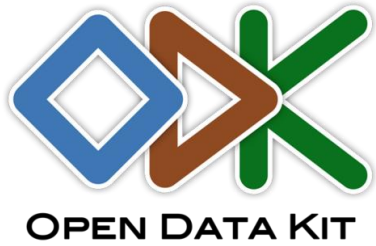# Session 2: ODK

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Training Outline

- Introduction to ODK

- Building xlsforms

- Setting up ODK Collect

- Setting up ona.io account

- Authoring advanced xlsforms

Introduction to ODK

- Open Data Kit (ODK) is a free and open-source set of tools to help create mobile data collection services.

- The tools that are geared towards simple, effective and efficient data collection on mobile devices.

Why ODK?

- **Powerful forms:** Geopoints, Skip logics, calculations, barcodes, Multiple languages, external datasets, audio, video, pictures…

- **Collect data offline** and sync data when connection is available

- **Data format** interoperable with apps like STATA, R, Excel etc.

- **Open Source**: use as is or customize to fit needs

- **Realtime reports:** Prompt data submissions to live dashboards

- **Proven globally**: In use for 13 years in every country with millions of submissions

ODK Components

- Build
  - Creating forms
- Collect
  - Set up ona.io account
  - Android app
  - Download forms/collect data
  - Upload data
- Aggregate
  - Store data (Google AppEngine or webserver)

Build

- **Creating forms**
  - Forms can be created using: xlsforms, ODK Build, Web-interfaces.

- **xlsforms**
  - XLSForm is a form standard created to help simplify the authoring of forms in Excel.
  - Each XLSForm has three mandatory worksheets: *survey, choices* and *settings*. These worksheets have mandatory columns that must be present for the form to work and then optional columns.

  - **For more info visit** http://xlsform.org/

Build

- **The Survey Worksheet**

  - The survey worksheet has 3 mandatory columns: **type, name,** and **label**.

  - The **type** column specifies the type of data you are asking (e.g text, integer, decimal etc.)

  - The **name** column specifies the unique variable name. (e.g age)

  - The **label** column contains the actual text displayed for the user on the tablet or phone, (e.g. Enter the respondent's age.) *If multiple languages in the questionnaire are desired, label columns that are named accordingly can be used, e.g. label::English, label::Swahili, label::French.*

  - Other columns may also be added as needed such as *(hint, required, required_message, relevance, constraint, constraint_message, appearance, calculation*

Build

Question type	Answer Input requested by the type
integer	Integer (i.e., whole number) input.
decimal	Decimal input.
text	Free text response.
select_one [options]	Multiple choice question; only one answer can be selected.
select_multiple [options]	Multiple choice question; multiple answers can be selected.
note	Display a note on the screen, takes no input.
geopoint	Collect a single GPS coordinates.
geotrace	Record a line of two or more GPS coordinates.
date	Date input.
image	Take a picture.
audio	Take an audio recording.
video	Take a video recording.
barcode	Scan a barcode, requires the barcode scanner app to be installed.

Build

- **Choices Worksheet**
  - **list name**: Contains the name of the list of response options
  - **name**: contains the numeric value for each option in the list
  - **label**: contains the text that will appear for each response option

Build

Text widget

The text entry field expands as the user types, and line breaks can be included.

type text

A simple text input.

type	name	label
text	name	What is your name?

Build

Number widget

type integer

Integer widgets will not accept decimal points, and the entry field has a limit of nine digits.

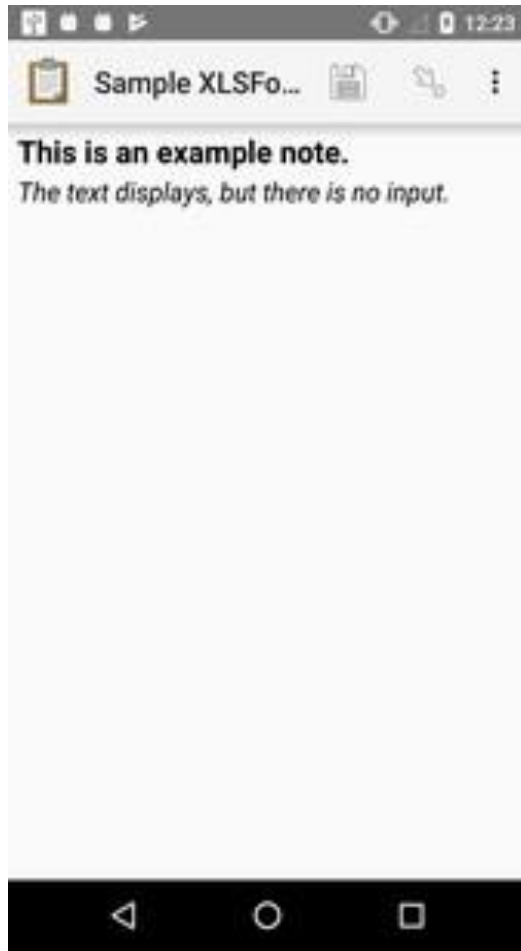| type	name	label
integer	age	What is your age in years?

