RPA Design & Development v1.1

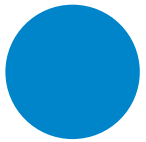
Lesson 1 Programming Concepts Basics- 1

UiPath™

Agenda

Software Applications

- What is a software application?
- What are the different types of software applications?



Introduction to Programming

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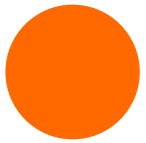
- What are the components of programming?



Data and Data Structure

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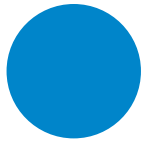

Sequence and Flow

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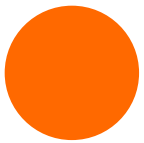
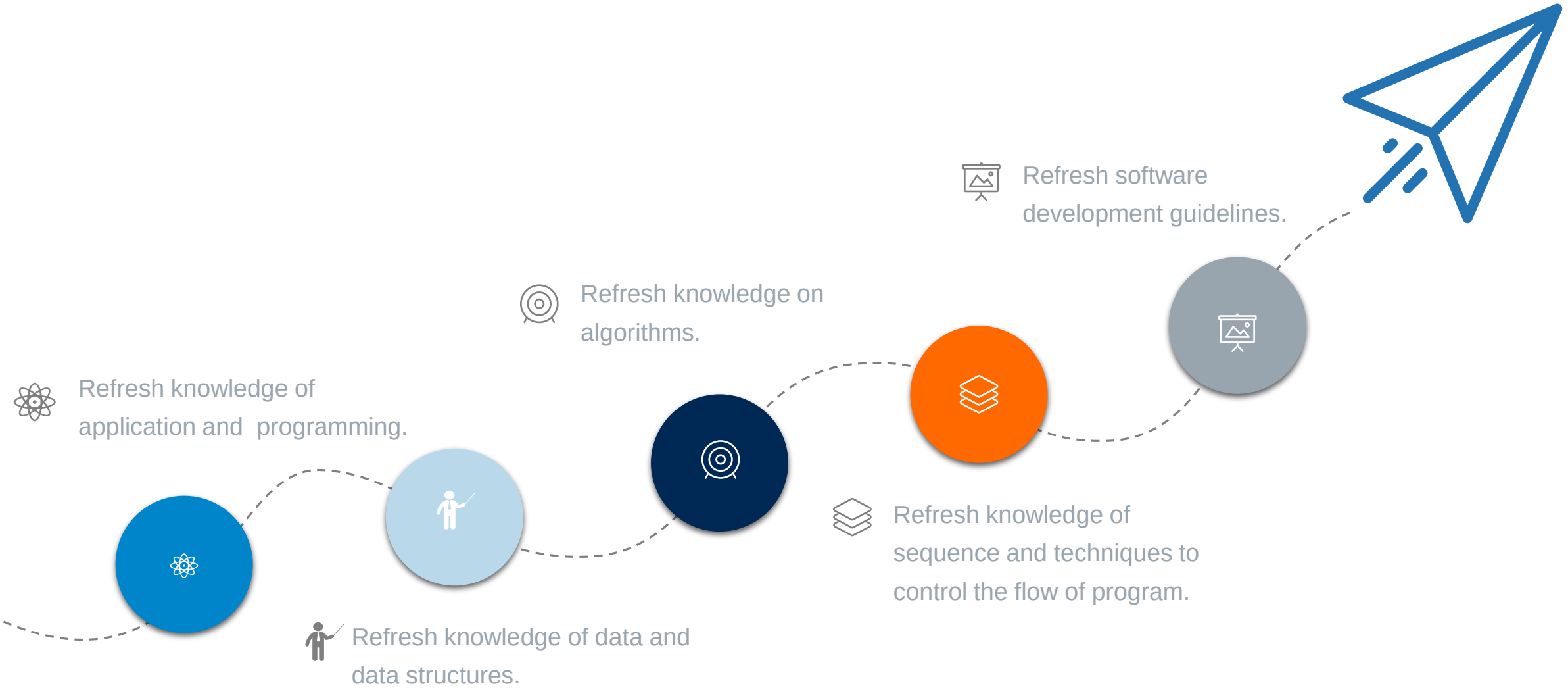
- What is a flow chart?
- What are the techniques to control the flow in a program?



Software Development Guidelines

- What is Software Development Life Cycle?

Learning Objectives



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Software Application

An application is a computer software package that performs a specific function directly for an end-user or for another application.

Application Software		
Word Processing	Spreadsheets	Presentations/ Web Browsers
Gaming	E-mail	Databases

System Software		
File Management Tools	Operating System	Utilities

Types of Applications

Based on the scope, applications can be categorized into four types:

Types of **Applications**

Native

An application that is developed for use on a particular platform or device such as a desktop or a mobile.

It runs on specific hardware, such as a PC or Mac. Example: Notepad.

Web

An application that is stored on a remote computer and delivered over the Internet through a browser interface.

Example: Email program like Gmail or social platform like Facebook

Types of Applications

Hybrid

A hybrid application that combines elements of both native and Web applications. It can function irrespective of whether the device is connected to the internet or not.

It integrates with a device's file system and with Web-based services.

It may also contain an embedded browser to improve access to dynamic online content.

Example: Twitter App for a PC

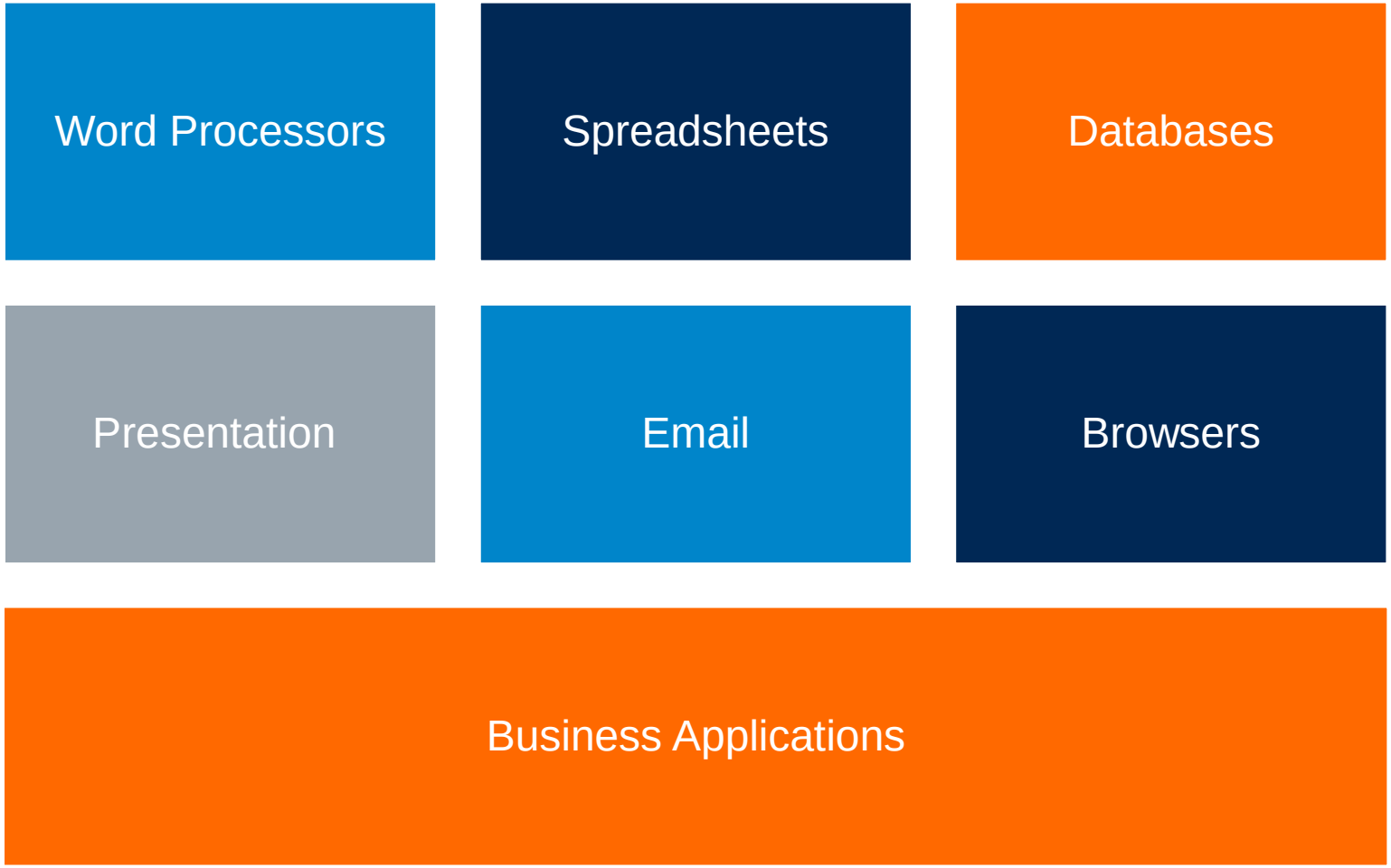
Legacy

Legacy applications are developed for older platforms and are used on newer platform by using some kind of shell or wrapper.

