






Data & Control Flow

Data & Control Flow - Agenda




Building blocks

-  Workflows, activities

Data flow

-  Variables, data types, default value
-  Arguments, argument types
-  Properties

Control diagrams

-  Flowchart diagram
-  Sequence diagram
-  Control flow activities

Best Practices

Q&A

Test

Online Resources

Building Blocks

Workflow

Visual Interface designed for setting up automation processes
Made up of flowcharts, sequences, and diagrams
Requires little to no programming knowledge to set up

Activities

Any action that the robot would perform in a workflow
Find one by exploring categories or searching
Add one by drag & drop or copy & paste
All have properties which can be parameterized
Annotations can be added to an activity

Variables

Allow the user to store, transmit, and manipulate important data from activity to activity.

Key features: **Name, Value, Scope** and **Type**

Variables should have unique and descriptive **names**

The **value** of the variable is the data that it represents

- The variable has a default value until you assign another one

Scope is the region in which a variable is visible and can be referenced.

Variable types

Different variable **data types**:

String – Any text - combination of symbols and letters in quotation marks
e.g. *"Hello World!"*, *"AG221fk"*

int32 – Generic variable type for any integer
e.g. *12*, *44120*

Double - floating point number
e.g. *33.34*, *842.01*

DateTime – Represents year, month and day
e.g. *new DateTime(2015, 12, 25)*, *today*

Boolean – Logic value of either True or False

DataTable – Stored data in the format of a generic table

Generic Value – Versatile data type that can hold a number, string or date

Arguments

Allow the user to transmit important data from workflow to workflow.

Arguments can vary in type just like variables do

Arguments vary in direction as well: In, Out, or In/Out

Arguments can be passed with default values, which are to be manually entered. If no value is passed to the argument when the workflow is invoked, the default will be used

Properties

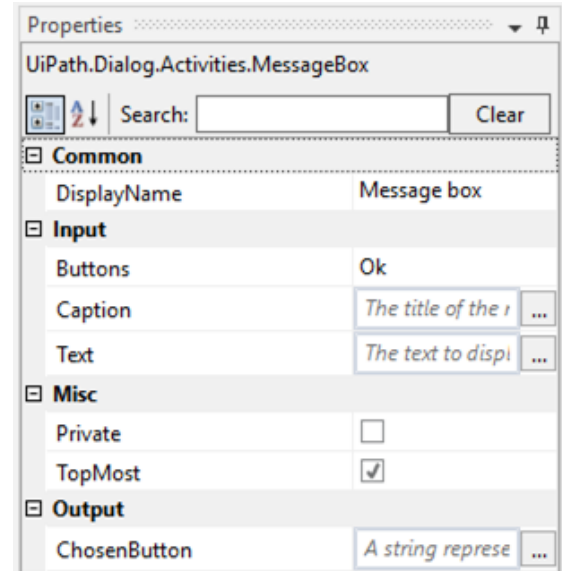
Each activity has a specific list of properties

They are found in the properties panel on the right side of the interface

Most activities have Input and or Output properties

They configure the use of an activity

They can be set with a value or a variable



Control Flow – common activities

Flowchart Activities:

Flow Decision – Simple decision node to be used in a flowchart to branch the diagram based on a condition being *True* or *False*

Flow Switch – Matches the result of an expression with a set of maximum 12 cases

Sequence Activities:

If – Does the same thing as Flow Decision, but in a sequence

Switch – Matches the result of an expression with a set of cases

Do While – Executes action inside, then keeps going until the condition is met

Parallel – Executes each activity inside of it at once

While – Checks if condition is met. If not, it will keep executing actions until the condition is met

For Each – Iterates over items in a list and performs an action on each one

Break – Put inside a For Each activity to end it prematurely

Control Diagrams



Flowchart



- flexible and intuitive
- presentable layout
- suitable for business rules



Sequence



- structured execution
- suitable for UI interaction
- small UI/data decisions



State machine

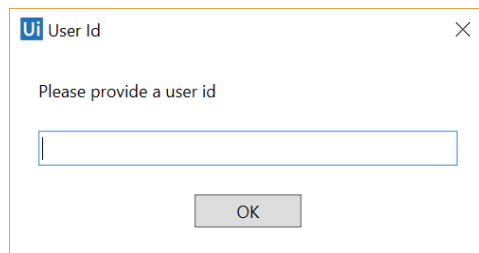


- complex high level process structure
- exception handling and recovery
- error reporting

Interaction with the user

Input dialog

ask
data

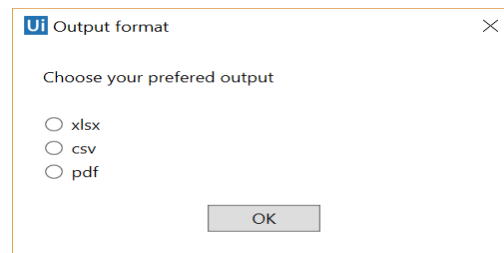


Ui User Id

Please provide a user id

OK

choose
predefined



Ui Output format

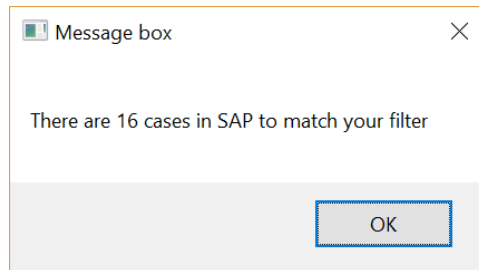
Choose your preferred output

☐ xlsx
☐ csv
☐ pdf

OK

Message box

inform
user

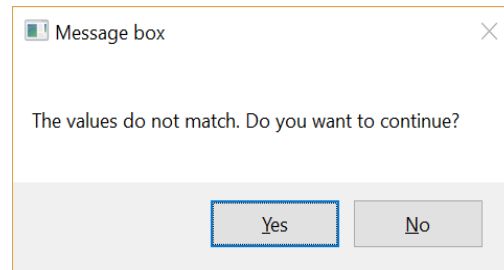


Message box

There are 16 cases in SAP to match your filter

OK

decide
step



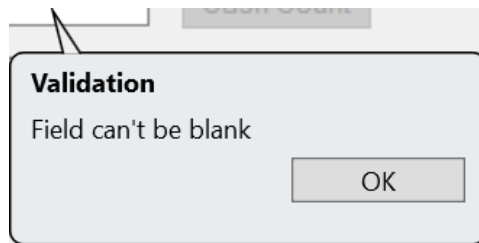
Message box

The values do not match. Do you want to continue?

Yes No

Callout

hint



Validation

Field can't be blank

OK

Exercise 1: Guessing Game

Robot picks a random number for us to guess guided by simple hints.

1. Robot should generate a random number and ask the user through an input activity to guess it
2. The robot will indicate if the generated number is larger or smaller than the user guess
3. Build the guessing interaction by using a flowchart diagram (looping, decisions)
4. Build the guessing game by using a sequential layout

Best Practices

- Workflow designs should reflect the process and be as simple as possible
- Complex workflows should be divided and organized into separate workflows and sequences
 - Sequences are to be commonly used inside flowcharts
 - Make sure to properly name sequences
- Repetitive sections of a workflow should be made into independent workflows so they can be reused
- Parameters in a workflow should comprise of variables and arguments
- Variable names should always be descriptive
- Avoid nested activities inside If activities
 - It may be better to use a flowchart with decision flow nodes instead



Q&A



Test

Online resources

 [Understanding UiPath's interface](#)

 [Conditions. Branching a workflow](#)