Incase the number has a decimal point, replace '**integer**' with '**decimal**'

Build

Note widget

Type note

Notes *are no-input text prompts which can give the*
enumerator information to read to the respondent or
any hints or messages.

Build

Location widget

Type geopoint

Captures the current location from the device

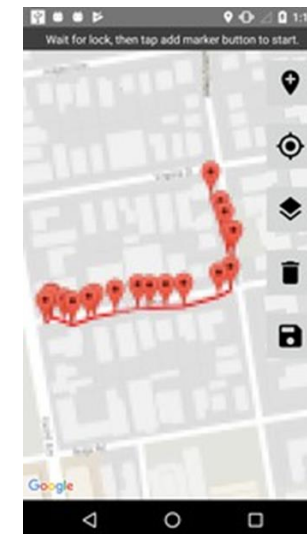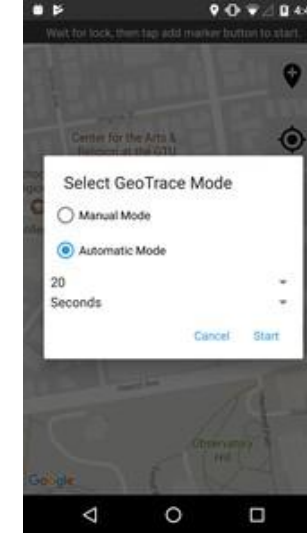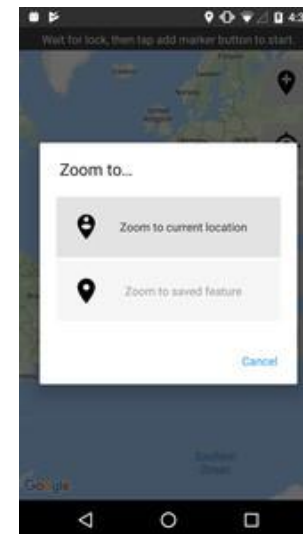| type	name	label
geopoint	geopoint_widget	Geopoint widget

Build

Location widget

Type geotrace

A line or polygon of coordinates tracking actual device movement. The user can specify one of two location-recording modes

- **Manual Mode** The user taps the device to place a marker as desired while moving.

- **Automatic Mode** The app creates a marker on a regular time interval (default: 20 seconds) as the user moves

Build
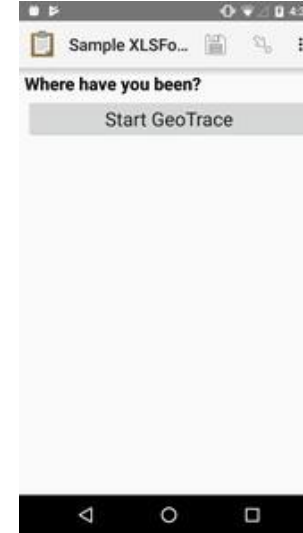
Single select widget

type select_one {list_name}

Select widgets offer the mobile users options to pick from.

The options for a select question are listed on the choices sheet.

type	name	label
select_one opt_abcd	select_one_widg	Select one etwidget

list_name	name	label
opt_abcd	a	A
opt_abcd	b	B
opt_abcd	c	C
opt_abcd	d	D

Build

Multiple select widget

type select_multiple {list_name}

Multi select questions support multiple answers

type	name	label
select_multiple opt_abcd	select_multi_widget	Multi select widget

list_name	name	label
opt_abcd	a	A
opt_abcd	b	B
opt_abcd	c	C
opt_abcd	d	D

Build

Image widget

Type image

Captures an image from the device. The user can choose to take a new picture with the device camera, or select an image from the device photo gallery