Example: Main frame applications used on a PC

Personal Productivity Applications

Based on the usage of the software, personal productivity applications can be categorized into many types, such as:



Types of **Business Applications**

Business applications are the software applications that are generally used in business to accomplish business related tasks, such as:

CRM: Customer Relation Manager:

Customer Relation Manager, is a type business application used for managing an organization's relationships and interactions with existing and future customers

Example: Microsoft Dynamics, Netsuits, HubSpot

HRM: Human Resource Manager:

HRM: Human Resource Manager, is a type business application used for managing an organization's relationships and interactions with existing and future employees

Example: Beehive, Zoho people, GerytHR

Types of Business Applications

Business applications are the software applications that are generally used in business to accomplish business related tasks, such as:

ERP: Enterprise Resource planning:

ERP: Enterprise Resource planning, is a type business application used for collecting, storing, managing and interpreting data from many business activities, It helps in managing various department of an organization.

Example: SAP, Oracle, Microsoft Dynamics

DMS: Document Management System:

DMS: Document Management System, is a type business application used for storing documents in a manner that is easily searchable.

Example: Documentum, OpenText, Alfesco

Types of **Business Applications**

Business applications are the software applications that are generally used in business to accomplish business related tasks, such as:

MIS/BI: Management Information System, Business Insight:

MIS/BI: Management Information System, Business Insight, is a type business application used for storing financial and operational information of an organization in such a way that it produces regular reports.

WFMS: Workflow Management System:

WFMS: Workflow Management System, is a type of business application used for setting up, performing, and monitoring of a defined sequence of tasks, arranged as a workflow.

Example: Sharepoint, Appian

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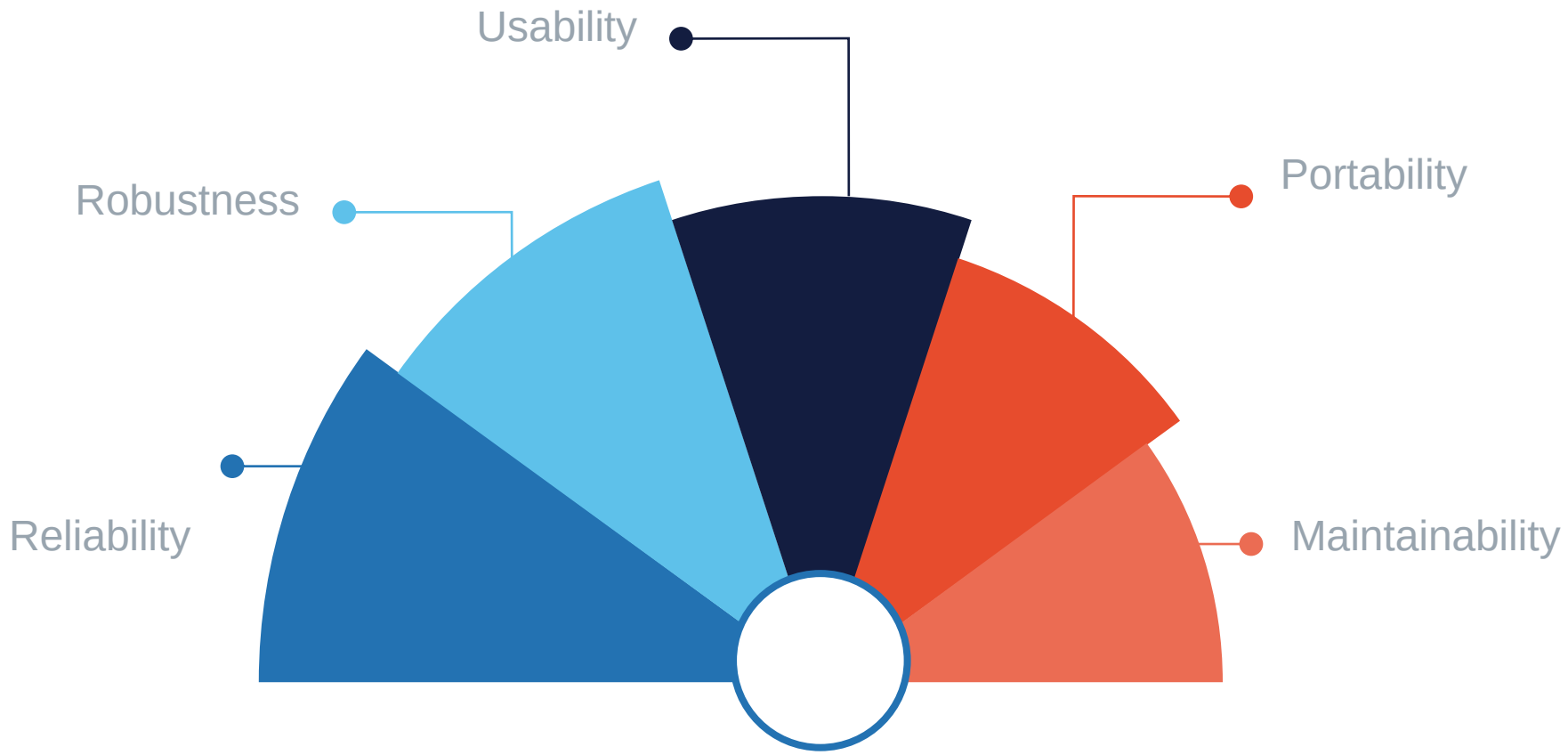
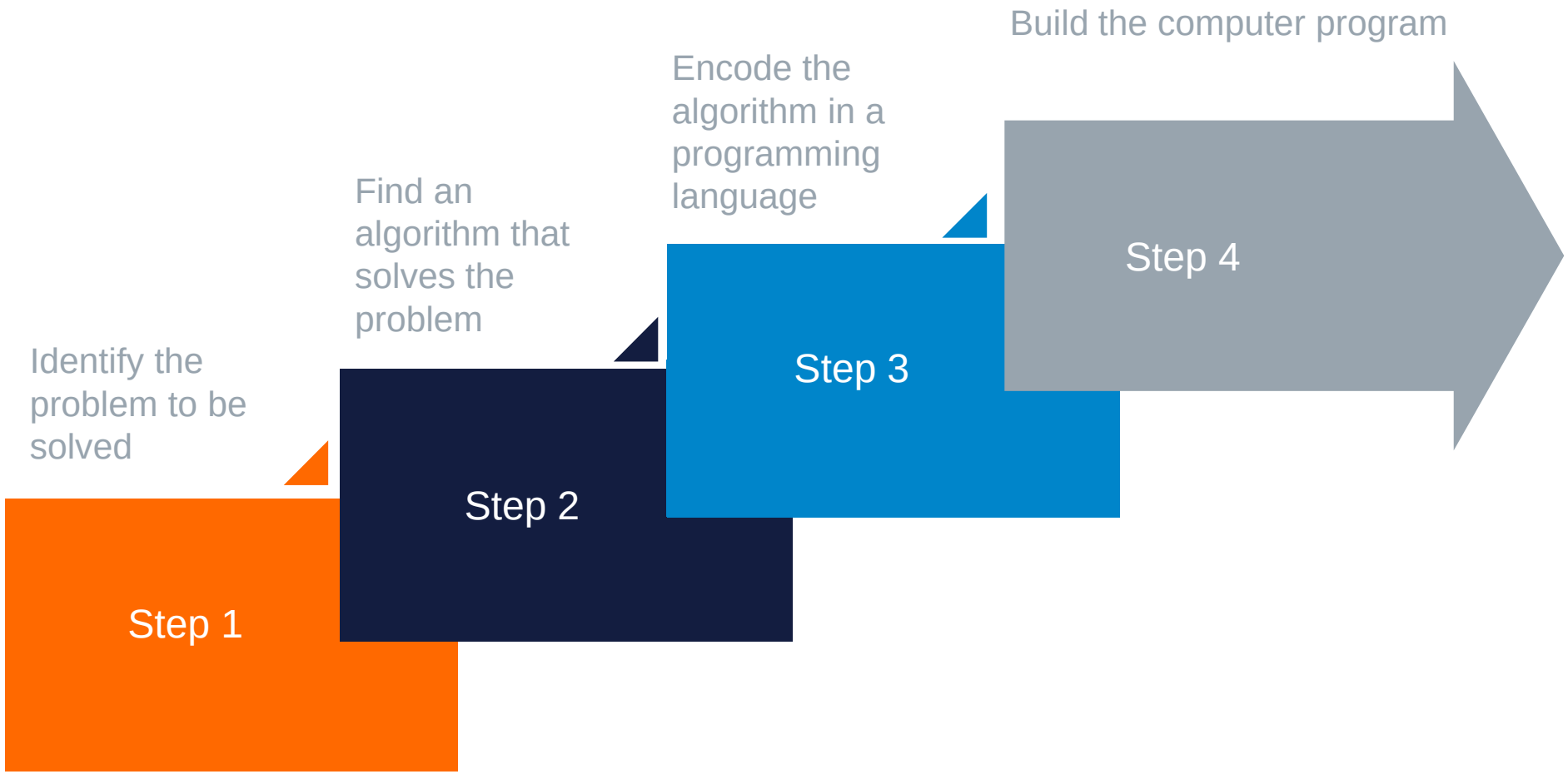
Introduction to Programming

Programming is the process of writing instructions for computer to perform certain tasks. Characteristics of a good program are:



