

Building Custom Solutions using PowerApps

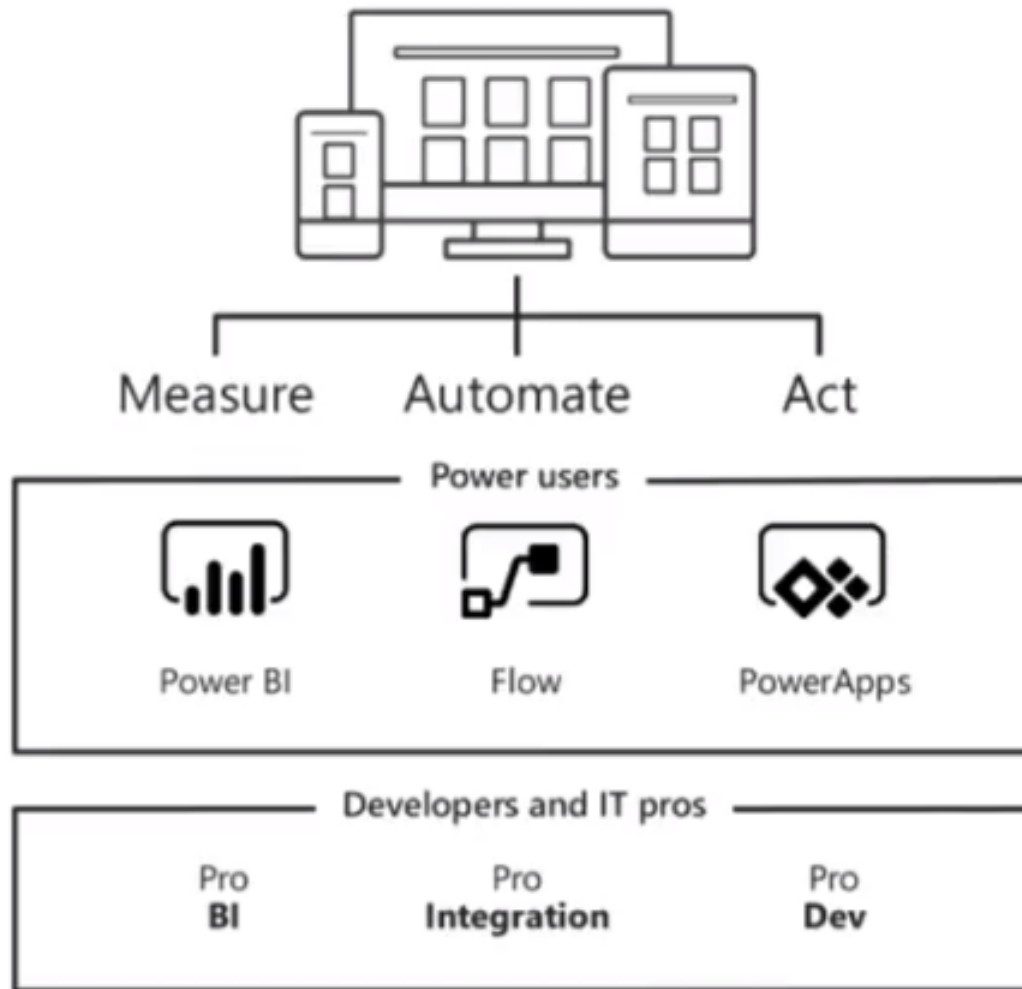


Agenda

- Working with Variables and Collections
- Managing Application State using Records and Tables
- Using Table Functions for Filtering, Sorting and Grouping
- Writing Imperative Logic in PowerApps Event Handlers
- Using Delegates to Filter, Sort and Aggregate Data
- Creating a Custom Connector



Business Application Platform



Creating PowerApps from a Template

- Create app based on a template for a specific scenario
 - Pre-built layouts and colour schemes for different app screens
 - Templates have predefined screens, features, and sample data
- Customize app made from template
 - Change layout, screens, features, and delete sample data



Learning from Template Apps

- Learn how controls are being configured for common actions such as:
 - Submit data from a form by clicking on a button
 - Transition from one app screen to the other
 - Show a list of items from my data, etc.
 - Data flows in and out of your app
 - Wire up your data source to your app
 - Camera or GPS are being integrated into your app



Phone Layout Templates

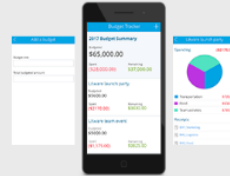
Templates



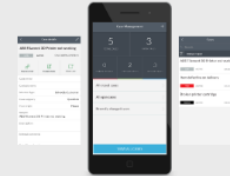
Alumni Association



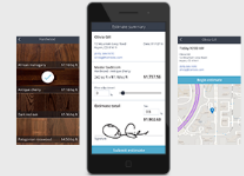
Asset Checkout



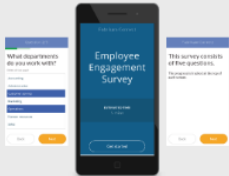
Budget Tracker



Case Management



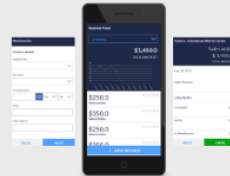
Cost Estimator



Employee Engagement Survey



Health Plan Selector



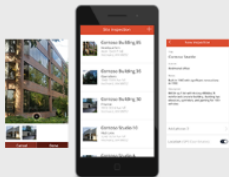
Invoice Management



Quick Tips



Service Desk



Site Inspection



Tablet Layout Templates

Templates



Asset Checkout



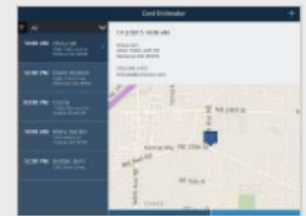
Budget Tracker



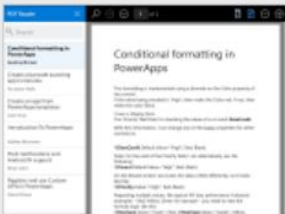
Case Management



Contest Registration



Cost Estimator



PDF Reader



Product Showcase



Service Desk



Site Inspection



PowerApps Studio Interface

The screenshot displays the PowerApps Studio interface for a 'Budget Tracker' app. The interface is divided into several key areas:

