain (URL Domain)

A region of the internet that is grouped together for administrative purposes, such as allocating ownership of resources. Every domain name has a suffix that indicates which top level domain (TLD) it belongs to. Examples include: .gov - Government agencies .edu - Educational institutions .org - Organizations (nonprofit) .com - Commercial business

domain name

An identification string that indicates what domain a website belongs to.

element

A single entry of a list. An element can be different data types, such as integer, float, string, or Boolean.

endpoint URL

A specific URL location that allows a device to interact with a web server to modify or collect data. If you enter the URL for an endpoint into a browser, you can see details about the service.

equality

An operator that compares values. An example of a numerical equality is testing whether a conditional statement returned the value you were looking for (8=8).

event-based programming

A type of programming that is controlled by events. Nothing executes until the user does something to cause an event.

expression

A sequence of one or more operators and/or operands. A mathematical phrase or sequence that has values (operands) and operators.

file extension

The abbreviation that comes after the period in a file name and identifies what the file contains, what programs can open it, and how to display the file.

file path

The directions a computer can follow to find a specific file.

float

A type of number (number type) that provides very precise information by including all the numbers after the decimal.

for loop

A control flow statement that allows a set of instructions to be executed repeatedly. A for loop is usually used when the number of iterations is predefined “execute this loop so many times”. Otherwise, a programmer might use a while loop, which would execute the loop repeatedly as long as a certain condition is met.

function

In programming, a named section of a program that performs a specific task. A function is a block of organized and reusable code that performs a single action. A function can be a procedure or a subroutine. In a sense, many of the blocks in MIT App Inventor can be thought of as functions. In Python there are many built-in functions, because all programmers need many of the same actions to be executed often.

hack

An inelegant solution to a problem. A programming language created by Facebook.

hacker

Someone who attempts to break into computer systems with malicious intent or a clever programmer who is able to identify exploits in computer systems. One is a criminal; the other is a cybersecurity specialist.

high-level programming language

A language such as Python that abstracts some details to make programming faster and easier.

ill-defined problem

A problem that is not well defined by anyone. The problem situation has many contributing factors and cannot be easily understood and a solution is not readily available.

inclusive statement

A type of statement that makes sure that all items are included. For example, “1–3” includes 1, 2, and 3.

incremental counter

A loop that changes the value of a count by a certain amount every time an event occurs.

Independently Written Response (IWR)

Part of a project evaluation that demonstrates your ability to describe what your program and algorithms do and how abstraction manages complexity in your program.

index

A specific location by order for an individual element in a list. The position of an item in a list is often called its index. In MIT App Inventor, the first item in a list has an index of 1, the second has an index of 2, and so on. In Python, the first index is represented by 0. The plural form is indices.

innovation

Taking something in existence and improving or changing it in a way that others may find more useful than the original.

interest inventory

A survey to help provide insight into a person’s interests.

interpreted language

A programming language like Python® where many instructions can be executed directly, one at a time without the need to compile the program.

interpreted performance rubric

A modified version of the College Board create performance task rubric used in AP Computer Science Principles.

list

An ordered way to store information. When items are added to a list, they are placed in a certain position in the list. The position of an item in a list is called its index. In MIT App Inventor, the first item in a list has an index of 1, the second has an index of 2, and so on.

list object

A collection of data values that do not have to be the same type. Each item in a list is called an element.

local database

A storage space on a device used to store information from an app.

logic

In a program, processing conditional statements to determine what action to take next.

low-level programming language

Sometimes referred to as machine language or assembly language, a low-level programming language encodes instructions in binary (zeros and ones) so that they can be directly read and executed by a computer.

method

A function that is a member of a class.

modular

A way of developing individual pieces of code that are each concerned with their own contribution, depending as little as possible on the details of other pieces. Pieces usually have to connect, but the connections should be simple and well defined. That way, pieces can be improved or replaced without requiring all the other pieces to be redesigned.