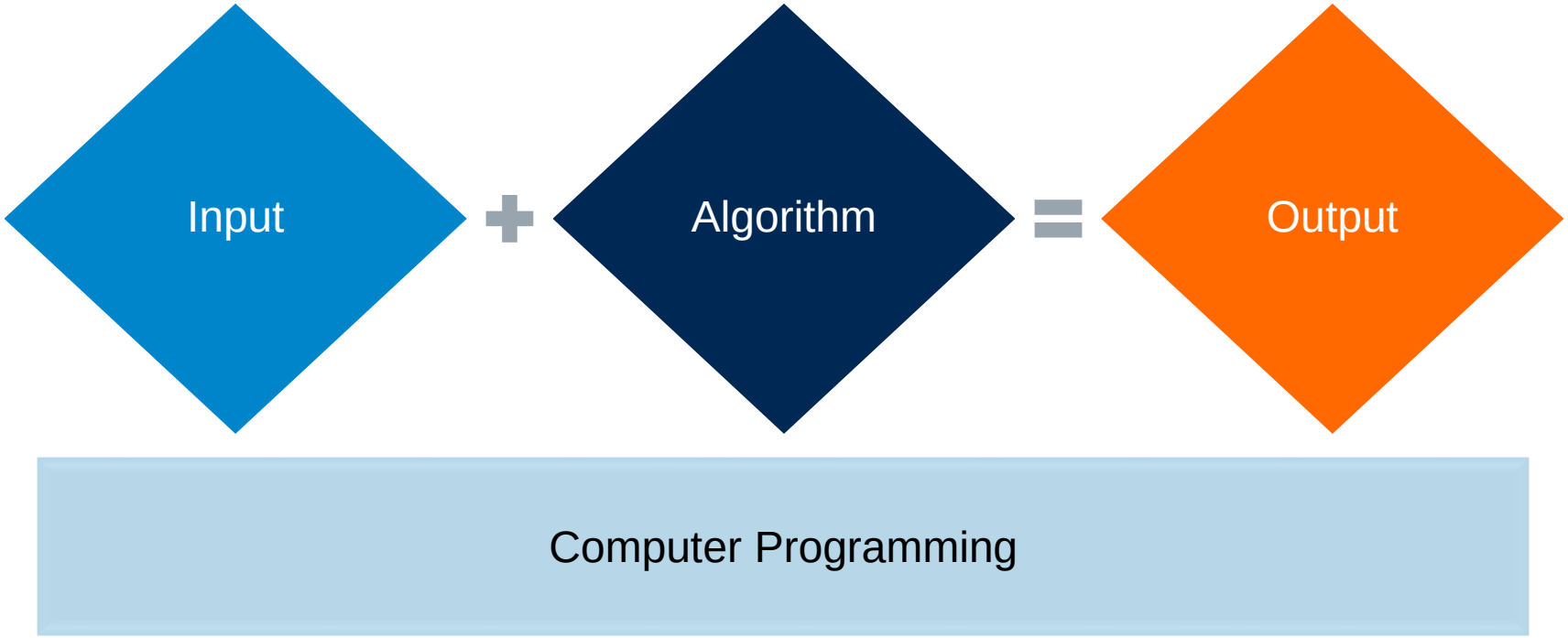
Steps for Creating a Computer Program

Building blocks of a computer program.



Key Components of Programming

Input, output and algorithm form an integral part of computer programming.



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Data

Data is a piece of digital information.

Definition

Data is a set of variables/values that can be processed by any computing machine.

Storage Form

At machine level, all data is stored in the form of 0 and 1.

Examples

Weights, Number of items sold, Employee names

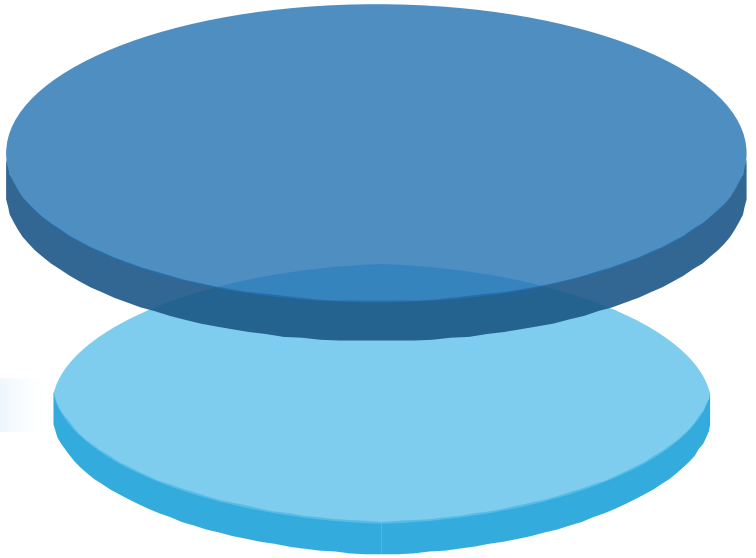
Information

When the raw data is processed it turns into information.

.

Data Storage

There are two ways of storing data:



Temporary

- Stored in computer's temporary memory

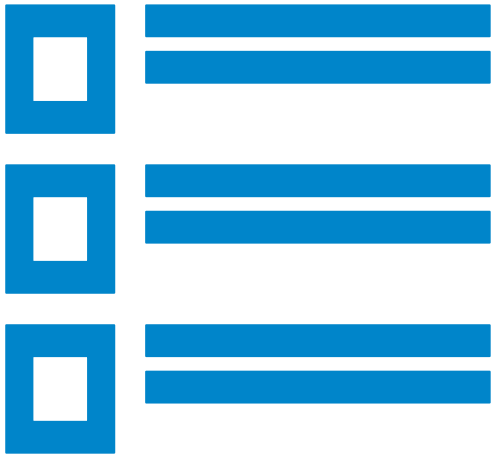
Permanent

- Stored permanently for current and later use
- Stored in files

Types of Data

On the basis of structure and uniformity, data can be categorized as:

Structured Data



For example: Spreadsheet, Online forms

Unstructured Data

For example: Email

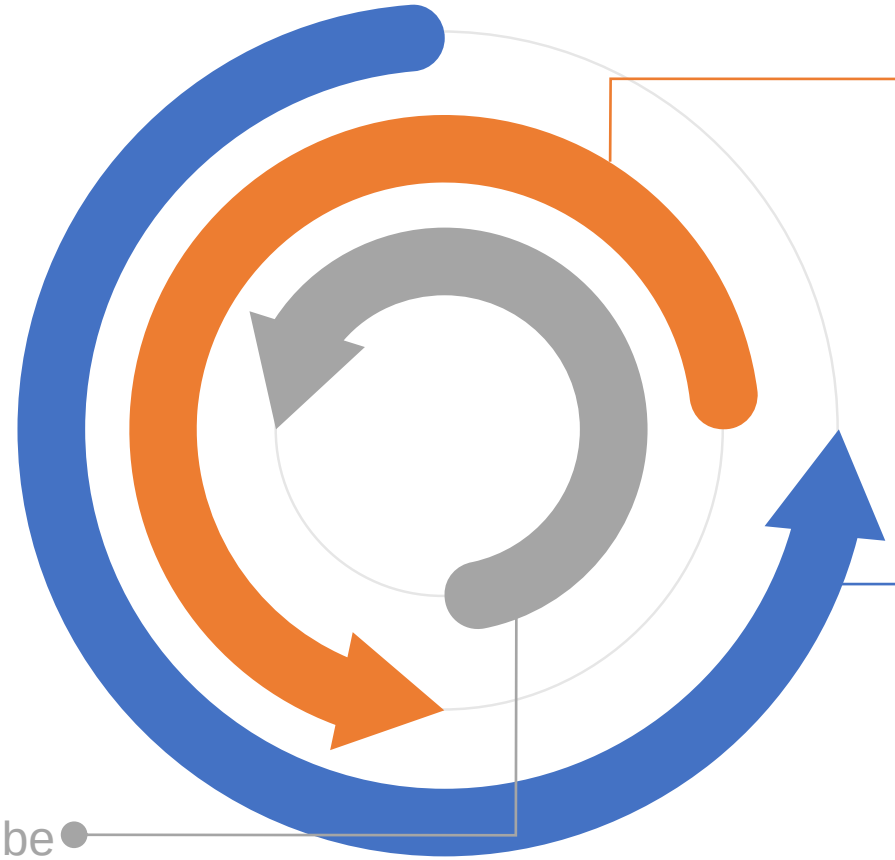
Types of Data Structures

A data structure is a particular way of organizing data. There are five different types of data structures:

1.  Array
2.  Linked List
3.  Stack
4.  Queue
5.  Dictionary

Array

Array is a data structure which stores homogeneous elements at logical locations.



It is difficult to insert or delete data in an Array.

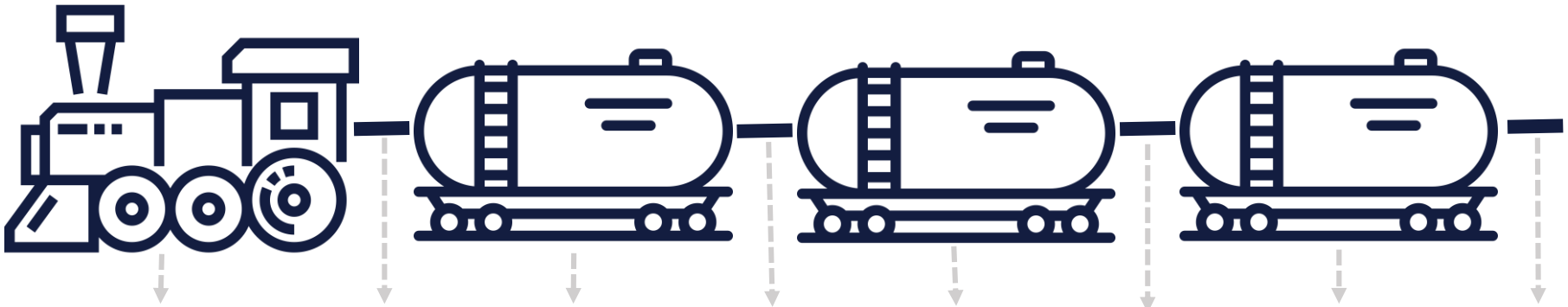
Array is static in nature.