type	name	label
image	image_widget	Image widget

Build

Barcode widget
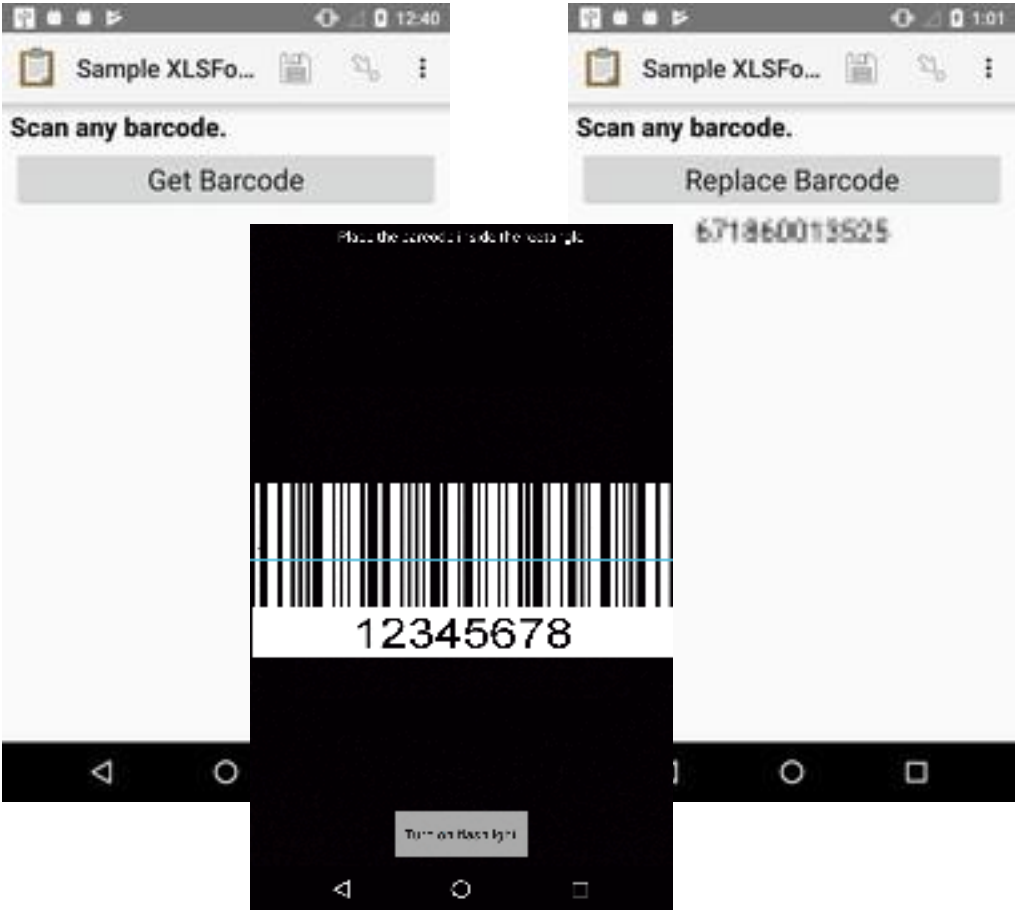
Type barcode

Scans, decodes, and captures the content of a barcode, using the device camera.

Several barcode formats are supported:

- UPC-A
- UPC-E
- EAN-8
- QR Code

type	name	label
barcode	barcode_example	Scan any barcode.

Build

Exercise

1. create your xls template

2. Add the 2 mandatory worksheets.

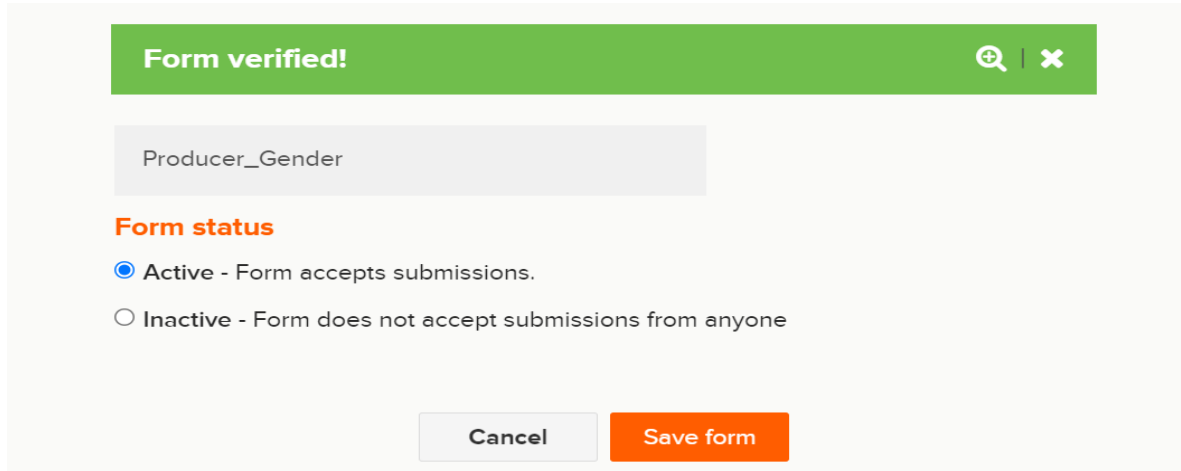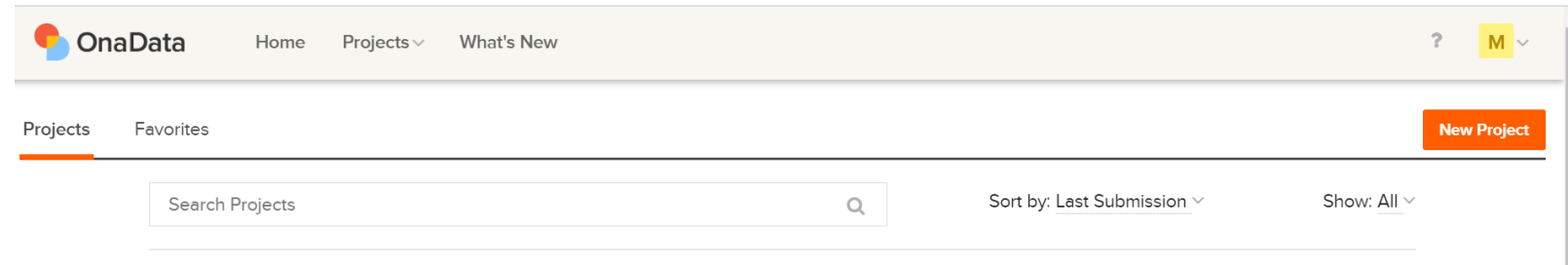3. Start planning and deisgning your survey in order to collect the following:
- ✓ trial location
- ✓ land clearing method
- ✓ Between row distance
- ✓ Number of plants germinated
- ✓ Weeding date
- ✓ Name of variety grown
- ✓ Source of planting material