- Ribbon (Top):** Contains tabs for File, Home, Insert, View, Action, and Screen. The 'Insert' tab is currently selected, showing options for New screen, Label, Button, Text, Controls, Gallery, Data table, Forms, Media, Charts, and Icons.
- Property Pane (Right):** Shows the 'BudgetScreen' selected. It includes sections for Properties, Data, and Advanced. The 'Fill' property is set to 'RGBA(255, 255, 255, 1)'. The 'OnHidden' property is set to 'false'. The 'ImagePosition' property is set to 'ImagePosition.Fit'.
- Canvas (Center):** Displays the 'Budget Tracker' app design. It features a table of budgets, a pie chart for expenses, and a list of expenses.
- Left Pane (Screens):** Lists the components of the app, including 'BudgetScreen' and various controls like 'icon7_1', 'TextBox2_3', 'Button2', etc.

Budget Tracker Data:

All budgets		
	Budgeted	Spent
Team events at Contoso	\$10,000	\$1,950
Spring customer visits	\$5,000	\$3,175
Meta Conference XVI	\$10,000	\$8,732
Litware team event	\$5,000	\$1,175

Remaining Budgets:

	Remaining
Team events at Contoso	\$8,050
Spring customer visits	\$1,825
Meta Conference XVI	\$1,268
Litware team event	\$3,825

Expenses:

	Amount
Cake	\$300
Movie	\$500
Extra	\$1,000
Cleaning	\$150

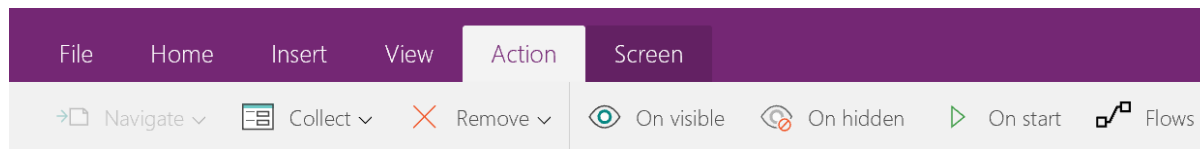
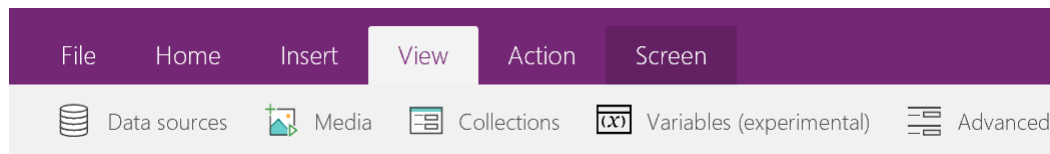
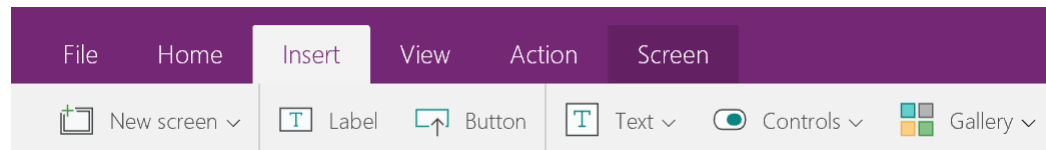
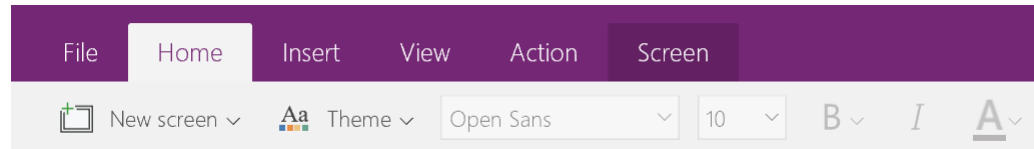
Attached receipts: No receipts



Ribbon

- Set of context-sensitive tabs which will display controls you can use to build your app:

- Home tab
- Insert tab
- View tab
- Action tab



Panels

- **Properties Panel**
 - Will expose most common properties of any control you can configure visually without writing an expression
- **Data Panel**
 - Will surface configuring data sources and binding fields to Gallery and Form controls
- **Advanced Panel**
 - Used for more advanced customizations for controls



Properties Panel

- Configure controls without using a formula
 - Varies based on control
- Configure properties such as:
 - Text
 - Tooltip text
 - Position
 - Look & Feel
 - Size
 - Padding
 - Colors
 - Borders

Properties Panel for Button2

Buttons: Properties (selected), Data, Advanced

Text: No value

Tooltip: No value

Position: X=656, Y=475

Size: Width=40, Height=40

Padding: Top=5, Bottom=5, Left=5, Right=5

Color: A (selected)

Border: — (selected), 2 (selected)

Focused border thick...: 4

Radius: 60

Auto disable on select: On (selected)