Its size needs to be declared during initiation.

Linked List

A Linked List is a linear data structure containing a set of records linked together by links.

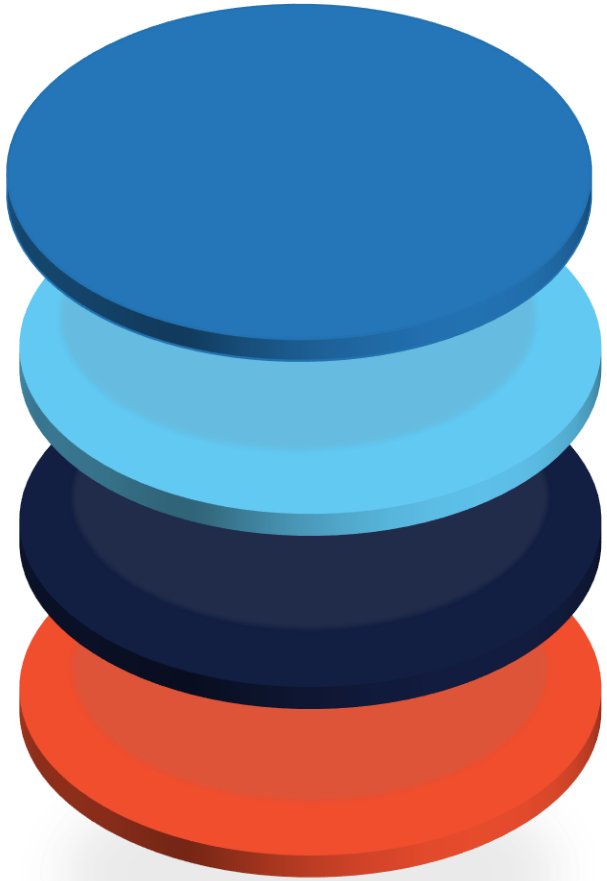
Singly Linked List



Data	Next	Data	Next	Data	Next	Data	Null
Head		Node		Node		Node	

Stack

Consider an example of books stacked over one another in the library.



A stack is a linear data structure which follows a particular order in which the operations are performed.

This order may be LIFO (Last In First Out) or FILO (First In Last Out).

Array

Linked List

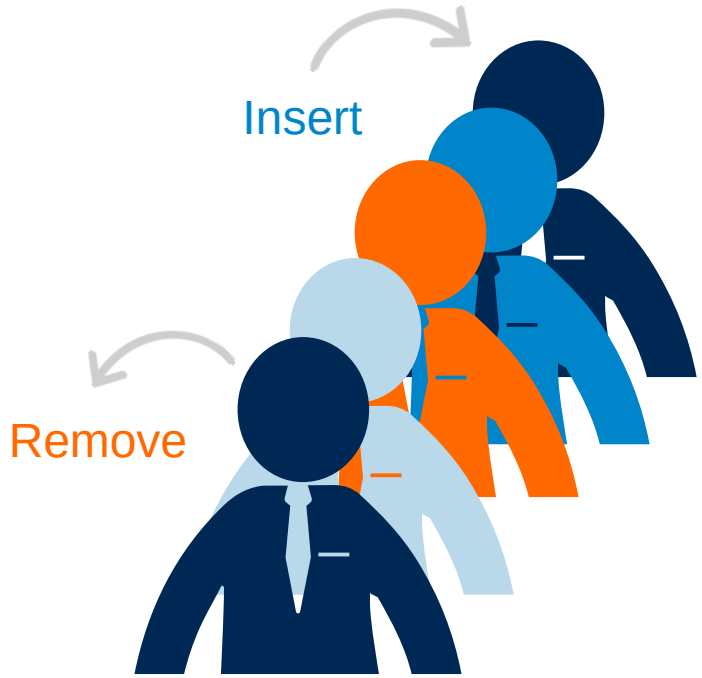
Stack

Queue

Dictionary

Queue

A queue is a linear data structure in which the operations are performed in First In First Out (FIFO) order.



Can you give a real life example of a Queue structure?

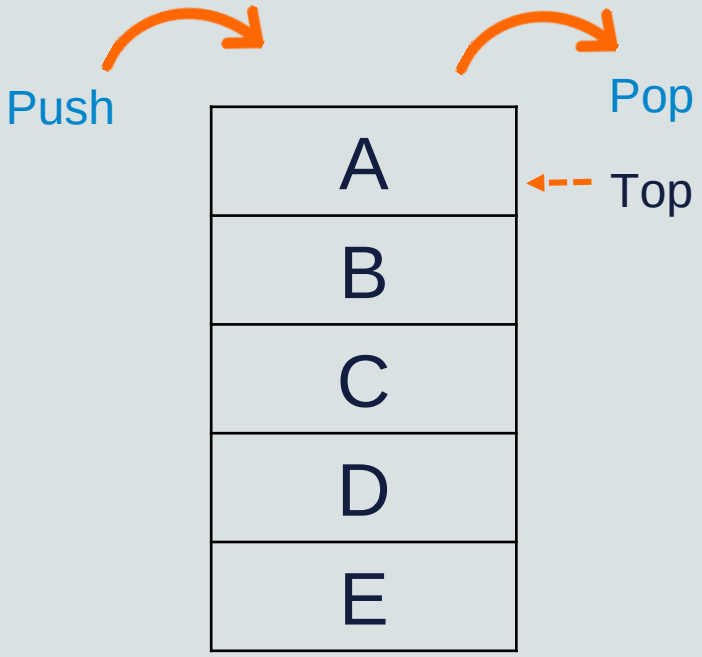
Dictionary

A dictionary consists of a key and a value.

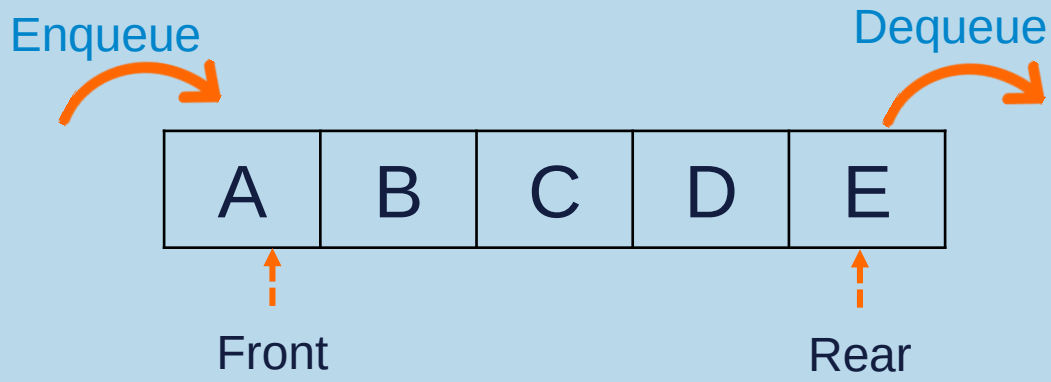
The hash function evaluates a key and uses it as an index number.

The value is stored according to its index in an array.