Collect

DuduCamp

Before you start, ensure you have an ona.io account

Set- up an ona account

- www.ona.io

- Create an account

- Upload xlsform to ona

OnaData Home Projects ⌄ What's New   ? **M** ⌄

Projects   Favorites   **New Project**

Search Projects   Sort by: Last Submission ⌄   Show: All ⌄

Form verified!   🔍 | ✖

Producer_Gender

Form status

🔘 Active - Form accepts submissions.

⚪ Inactive - Form does not accept submissions from anyone

Cancel   Save form

- Go to New Project
- Indicate Project Name
- Category
- Add a form

Setting up ODK collect

Install ODK Collect

- Download "ODK Collect" from the Google Play Store (*recommended)*

- You can also install remotely using an .apk file
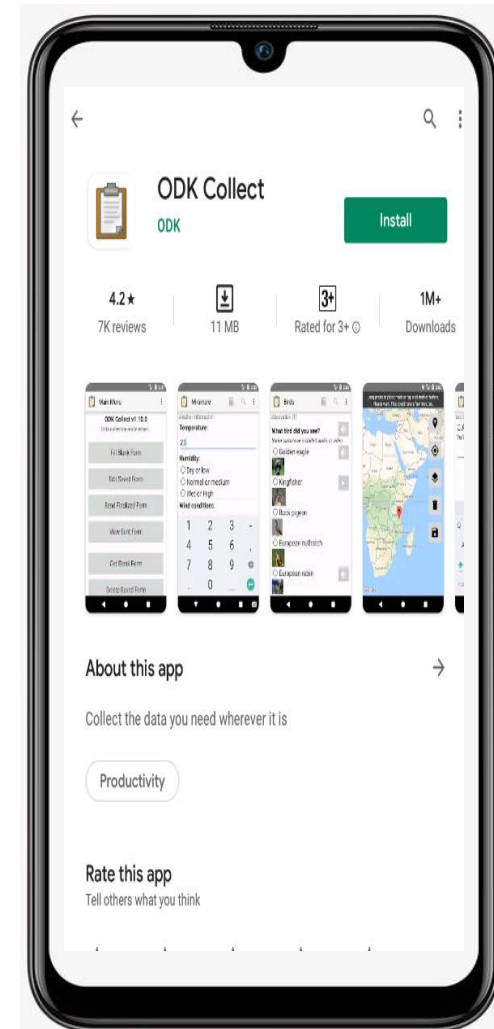
Setting up ODK collect

To configure data synch path;

- Manually enter project details
    - url: *https://odk.ona.io/*
    - Username *account name*
    - Password *Account password*