modulo

A mathematical operator that performs division, but returns the remainder.

navigation control

A WebViewer component in MIT App Inventor that allows you to browse the internet. Navigation controls perform actions like returning to a previous page or returning to the home page.

nesting

Putting a function inside another function or a loop inside another loop. One method is contained within another one.

notifer component

A component in MIT App Inventor that allows a programmer to use a pop-up screen to give the user feedback.

object

An instance of a class. A class is a template/blueprint that describes the behavior/state that an object of its type supports.

online code editor

An environment for creating programs that eliminates the need for installing programming software locally.

open-ended problem

A situation that does not have a single correct answer, but many possible resolutions.

operating system (OS)

Software that supports a computer's basic functioning. Every general purpose computer has an operating system.

operand

One or more values that an operator operates on. If the computer is adding 5 + 2, the operator is the +, and the 5 and 2 are both operands.

packaged app

When app development is done, the program puts that app into a final form that devices can understand and use while protecting the code itself from being changed.

pair programming

A structured collaborative process in which two people create code together, each with a specific role. The "driver" types at the keyboard and the "navigator" directs the code creation based on the requirements of the development. It is important to switch roles in the process often and maintain equity in the collaboration (avoid one person being dominant).

parameter

A special kind of variable defined in a function to receive specific information. "Parameter" and "argument" are often used interchangeably. In this course, we will use the term "argument".

pi

The ratio of a circle's circumference to its diameter, 3.14.

post

A list that contains a class of objects, such as in social media posts.

primary source

An original source. Primary sources are distinguished from secondary sources, which cite, comment on, or build upon primary sources.

problem solving

A systematic process for finding solutions to complex issues.

procedural abstraction

The process of applying or using a procedure and only knowing what the procedure does, without knowing how it does it.

process

The act of a computer looking at the path to determine the next step, doing the next step in the program, and then moving on to look at the next step in a sequential manner.

processor

A computer chip that processes information and data from input and delivers information or data as an output.

product owner

The keeper of the requirements for a development process.

program mode

Creating a source code in a text file that can be loaded into the interpreter.

protocol

An agreed-upon method for conducting a communication.

Python

A text-based language designed to emphasize code readability with a syntax that allows programmers to express concepts in fewer lines of code than possible in languages such as C++ or Java. (Python is a registered trademark of the Python Software Foundation.)

Python prompt

A visual cue in the Python shell that tells you where you type instructions into the interpreter. In Cloud9, the prompt is three chevron characters (>>>).

Python shell

The window (usually located at the bottom of the Cloud9 interface, but may be closed) where you type and test code all in one place. Python shell, bash, and interactive interpreter window are all used interchangeably.

radius

The distance from the center point of a circle to the edge of that circle.

range loop/function

A function that identifies a number to start at, a number to stop at, and how much to change by each time the program executes the loop. The function will loop as many times as necessary until it gets to the end value.

return value

The value a computer returns after completing a function.

RGB color model

An additive color model using a scale from 0–255 to determine the hue for each primary color, Red, Green, Blue (RGB), on a screen or monitor. “0” means you do not want that color; “255”

means you want as much of that color as possible. By mixing the three primary colors, you can create a broad array of colors.

Scrum Master

The person responsible for making a development process run smoothly, for removing obstacles that impact productivity, and for organizing and facilitating the critical team meetings.

Scrum poker

A technique to determine the priority of items in a backlog. A planning tool used to estimate the time and value of tasks and avoid anchoring.

secondary source

A source of material that takes existing work and presents some parts, such as a summary, as their interpretation of the original work and provides citations of referenced work.

set block

A block that sets the value or parameter for something on the screen—an input, an output, or anything being controlled in your program.

shell mode

A program mode in which you can type Python code into the Python shell (also called the bash or Python interactive interpreter), and the shell/ interpreter shows you the result immediately.

skeleton code

A program that has many missing pieces to be filled in. Often skeleton code contains comments to inform the programmer what kind of code needs to go where, so others can take the tracer round of the program and modify it for their own needs.