Stack vs. Queue



Stack



Queue

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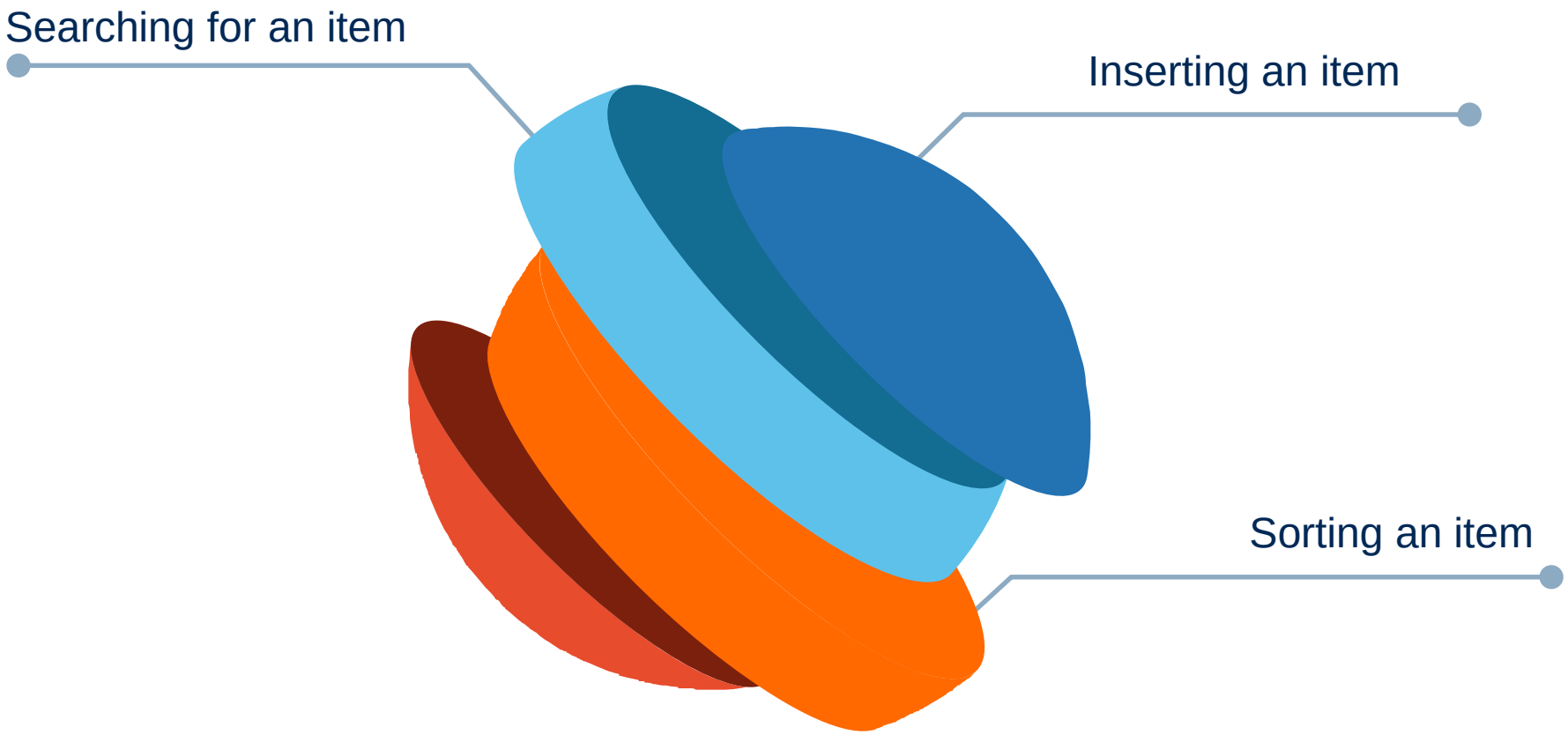
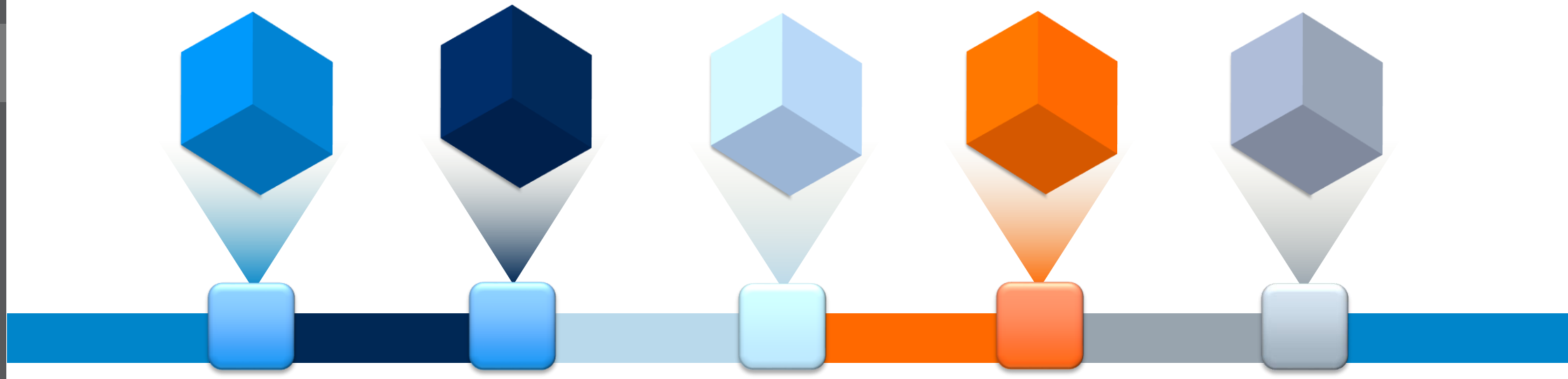
Algorithm

Algorithms are used to link data structures together to create a program that solves a certain task. They are also used to manipulate data in various ways, such as:



Algorithms in Day-to-Day Life

Algorithms can be associated with things that we do in our daily life.
An example of an algorithm for a taxi ride is as follows:



Step 1

Go to the taxi stand.

Step 2

Get in a taxi.

Step 3

Give your address to the driver.

Step 4

Reach destination.

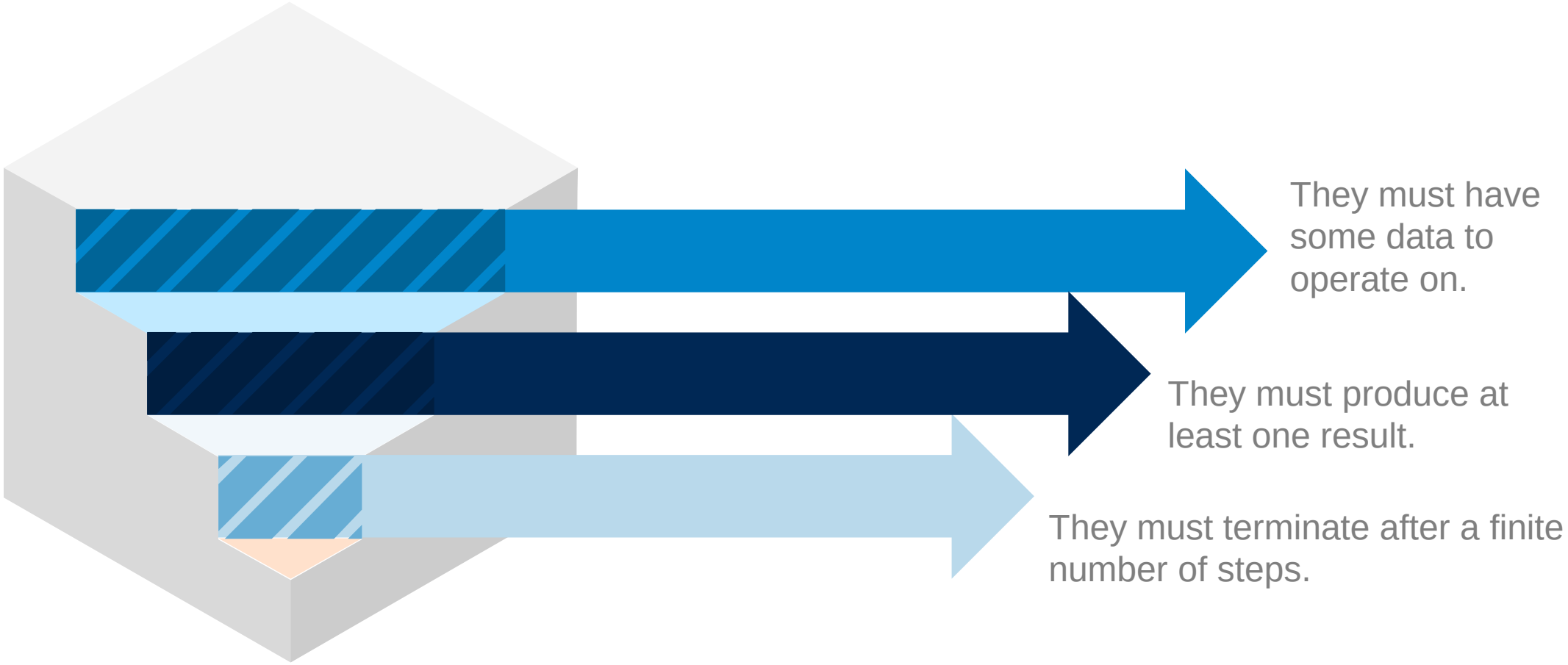
Step 5

Pay the fare.

.

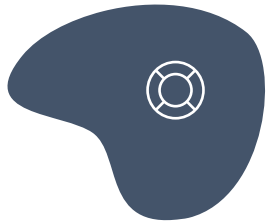
Algorithms in Programming

Algorithms have certain features:



Types of Algorithms

Algorithms are divided into following generic categories:



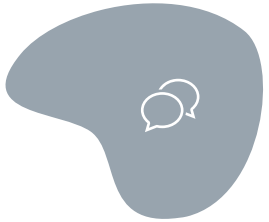
Searching

Sorting

Compression

Parsing

Encoding



Geometric

Pattern Matching

Algorithm Exercise

Think about ways of using algorithms to solve basic tasks.