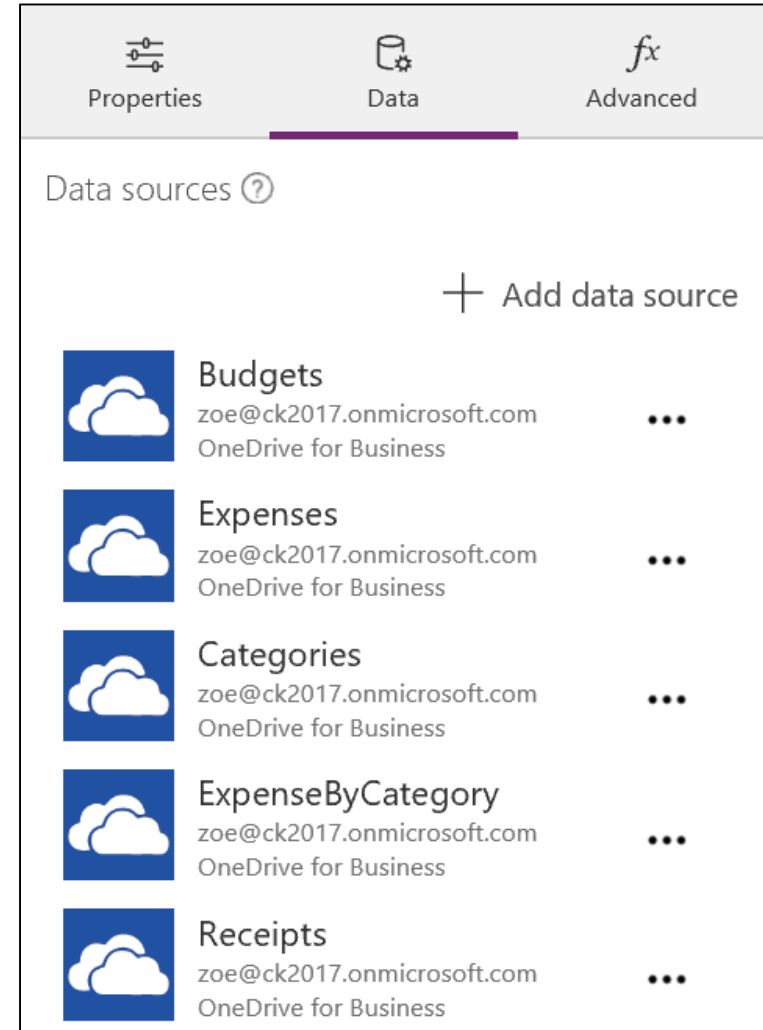
Display mode: Edit (selected)

Visible: On (selected)

Disabled color: A (selected)


Data Panel


- Will list existing data sources
- Also provides ability to add new data sources




Advanced Panel

- Configure more advanced customizations for controls

 Properties

 Data

 Advanced

ACTION
OnSelect

```
Navigate  
(AddExpenseScreen,ScreenTransition.Fade,  
{SpendRecord:SpendRecord,Record:Defaults(Expenses)});ResetForm  
(FormNewExpense);NewForm  
(FormNewExpense);Clear  
(ReceiptsCollect)
```

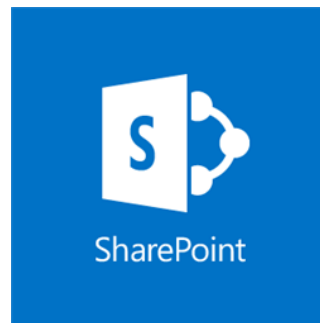
DATA
Tooltip

DESIGN
AutoDisableOnSelect

Color

Create App from Data Source

- In PowerApps, you can automatically generate an app based on a data source which includes:
 - SharePoint List
 - Create directly from SharePoint list
 - Or create a connection to the SharePoint list
 - Excel data
 - CDS Entity



Excel Data

- You can use an Excel file that has table data.
- Excel files must be uploaded to a cloud service before you can create the PowerApp:
 - Box
 - Dropbox
 - FTP
 - Google Drive
 - OneDrive
 - OneDrive for Business



Agenda

- ✓ Getting Started with PowerApps Studio
- Creating an App From Scratch
 - Connecting to Data
 - Integrating PowerApps with SharePoint Online



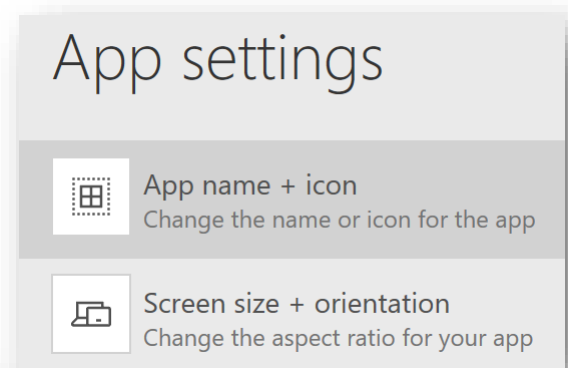
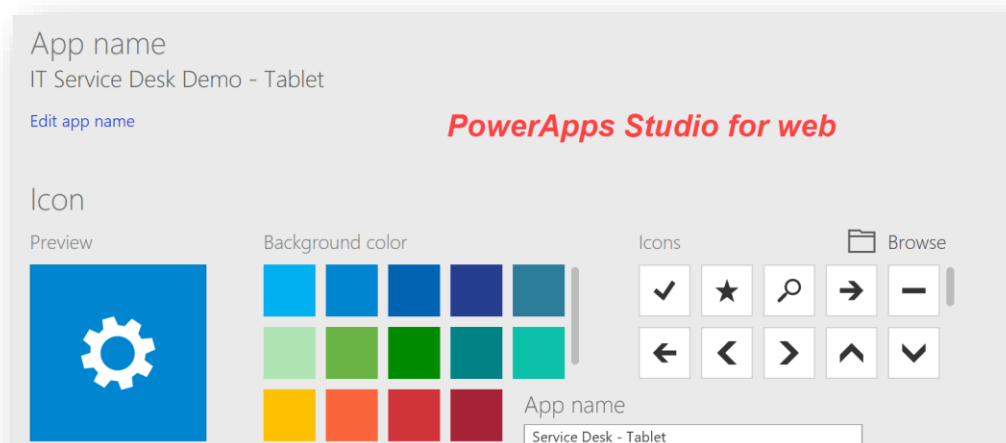
Creating Custom PowerApps

- You can create your own app from scratch using the Blank app template:
 - Using any one of a variety of data sources and then adding more sources later.
 - This approach is much more time-intensive than generating an app automatically.
 - Experienced app makers can build the best app for their needs.
 - Specify the appearance and behavior of each UI element so that you can optimize the result for your exact goals and workflow.