sprint task list

A list of the individual parts that need development to address a backlog item.

statement

The smallest executable piece of code in a text-based programming language.

string

Text or characters displayed by a program. In MIT App Inventor block mode, a text block lets you manage how text or “strings” will be presented to the user of an app.

syntactically

According to the rules of syntax.

team member

A self-organizing and cross-functional member in a group of people who do the hands-on work of developing and testing a product.

terminal

The area in Cloud9 where you can write and save Python programs. When you name and save a file, the File tab shows the .py file extension, which indicates that you are in the programming terminal. If the .py extension is not there, then it is not possible to run the program.

tracer round program

A highly abstracted program that implements only the most basic and necessary structures without implementing the more specific details.

type

The kind of data stored in a variable.

Ubuntu

A free and popular operating system.

underscore case

A style of writing where the underscore character (_) is substituted for spaces and everything is lowercase. For example, underscore_case.

usability

The quality of how easy is it for a user to use an app without any explanation outside of the app.

user

The person or persons who offer outside feedback throughout a development project to provide input from a user needs perspective.

user-centric design

A development process where the developers continually collaborate with the end user to determine the initial requirements of a solution, the effectiveness of a feature, and whether the software meets the desired need.

user interface

The visual platform that a user interacts with, which then sends a message to the operating system for what to do next.

user story

The individual items that make up the whole solution that will benefit the user. Each user story is addressed individually in a prioritized manner during app creation.

value

An object such as a number or word. A value is an expression that cannot be evaluated any further.

variable block

A block of code in MIT App inventor that accepts any type of value as an argument. App Inventor has five types of variable blocks: get, set, initialize global name to, initialize local name to in (do), initialize local name to in (return).

version control system

Any means by which people working with information can track changes, prevent conflicting data, and keep track of the most current version of their files.

video of developed code (VDC)

A short video recording that demonstrates the working code with your narration of the code calling attention to specific parts using appropriate vocabulary key terms.

virtual machine

A simulated computer system; many virtual machines may exist on a single physical computer.

while loop

A control flow statement that is a repeating if statement. The while loop will continue to execute indefinitely long as the condition being evaluated is true.

whitelist

A list of websites that your school IT has approved for you to visit, although they might otherwise not be allowed through an internet filter.

aggregator

A variable that adds together all the values or data at a specific moment.

professional

A way of behaving, dressing, and communicating with people that is respectful of everyone's backgrounds and opinions.

output

Information or signals produced or delivered by a computer system.

input

Information or signals entered into a computer system. Examples of input devices are buttons, keys on a keyboard, touch screens, and accelerometers.

syntax

The set of rules that defines the combinations of symbols that are considered to be correctly

structured in that language. The grammar and spelling of text-based programming languages.

feature

A function of an application or user interface.

event

An action or occurrence that happens during runtime that will trigger a response or behavior by the software. An event can be user input, such as clicking a button, or external, such as a device receiving an SMS text message.

event handler

In MIT App Inventor, a control block that looks for inputs or events to know when to perform a specific action.

procedure

A sequence of actions or instructions to follow in solving a problem or accomplishing a task. Also called subprogram, a procedure is a group of statements that may be used at one or more points in a computer program. In MIT App Inventor, many commonly used procedures (procedure blocks) are premade.

iteration

A process of repeating a set of instructions a specified number of times or until a condition is met. Such as in a repetition of a process or a newer version of development in computer science.

variable

The smallest unit of data storage that a program can use. A variable contains known or unknown information referred to as a “value”. Two types of variables are global and local.

operator

A symbol that represents a comparative action for a computer to take, be it an arithmetic operator (+ – / × % **), a relational operator (< > ≥ ≤ = == ≠ !=), or a logical operator (AND OR NOT).

logical operator

A representation of a logical statement that is used to examine the relationship between two values and determine whether the statement is true or false (Boolean conditionals). Examples of logical operators include AND, OR, and NOT.