1. Which algorithm will be faster in sorting numbers between 1 and 10?

1, 2, 3, 4, 5, 6, 7, 8, 9, 10

2. Which algorithm will be the faster in sorting 1 million book titles?

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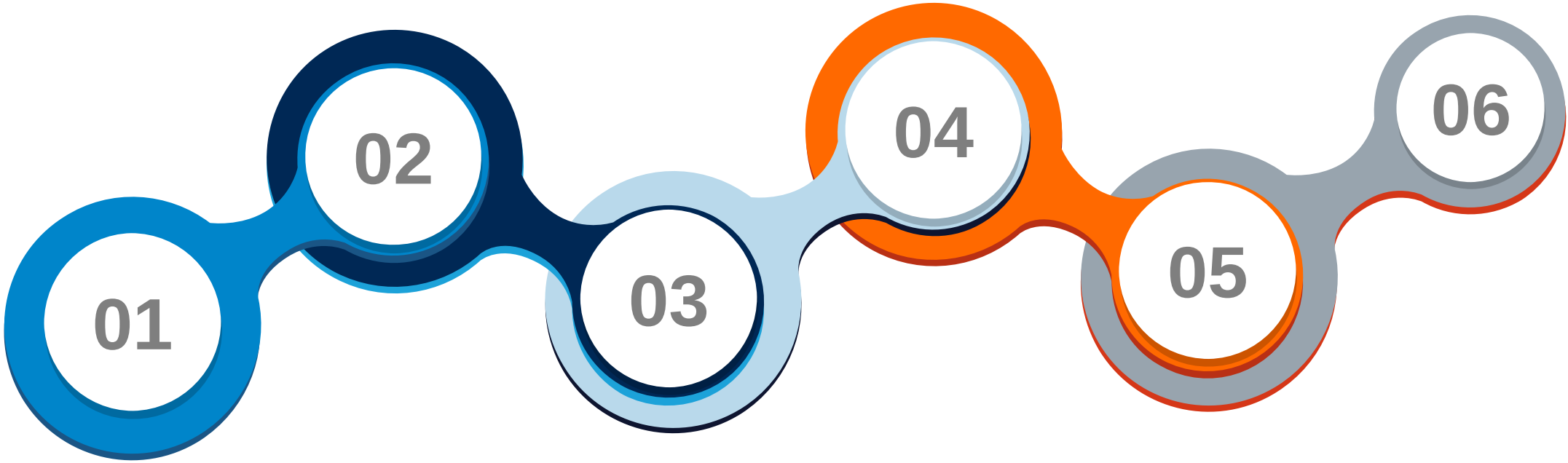
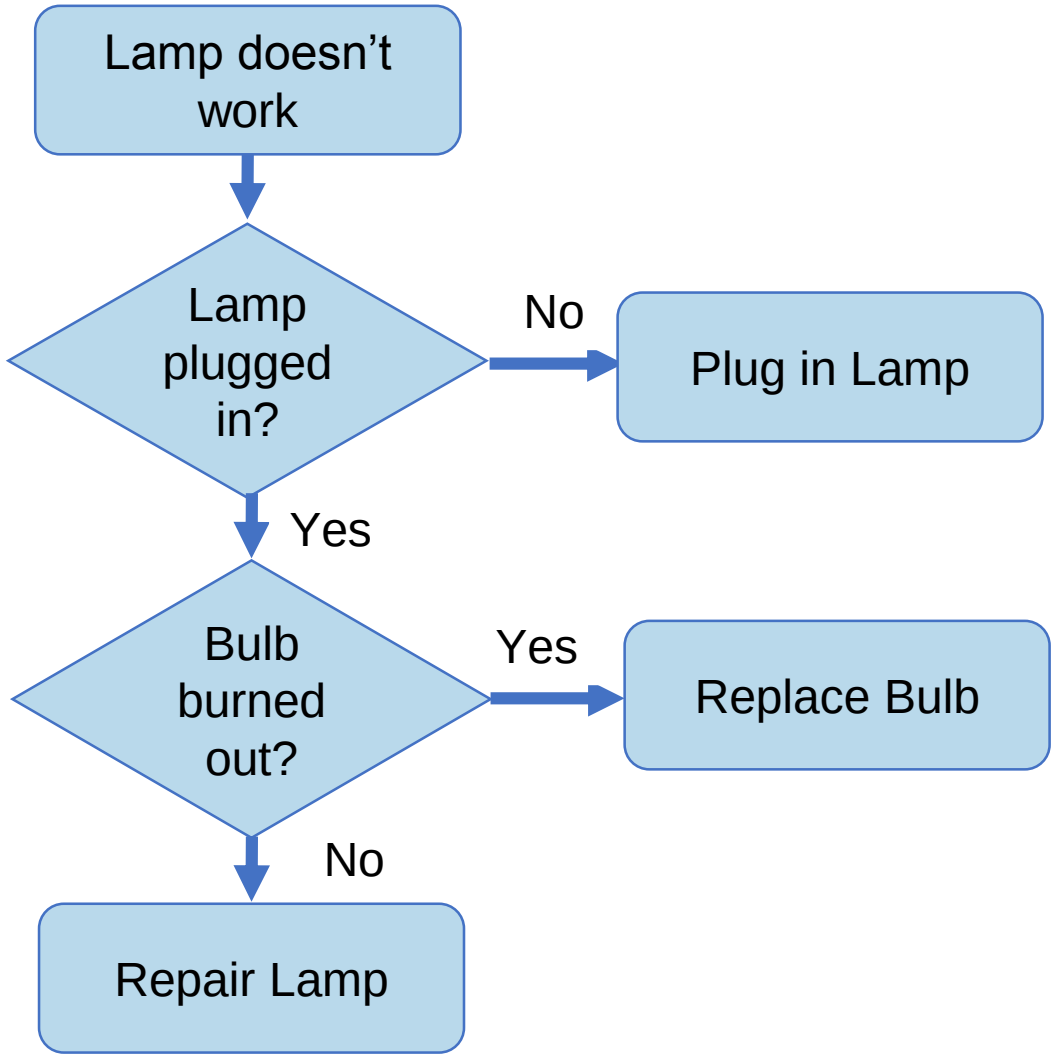
Sequence

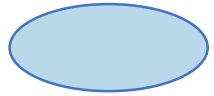
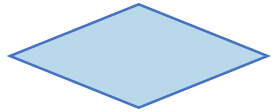
A sequence is composed of a series of statements which are executed one by one from top to bottom.



Flowchart

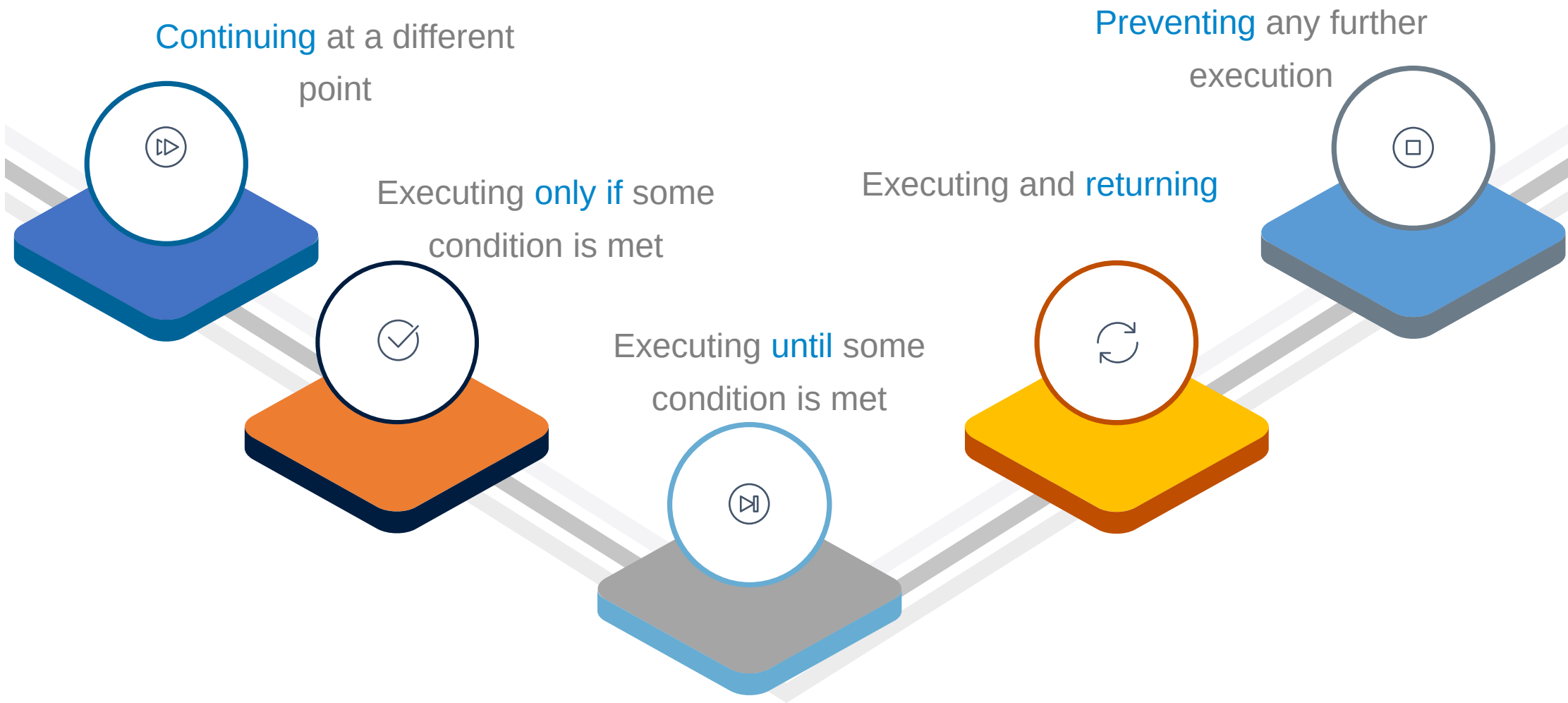
A flowchart depicts the flow of a program.