Collect
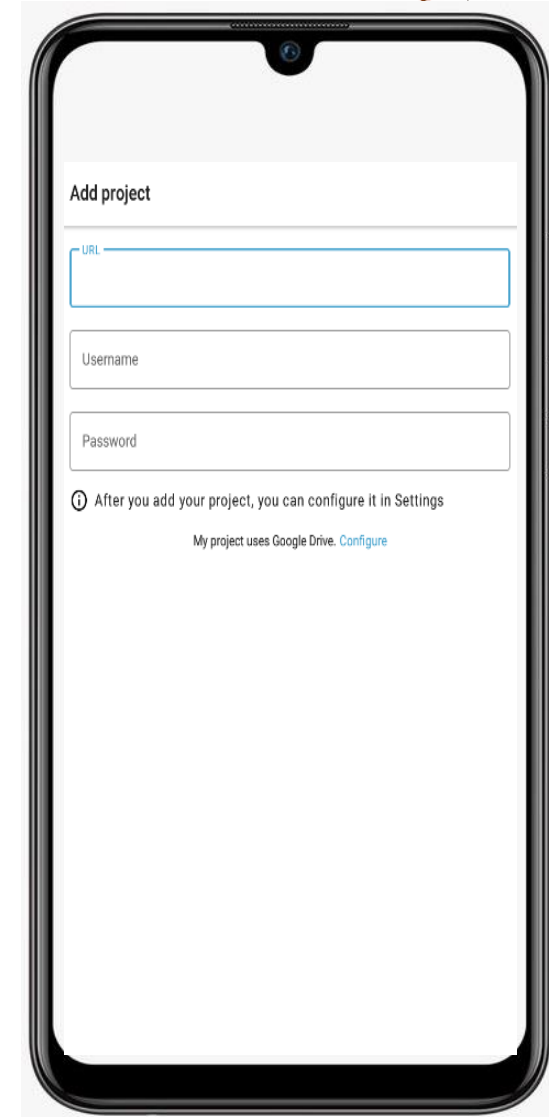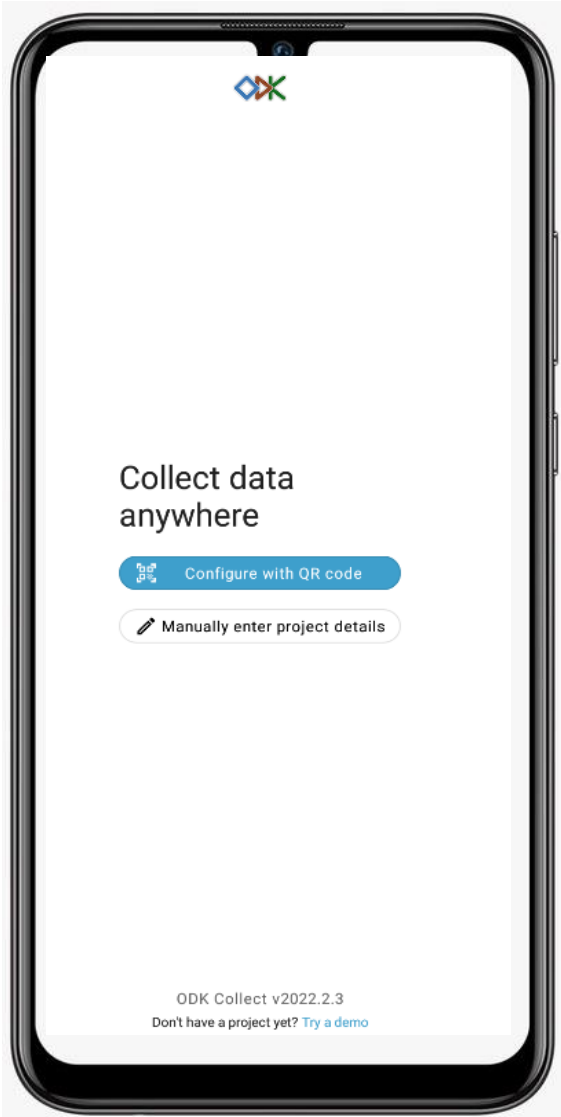
Main menu

- ***Fill Blank Form*** Lists available blank forms and lets you select a form to begin filling out.

- ***Edit Saved Form*** Lists completed and saved forms and lets you select a form to edit.

- ***Send Finalized Form*** Lists finalized but unsent forms and lets you select forms to send to the server.

- ***View Sent Form*** Lists forms that have been sent, even if they were deleted.

- ***Get Blank form*** Lists blank forms available on the server and lets you download them.

- ***Delete Saved Form*** Lists all the Saved and Blank Forms and lets you delete them.
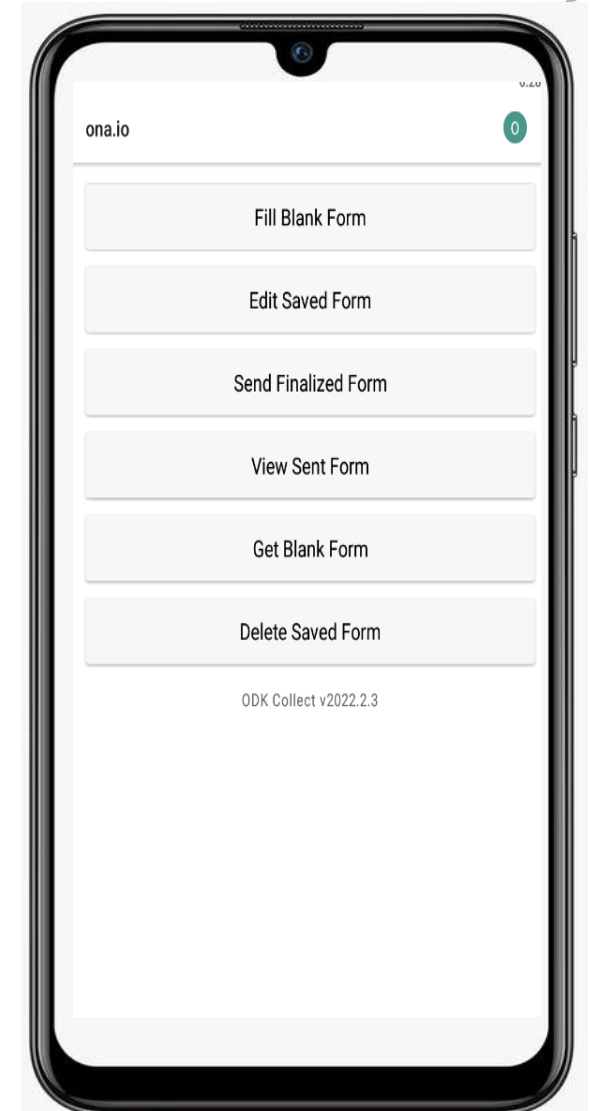
- Practise how to;
  - ✓ *Get Blank form*
  - ✓ *Fill Blank Form*
  - ✓ *Edit Saved Form*
  - ✓ *Send Finalized Form*
  - ✓ *View Sent Form*
  - ✓ *Delete Saved Form*