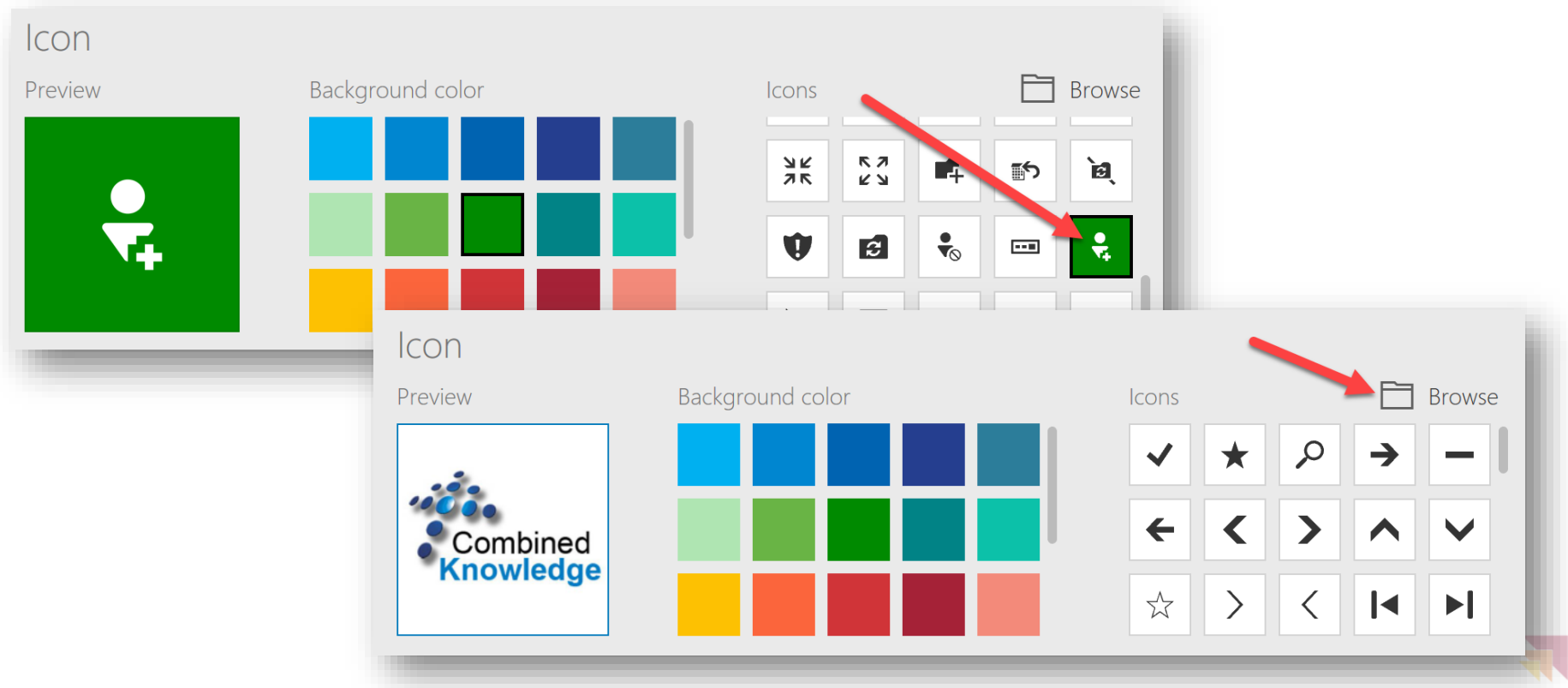
App Name & Icon

- Name, icon, and description settings your app
- **File tab > App Settings (PowerApps Studio)**



App Background & Icon


- Use pre-defined icons & change background color or use your own image
 - For best results, use square icon (i.e. 300x300)





Screen Size & Orientation

Phone layout

App settings

 App name + icon
Change the name or icon for the app

 Screen size + orientation
Change the aspect ratio for your app



Orientation

☒ Landscape

☐ Portrait

Advanced settings

Lock aspect ratio

Locking this automatically maintains the ratio between height and width to prevent distortion.

☒ On

Lock orientation

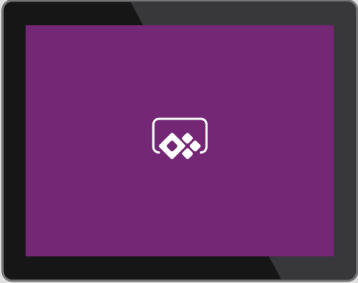
Locking orientation keeps the screen in its current orientation, even when the device is rotated.

☒ On

Tablet layout

Screen size + orientation

Choose the screen size and orientation that your users will most likely be using.



1024 x 768

Orientation

☒ Landscape

☐ Portrait

Size

☐ 16:9 (Default)

☐ 3:2 (Surface Pro 3)

☐ 16:10 (Widescreen)

☒ 4:3 (iPad)

Advanced settings

Lock aspect ratio

Locking this automatically maintains the ratio between height and width to prevent distortion.

☒ On

Lock orientation

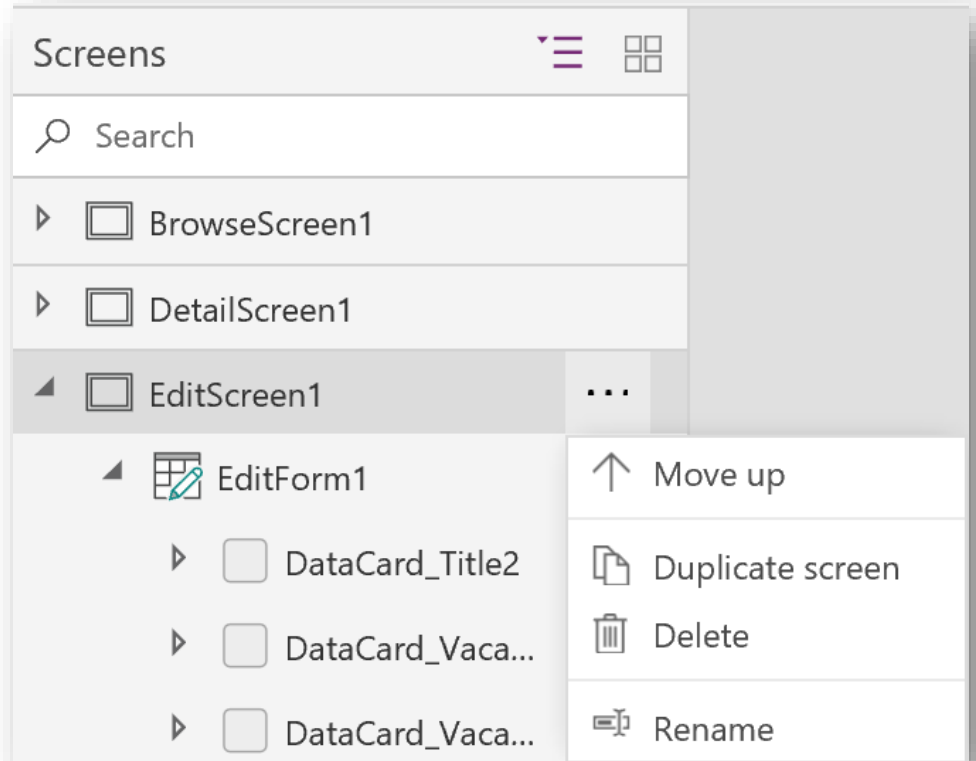
Locking orientation keeps the screen in its current orientation, even when the device is rotated.