integer

A whole number that does not have a decimal or any digits after the decimal.

global variable

Stored data that may be used by any part of the program. A variable is simply a storage location for a value that is known or may be changing often based on inputs. By making a

variable “global” it means all parts of the program can access it. Only using global variable in large programs can create problems because how the data is used in subroutines might be slightly different.

local variable

Stored data that is only used within a small scope of a project and cannot be used by other parts of the program.

scope

A description of the parts of a program where a particular variable can be accessed and modified.

natural language

The language that people use in daily conversations with each other.

pseudocode

A way to work out the logic without worrying too much about the specifics of the language you are programming in.

loop

A sequence of instructions that continually repeats until a condition is met.

problem decomposition

The process of breaking a complex problem or system into parts that are easier to conceive, understand, program, and maintain.

URL

The acronym for “Uniform Resource Locator”. The systematic way to find specific web addresses and web pages. A URL is composed of characters that contain information about where to locate a resource over the internet.

prepend

To add to the beginning.

import statement

A statements that gets specific code from a database through the function name to use in a different place.

blog

Short for “wed log” it is a regularly updated website or web page, typically one run by an individual or small group, that is written in an informal or conversational style. A blog is a one-way form of communication on the web.

gallery

An exhibition, or display, of images.

template

Something that establishes a pattern. html, css, and django view templates are examples of templates that help programmers organize code that is used repeatedly and provides a common structure for all designers to align to.

user credentialing system

A means of allowing access to only individuals with an account.

bulletin board

A web application that allows many-to-many communication through online tools.

transistor

A physical component of a computer that acts like a light switch, only allowing two types of signals in a circuit (on or off). By connecting these components in a specific way, you can create more and more complex logic from simple (on off) signals.

TEMP

The acronym for Term, Example, Meaning, Picture; a vocabulary building strategy.

HTML tags

Tags within a web page that contain hidden keywords that define how your web browser must format and display the content. HTML tags begin with the less-than character and end with greater-than. These symbols are also called “angle brackets”.

tag

Markup component/element indicated by an opening less-than symbol, a keyword and possibly some more content, followed by a closing greater-than symbol.

Structured Query Language (SQL)

A standard computer language for database management and data manipulation.

server

A computer or computer program that manages access to a centralized resource or service in a network.

rendering

The process of displaying visual content using computer hardware; gathering data through templates to send and display to a user.

object-oriented programming

A style of programming language that focuses on creating reusable patterns of code, in contrast to procedural programming, which focuses on explicit, sequenced instructions.

mobile application

A program that runs and is used on devices that a person may take with them anywhere. Also called an app, which people download to their devices and use routinely.

migration

A command in Django frameworks that applies changes to the database of the website server.

initialize

To set a starting value.

index page

The default location that a website directs a browser to.

HTML

Hypertext markup language. The type of formatting that directs a web browser how to display a webpage.

formatting character

A character that allows variables to be used in strings, such as %d is for integers and %s is a string.

Django framework

A framework within Python that allows rapid web development of applications within a website.

CSS

Cascading style sheet. A file that describes how HTML elements are to be displayed on screen, paper, or in other media. CSS saves a lot of work. It can control the layout of multiple web pages all at once.

criteria

Conditions that can be judged and determined by a program to be true or false.

counting loop

A process where a set of code repeats, and each time through the loop (iteration), a counter is incremented. When the desired loop number becomes the same as the condition specified to the end loop, the loop stops.

complex conditionals

A series of checks that a program moves through in sequence before setting the Boolean value to true or false and determining which process to do next. Complex conditionals can also be called chained conditionals.

Scrum

An iterative and incremental development process used by a team of developers to create a product that benefits from input from multiple stakeholders.

decremented

reduced in number by one

hard coding

setting data, parameters, and conditions that make the program only behave differently when the programmer changes the code directly. It does not allow for varied user input.