Advanced xlsform Authoring

- hint
- constraint
- constraint_message
- appearance
- required
- required_message

- calculation
- repeat_count
- media:image
- media:audio
- media:video
- choice_filter

Advanced xlsform Authoring

Appearance
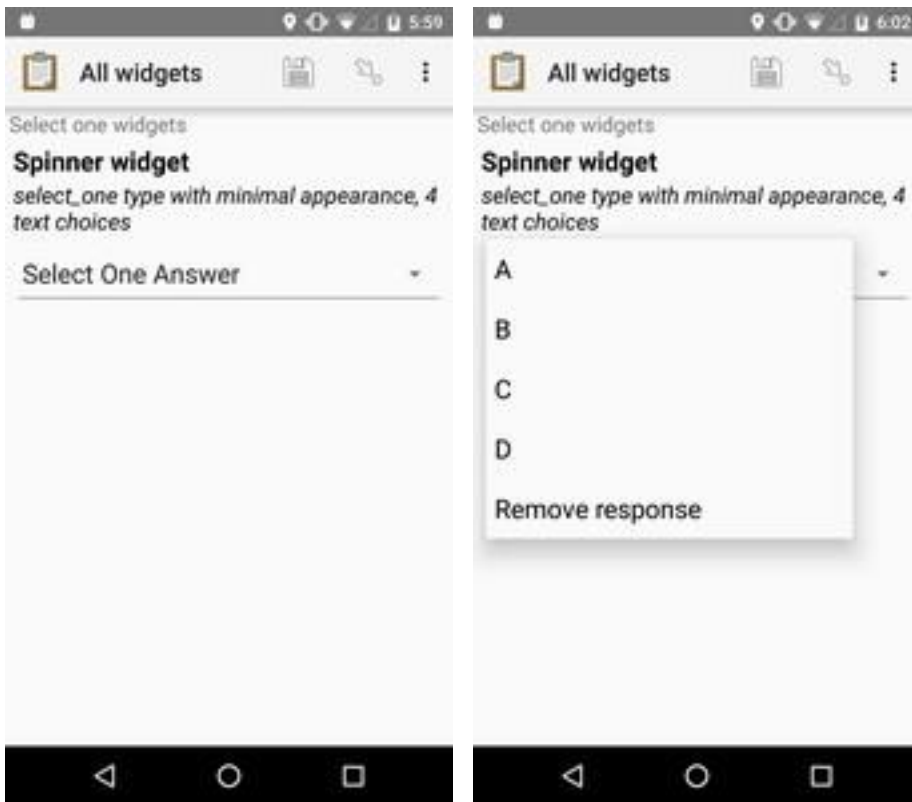
Single select widget with modal menu

Type select_one {list_name}

appearance minimal

Adding the minimal appearance attribute places the choices into a modal overlay menu.

type	name	label	appearance
select_one opt_abcd	spin-ner_widget	Spinner widget	minimal

list_name	name	label
opt_abcd	a	A
opt_abcd	b	B
opt_abcd	c	C
opt_abcd	d	D

type	name	label::English (en)	appearance
begin group	trialRating	Trial rating	table-list
note	rateNote	Rate the trial for the following problems observed:	
select_one score	rateDrought	Drought	minimal
select_one score	rateWaterLogging	Water logging	minimal
select_one score	rateErosion	Erosion damage	minimal
select_one score	ratePLB	Late blight	minimal
select_one score	ratePBW	Bacterial wilt	minimal
end group			
text	comment	Any additional comments or observations?	multiline