Symbol	Name
	Start/end
	Arrows
	Input/output
	Process
	Decision

Control Flow in Program

Control flow is the order in which individual statements, instructions or steps are executed or evaluated in a software program. Flow in a program can be controlled by:



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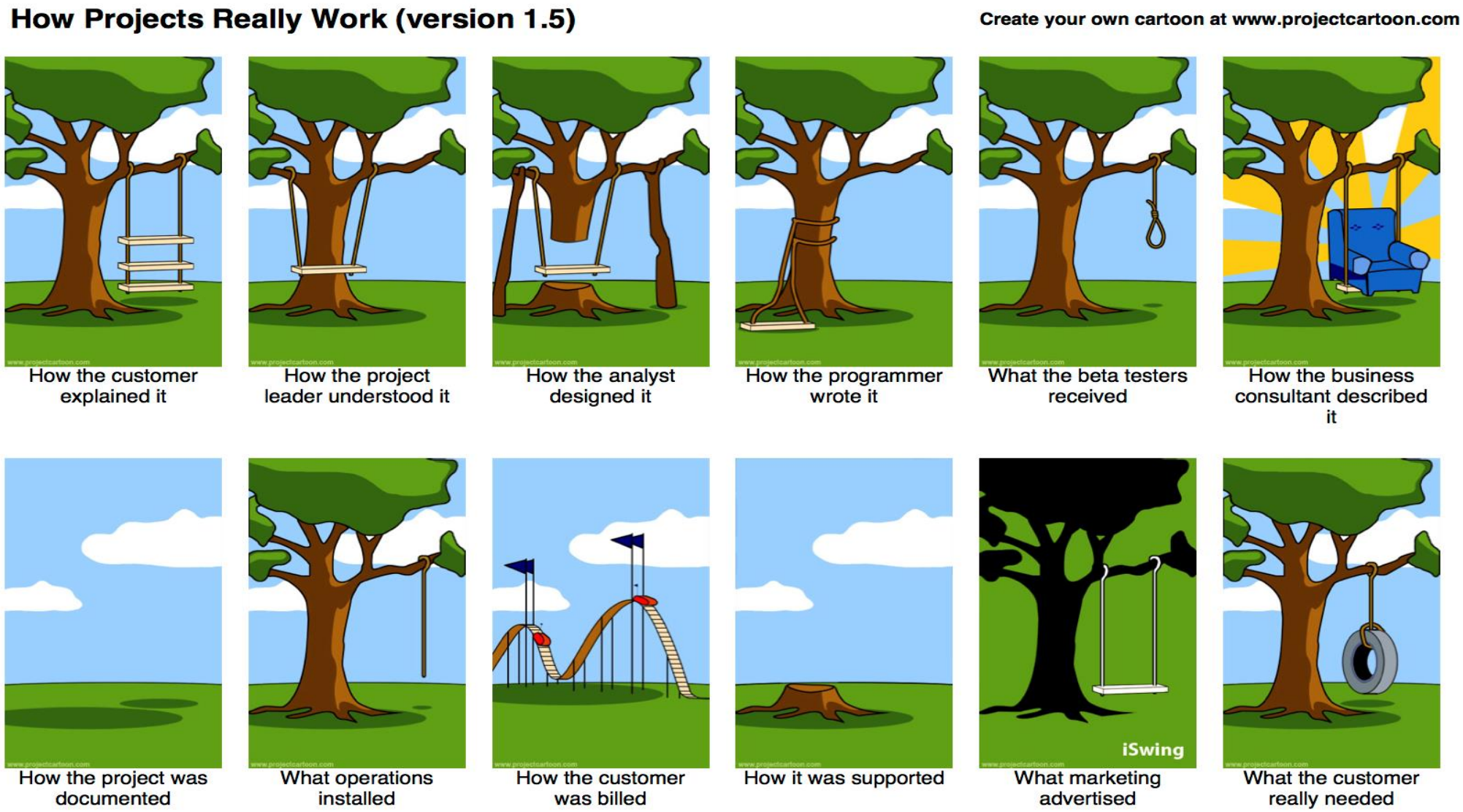
Software Development Life Cycle



Software Development Life Cycle (SDLC)

The following figure is a graphical representation of the various stages of a typical SDLC.

Stage 1
Planning and Requirement Analysis

Stage 2
Defining Requirements

Stage 3
Designing the Product Architecture

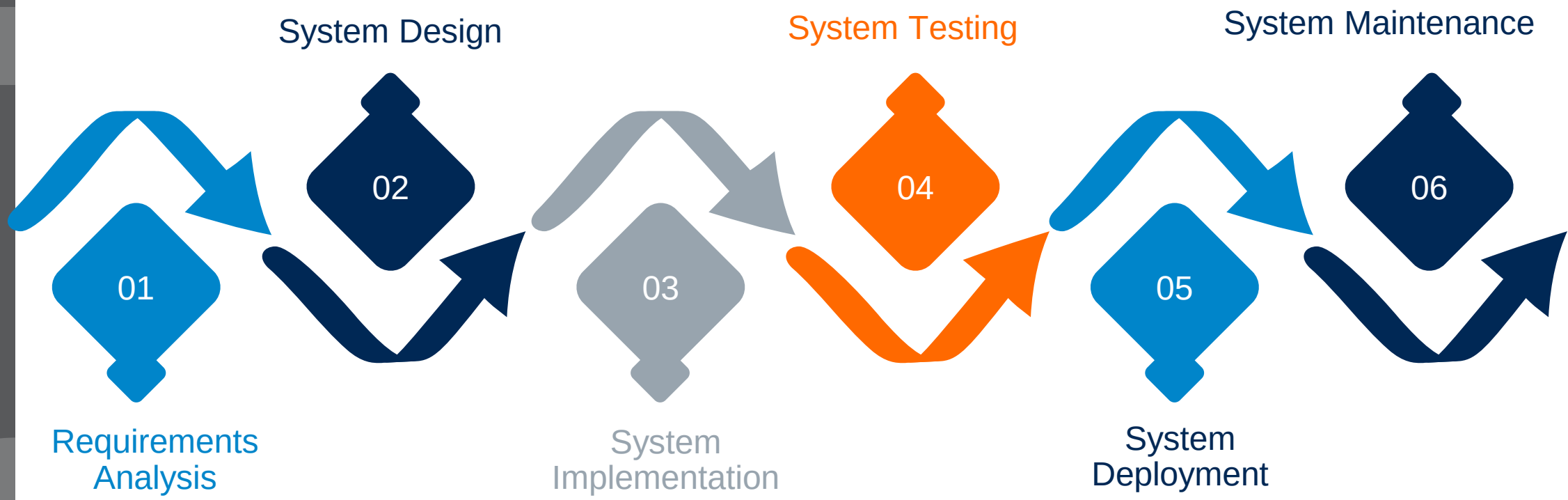
Stage 4
Building or Developing the Product

Stage 5
Testing the Product

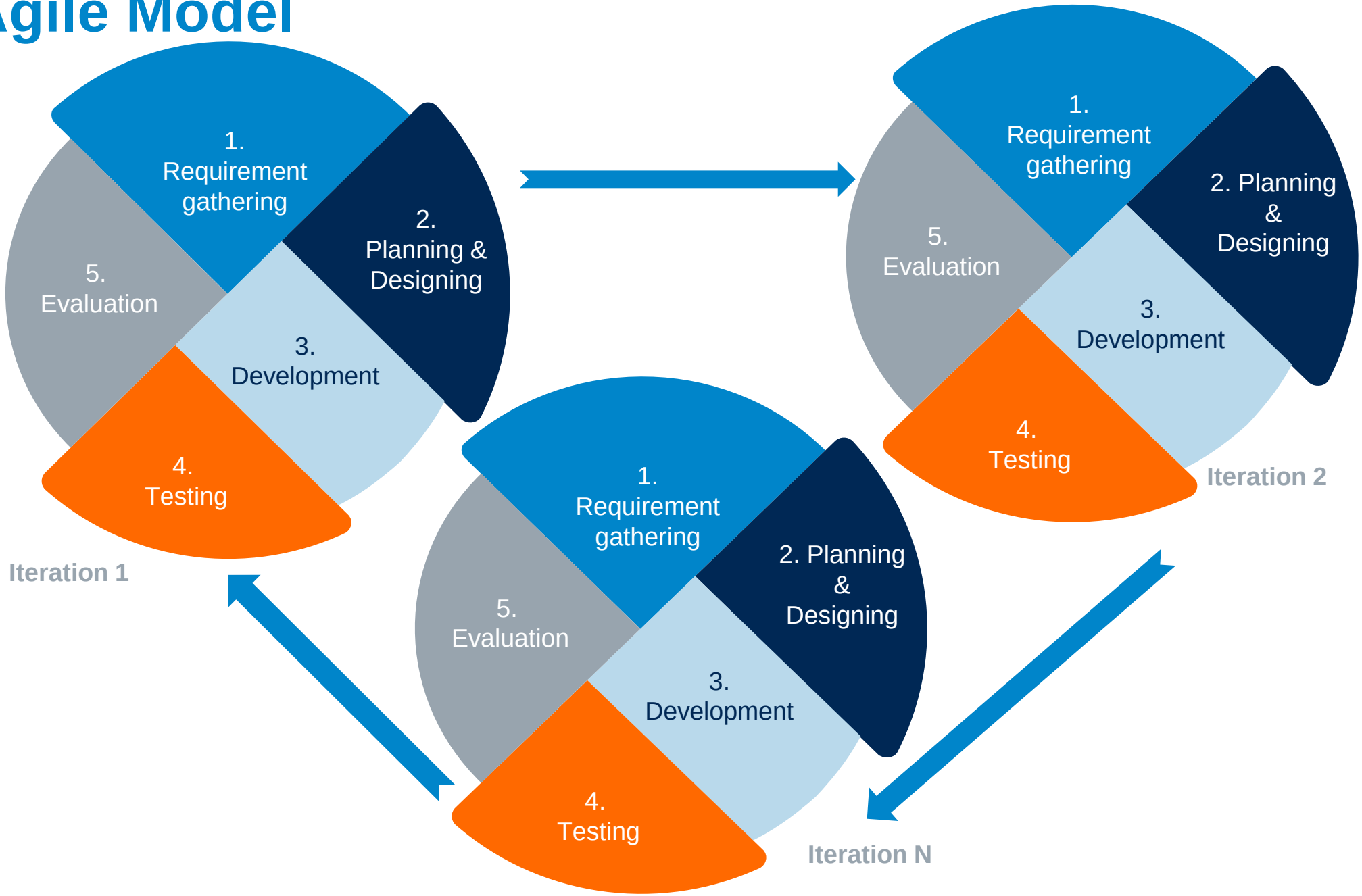
Stage 6
Deployment in the Market and Maintenance

Waterfall Model

Waterfall method focuses on gathering all of the customer requirements at the beginning of the project so that every step of the SDLC can be planned.