☒ On

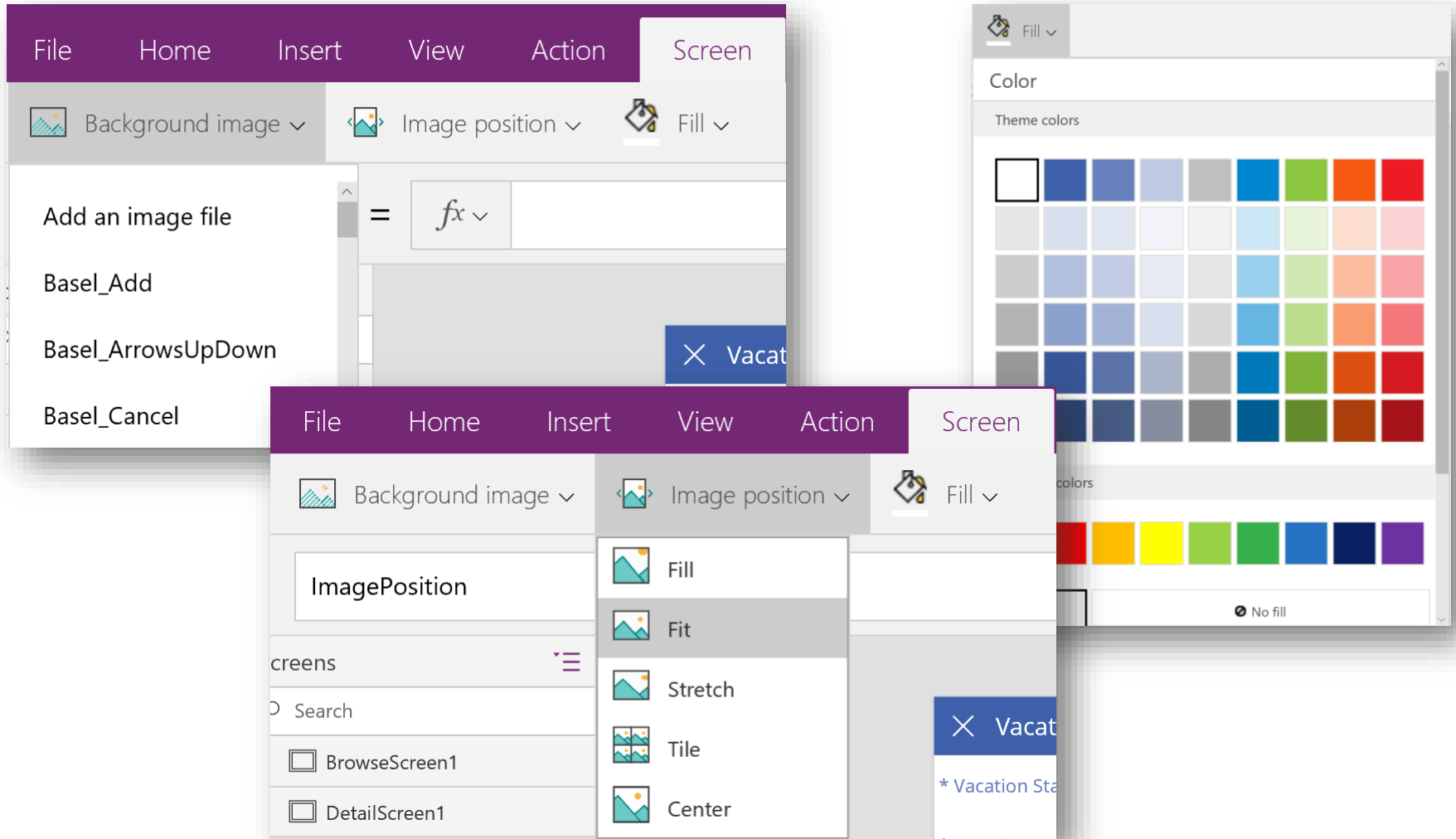


Customizing Screens

- Move (reorder)
- Duplicate
- Add screens
- Delete screens
- Rename screens



Screen Layout Settings



Form Layouts

The image displays the Microsoft Forms Designer interface for a 'Vacation Request' form. The form is titled 'Vacation Request' and includes the following fields:

- * Vacation Start Date: 12/31/2001
- * Vacation End Date: 12/31/2001
- * Time Off Type: (Dropdown menu)
- Comments: (Text area)

Below the form, there is a 'Card : PTO' section with a 'PTO' toggle switch.

The right-hand panel shows the 'DataCard_PTO2' card with tabs for 'Properties', 'Data', and 'Advanced'. The 'Form customization' section includes a 'Vacation Request' card with the email 'zoe@ck2017.onmicrosoft.com' and the 'SharePoint' provider. A 'Refresh' button is also present.

The 'Layout' section shows a 'Snap to columns' checkbox checked and a '1' column selection. Below this, the 'Form layout' section displays two options: 'Vertical' and 'Horizontal'. The 'Vertical' layout is currently selected, showing a preview of the form with fields stacked vertically.

At the bottom, there is a zoom slider set to 40% and a 'DataCard_PTO2' checkbox.