Appearance: Image Signature

type image

appearance: signature

Collects a signature from the user.
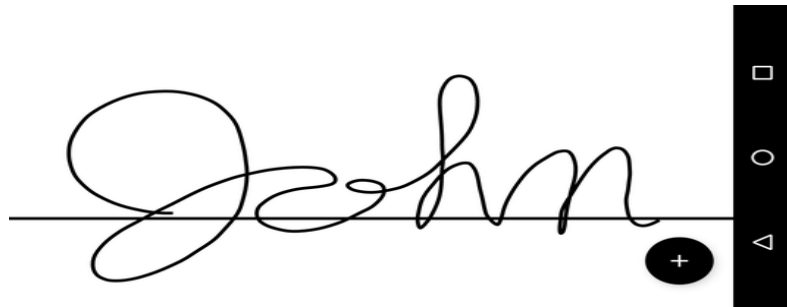
Add a calculation

type	name	label::English (en)	calculation
barcode	ENID	Scan the ID on your Enumerator card.	
barcode	HHID	Scan the ID on your household ID card.	
calculate	country		substr(${HHID},4,6)
calculate	currency		if(${country}='RW', 'FRW', 'NA')

Type integer

required: yes

read-only: yes

Calculation: ${var1}+${var2}

If you want to calculate a value and also display it, you create a numeric question, also filling out read-only and calculation

Advanced xlsform Authoring

Calculation Math operators

Math operators only work with numbers.

	Explanation	Example
+	addition	${salary_income}+ ${self_employed_income}
-	subtraction	${income} - ${expenses}
*	multiplication	${bill} * 1.18
div	division	${percent_int} div 100

Grouping multiple questions

type begin_group

appearance field-list

The field-list appearance attribute, applied to a group of widgets, displays them all on a single screen.

type	name	label	appearance
begin_group	gr01	Section1	field-list
end_group	gr01	Section1	

begin group	purpose	Purpose
note	banner	
note	intro	This tool serves to collect data in a validation exercise to evaluate a new fertilizer recommendation for potato (400 kg NPK 17:17:17 + 100 kg urea per hectare), against the current standard fertilizer recommendation (300 kg NPK 17:17:17 per hectare). A control without fertilizer is included to quantify returns-on-investment in fertilizer.
note	treatments	The three treatments are referred to using colour codes: 1 (black): control (without fertilizer) 2 (blue): current recommendation (300 kg NPK 17:17:17 per hectare) 3 (red): new recommendation (400 kg NPK 17:17:17 + 100 kg urea per hectare)
end group		

Advanced xlsform Authoring

Single question repeat
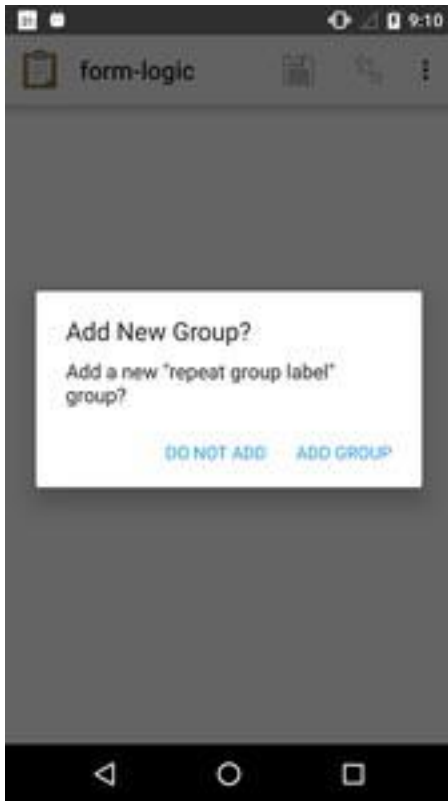
The user is given the option to add each iteration

type	name	label::English (en)
begin repeat	plotSizeRepeat	
begin group	plotSizeDetails	Plot size and plant stand
calculate	plotSizeTreatmentNr	
calculate	plotSizeTreatment	
decimal	plotW	Measure the exact width of the ${plotSizeTreatment} plot (m) [across the rows of potato]
decimal	plotL	Measure the exact length of the ${plotSizeTreatment} plot (m) [along the rows of potato]
calculate	plotSize	
integer	nrPlants	How many plants do you count in the ${plotSizeTreatment} plot?
end group		

Advanced xlsform Authoring

Multi-question repeat

type begin_repeat
type end_repeat

The user is given the option to add each iteration
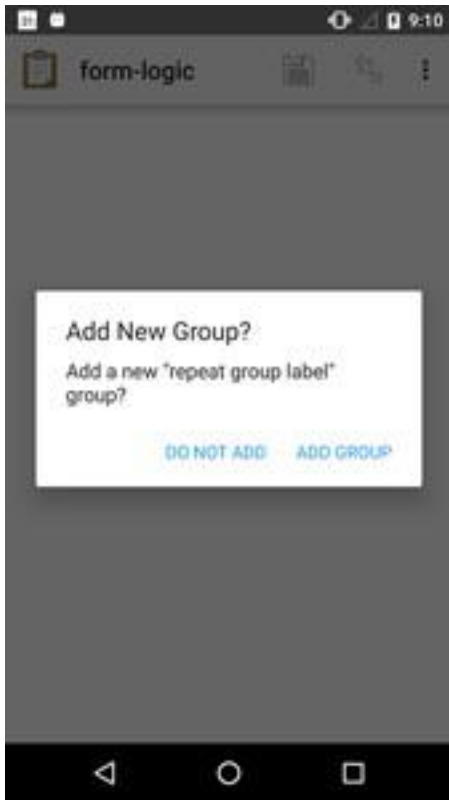
type	name	calculation	repeat_count
begin repeat	plotSizeRepeat		3
begin group	plotSizeDetails		
calculate	plotSizeTreatmentN	position(..)	
calculate	plotSizeTreatment	if(position(..) = 1, 'black', if(position(..) = 2, 'blue', 'red'))	
decimal	plotW		
decimal	plotL		
calculate	plotSize	${plotW} * ${plotL}	
integer	nrPlants		
end group			
end repeat			