Agile Model

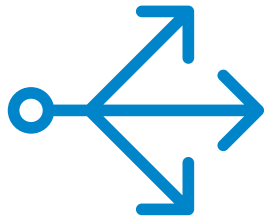

1. Requirement gathering
2. Planning & Designing
3. Development
4. Testing
5. Evaluation
Iteration 1
Iteration 2
Iteration N

Waterfall Vs. Agile

The basic difference between the two methodologies:

Waterfall

- The steps are defined in advance and followed sequentially
- The success criteria are established at the beginning
- Each step must finish before the next one can begin
- Follows ‘Plan everything first’ approach



Agile

- The process starts with Discovery Sessions to understand the business and RPA
- Iterative approach
- Suitable for frequent changes to ensure a prompt response time

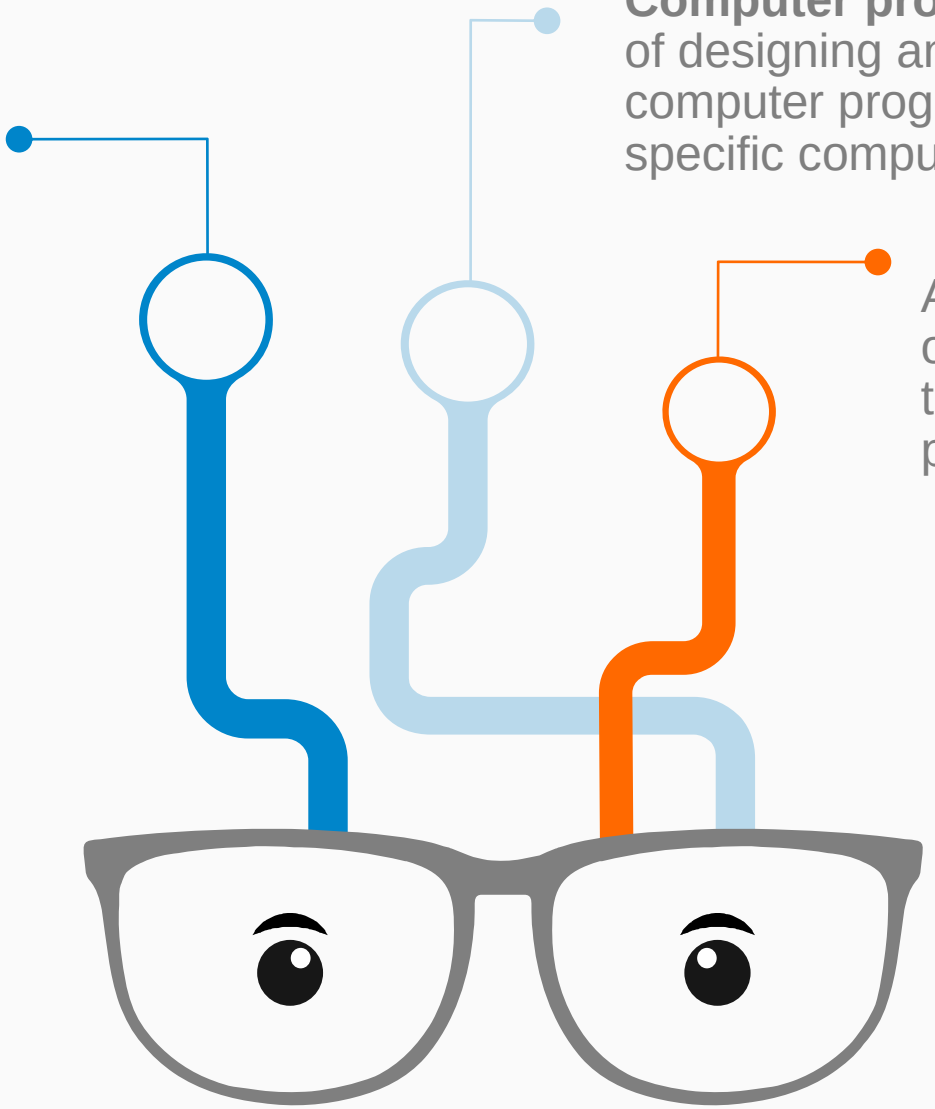
Takeaways

Software Applications, Programming, Data Structures

An **application** is a computer software package that performs a specific function directly for an end user or for another application.

Computer programming is the process of designing and building an executable computer program for accomplishing a specific computing task.

A **data structure** is a particular way of organizing data in a computer so that it can be used to resolve a given problem faster and more reliable.



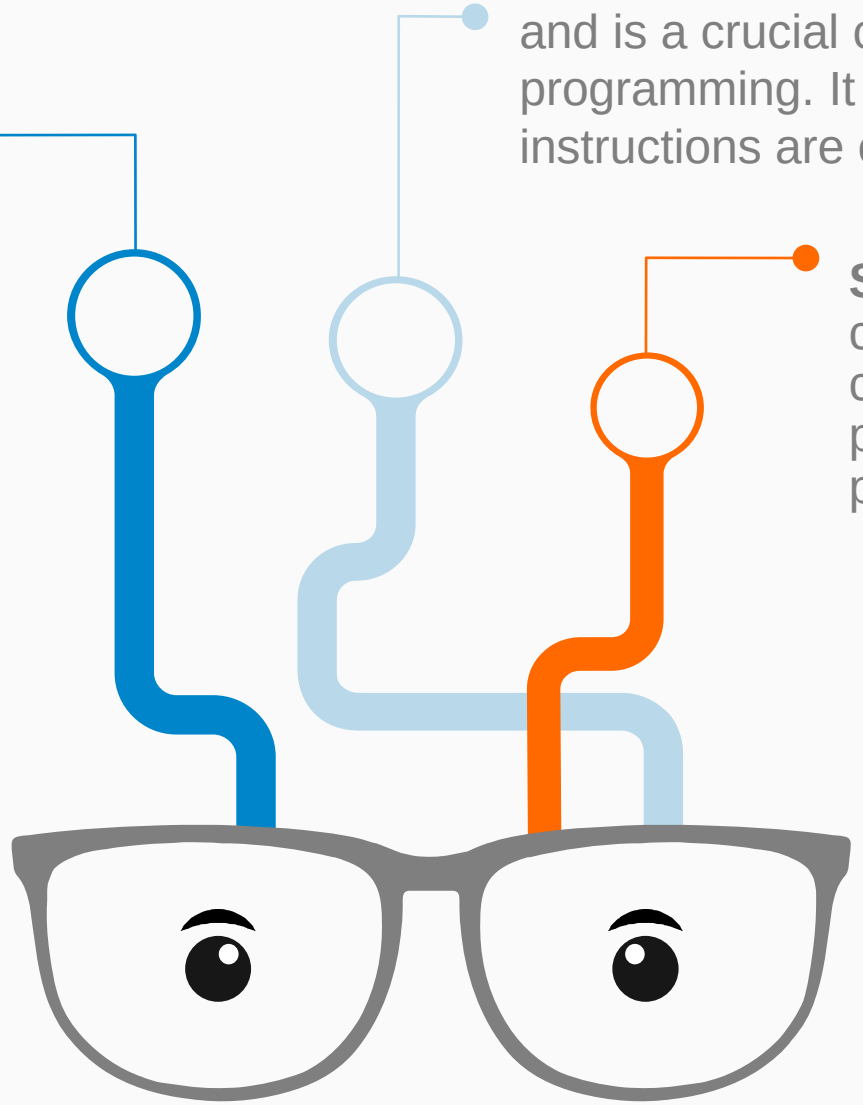
Takeaways

Algorithms, Sequence Flow, SDLC

Algorithms are step by step methods of solving a problem. They are used for data processing, calculation and other computer and mathematical operations.

Flow chart depicts flow of a program and is a crucial concept in programming. It is the order in which instructions are executed.

Software Development Life Cycle consists of various steps that are covered from the initiation of any project to the completion of the project.



Questions & Answers

HubSpot is a business application.

a) True

b) False

What are the different types of applications?

a) Web

b) Native

c) Hybrid

d) Legacy

e) All of above

Queue supports FIFO.

a) True

b) False

Which of the following is not a step in the Software Development Life Cycle?

a) Deployment

b) Planning

c) Evaluating

d) Building

e) Designing

Next Steps

Module 1 Lesson 2: Programming Basics 2