Controls

- You can add a variety of UI elements to your app which are called controls.
 - Controls have properties that can be configured to change the appearance and behavior of each control
- Properties can be configured:
 - Directly from the toolbar
 - In the **Properties** tab
 - Or in the formula bar



Adding Controls

- **Text:** Label, Text input, HTML Text, Pen input
- **Controls:** Button, Dropdown, Date picker, List box, Checkbox, Radio, Toggle, Slider, Rating, Timer
- **Gallery:** Vertical, Horizontal, Flexible height, Blank vertical, Blank horizontal, Blank flexible height
- **Data table**
- **Forms:** Edit, Display, Entity form
- **Media:** Image, Camera, Barcode, Video, Audio, Microphone, Add picture
- **Charts:** Column chart, Line chart, Pie chart
- **Icons**



Modifying Control Properties

The image shows a mobile application interface with a 'Vacation Request' form and a properties panel for a 'DataCard_PTO1' control.

Vacation Request Form:

- Title
- Vacation Start Date
- Vacation End Date
- Time Off Type
- Card : PTO (locked)
- PTO (toggle switch)
- Request Status
- Modified

Properties Panel (DataCard_PTO1):

- Properties:**
 - Position: X=0, Y=320
 - Size: Width=640, Height=103
 - Color: (color picker)
 - Border: (line style), 0 (width), (color)
 - Display mode: View (dropdown)
 - Visible: On (toggle switch)
 - Width fit: Off (toggle switch)
- Data:** (icon)
- Advanced:** (fx icon)



Card Controls and Data Cards

- **Card controls**
 - Building blocks of the **Edit** and **Display** form controls
 - Form represents entire record
 - **Card** represents a single field of the record
- Interact with **cards** in right-hand pane after you select a form control in design workspace
 - In the pane:
 - Choose which fields to show
 - Change order of fields
 - Change how to show each field



Data Cards

The image displays a PowerApps interface with a 'Vacation Request' data card and its customization pane.

Data Card Fields:

- Title:** Time off Request
- Vacation Start Date:** 9/4/2017
- Vacation End Date:** 9/10/2017
- Time Off Type:** (Dropdown menu)
- Comments:** SharePoint conference in Stockholm
- PTO:** (Toggle switch, currently on)
- Request Status:** (Dropdown menu)

Customization Pane (DataCard_Title2):

- Form customization:** Includes a 'Refresh' button.
- Layout:** Set to 'Vertical'.
- Fields:** A list of fields to customize. The 'Title' field is selected and highlighted with a red box. The 'Title' field's dropdown menu is open, showing options: 'View text', 'View phone', 'View email', 'Edit text', 'Edit multi-', and 'Allowed'. The 'Edit text' option is highlighted with a red box.

A red arrow points from the 'Title' field in the data card to the 'Title' field in the customization pane, indicating the link between the field and its customization options.

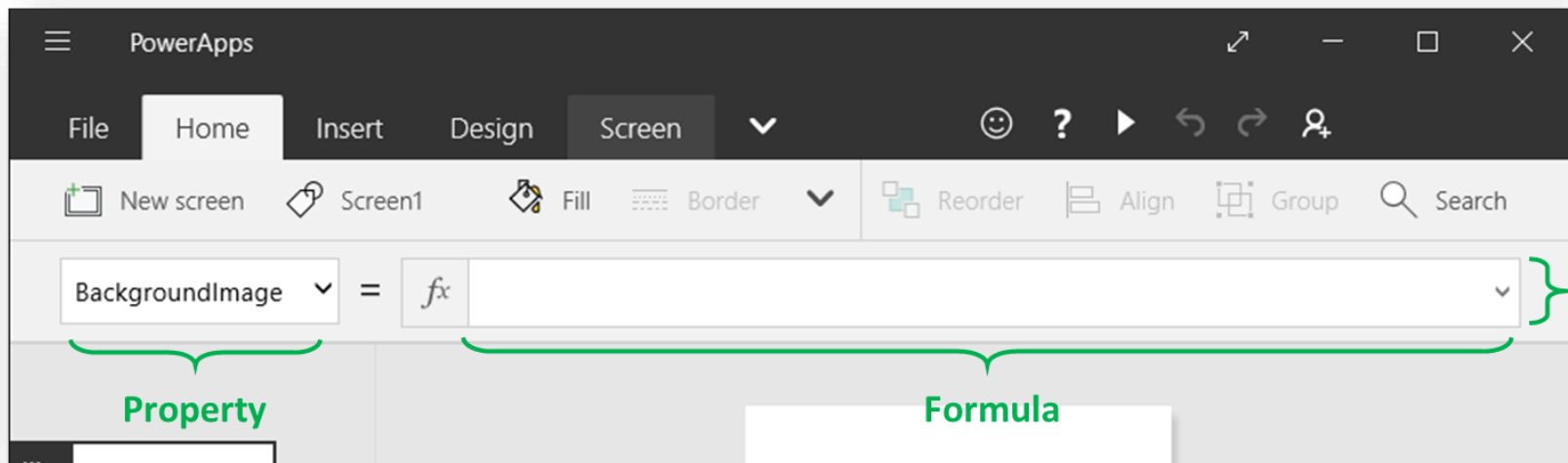
Working with the Formula Bar

- **Excel Formulas**
 - Build formulas that populate cells
 - Create tables and charts
- **PowerApps Formulas**
 - Build formulas similar to Excel as you configure controls instead of cells
 - Build formulas that apply specifically to apps instead of spreadsheets



Working with the Formula Bar

- Formula sits on top of the screen and has two parts:
 - **Property list:** Each control and screen has a set of properties. Use this list to select a specific property.
 - **Formula:** The formula to be calculated for this property, made up of values, operators, and functions.



Working with the Formula Bar

- Formula **Text** of a **Label** control
 - All strings must be in double quotes **“string text”**

The screenshot shows the Xamarin Studio interface with the **Label** tab selected in the top menu. The **Formula Bar** is visible, showing the **Text** property of a **Label** control. The formula is set to `"Vacation Request"`. Red annotations highlight the components:

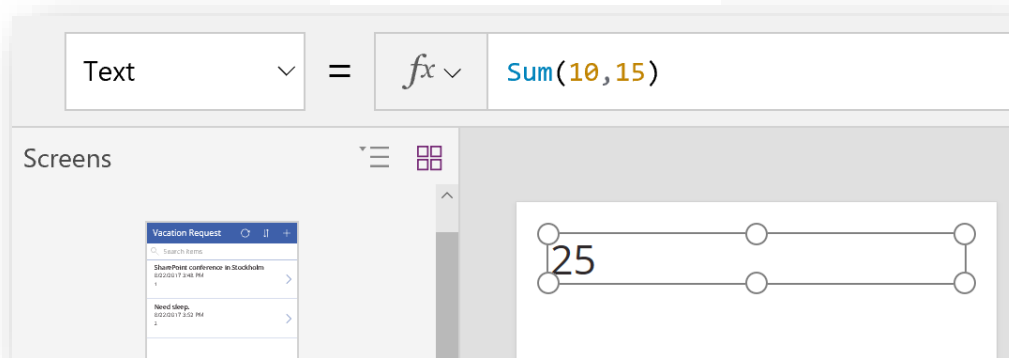
- A red bracket on the left points to the **Text** property, with the label **Property "Text"**.
- A red bracket on the right points to the formula `"Vacation Request"`, with the label **Formula: string "Vacation Request"**.

The background shows a preview of a screen titled "Vacation Request" with fields for Title, Vacation Start Date, and Vacation End Date. The right sidebar shows the **Properties** tab for the **LblAppName3** control, with the **Text** property set to `Vacation Request`.

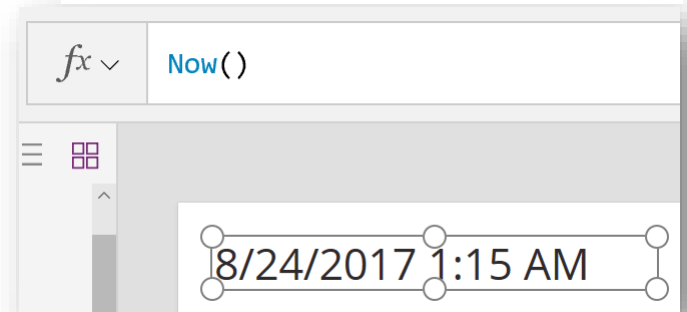


Formula Examples (Label Text)

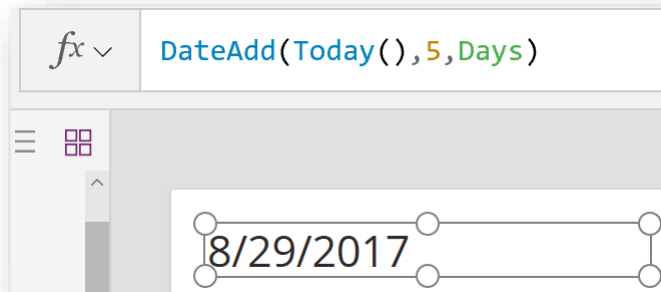
Sum of numbers



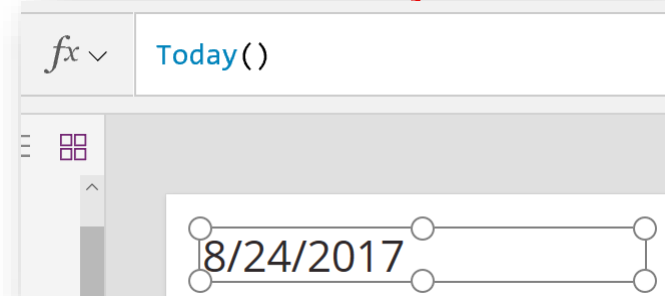
Return now (date and time)



Add 5 days to today's date



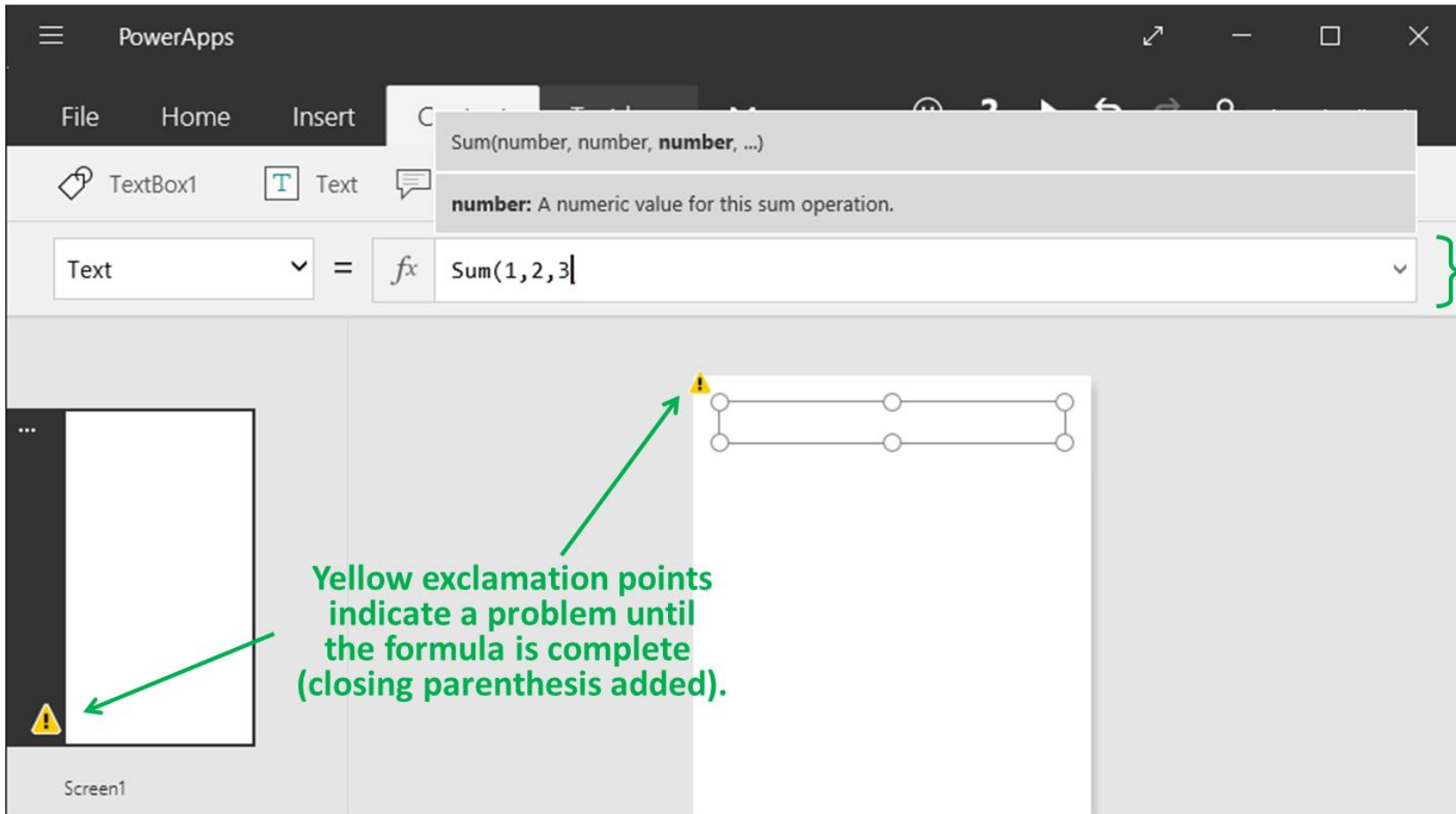
Return today's date



<https://powerapps.microsoft.com/en-us/tutorials/formula-reference/>



Formula Errors



Formula:
Partial,
missing an
ending paren

Yellow exclamation points
indicate a problem until
the formula is complete
(closing parenthesis added).



Change Value Based on Input

Book1 - Excel		
f_x	= A1 + A2	
	A	B
1	49	
2	64	
3	113	
4		

A3's formula depends on the values of cells **A1** and **A2**

Text f_x TextInput1 + TextInput2

49

65

114

← TextInput1

← TextInput2

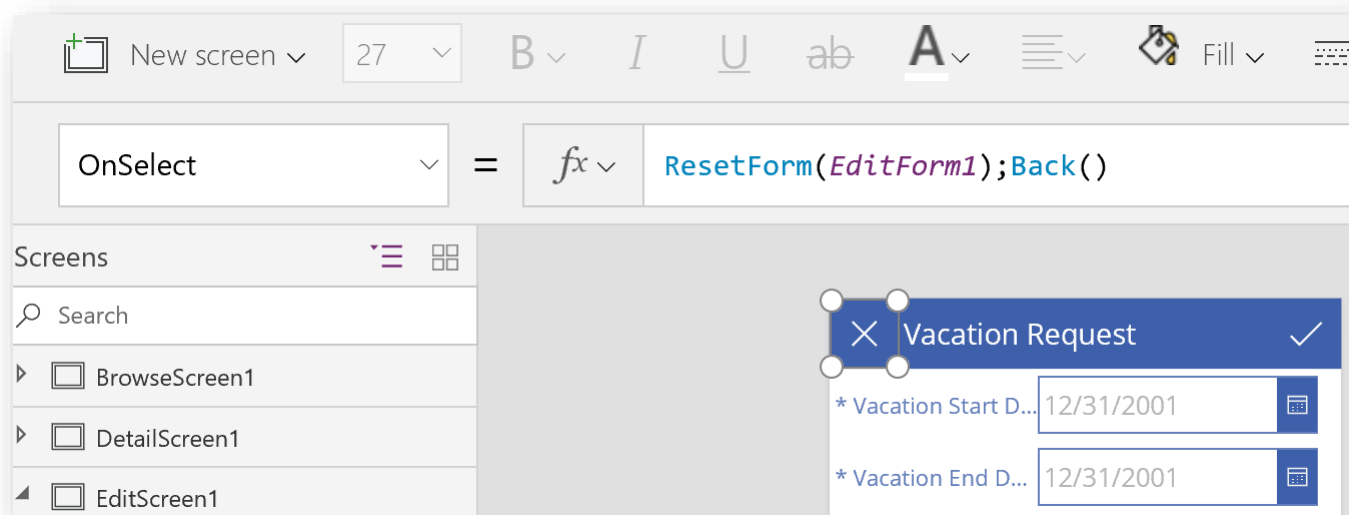
← TextBox1

Screen1



Form Interactivity & Navigation

- Create buttons and set the navigation to go back and forth between screens



Data Sources & Connectors

- **Data Sources**

- External information stored in cloud services
- Examples: Excel workbooks, SharePoint lists, SQL tables

- **Connectors**

- A proxy or wrapper around an API which allows the underlying service to talk to PowerApps and Flow



SharePoint



Office 365 Users



Salesforce

PREMIUM



Dropbox



Excel



SQL Server



Twitter



OneDrive for Business



Dynamics 365



OneDrive



Components of a Connector

- Components offers a set of operations:
 - **Actions**
 - Changed directed by a user such as an action to lookup, write, or delete data
 - **Triggers**
 - Can notify your app when a specific event occurs
- Two types of triggers:
 - **Polling triggers** – These triggers call your service at a specified frequency to check for new data.
 - **Push triggers** – Provides ability to send various notifications that directly targets your Apps. Trigger push notification directly from an App or from a Flow.



SharePoint List

- Generate an app automatically based on data in a SharePoint list
 - Users can manage items in app for SharePoint list
 - Libraries are NOT supported
- By default, the app will have 3 screens:
 - **BrowseScreen1** - browse through all records in the list
 - **DetailsScreen1** - view all fields for a specific record
 - **EditScreen1** - create or edit a record
- Customize these screens based on your needs
- Not all columns are supported



Supported/Unsupported Columns

Column type	Support	Default cards
Single line of text	Yes	View text
Multiple lines of text	Yes	View text
Choice	Yes (single values only)	View lookup
Number	Yes	View percentage View rating View text
Currency	Yes	View percentage View rating View text
Date and Time	Yes	View text
Lookup	Yes (single values only)	View lookup Edit lookup
Boolean (Yes/No)	Yes	View text View toggle



Supported/Unsupported Columns

Column type	Support	Default cards
Person or Group	Yes (single values only)	View lookup Edit lookup
Hyperlink	Yes	View URL View text
Picture	Yes (read-only)	View image View text
Calculated	Yes (read-only)	
Task Outcome	No	
External data	No	
Managed Metadata	Yes (read-only)	
Rating	No	



Summary

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 - Creating an App From Scratch
 - Connecting to Data
 - Integrating PowerApps with SharePoint Online