Use the **repeat_count** column to define the number of times a group will repeat.

Advanced xlsform Authoring

Adding a relevant condition

You may only want certain questions to appear for some users.

For instance, you may only want to ask questions about a user's land ownership if they indeed have land or about their children if you know they have children.

You can use the **relevant** column to create skip patterns, only asking questions that are relevant to that respondent.

Relevant conditions can be applied also to groups of questions.

Often, comparison operators are used in relevance expressions.

For example:
${age} <= 5 True if age is five or less.

${has_children} = 'yes' True if the answer to has_children was yes

selected (${has_children},'yes') for multi select questions

type	name	label::English (en)	relevant
begin group	plantingDetails	Planting details	selected(${event}, 'event1')
date	plantingDate	Specify the planting date.	
select_one variety	variety	What potato variety was planted?	
select_one source	varietySource	Who supplied the planting material?	
select_one plantingDensity	plantingDensity	At what planting density was potato planted?	
end group			

Choice filter

- To limit the options in a select question based on the answer to a previous question, use a choice_filter row in the **survey** sheet, and filter key columns in the **choices** sheet.

- For example, you might ask the user to select a state first, and then only display cities within that state. This is called a cascading select, and can be extended to any depth. This example form shows a three-tiered cascade: state, county, city.

survey sheet

type	name	label	choice_filter
select_one states	state	state	
select_one districts	district	county	state=${state}
select_one sdlocations	sdlocation	sdlocation	state=${state} and district=${district}
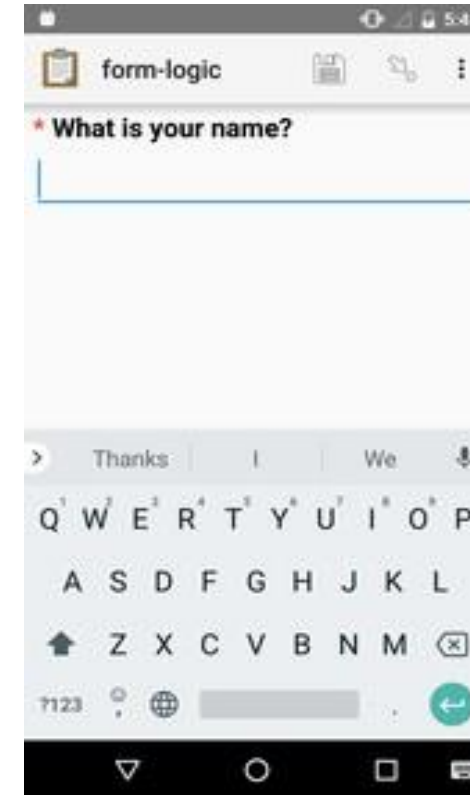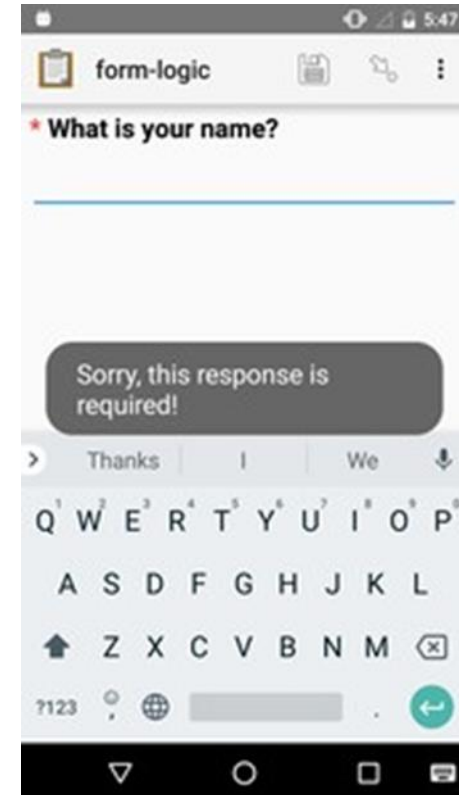
choices sheet

list_name	name	label	state	district
states	1	Beirut		
states	2	Bekaa		
districts	101	Beirut	1	
districts	102	Baalbeck	2	
districts	103	Hermel	2	
districts	104	Rashaya	2	
districts	105	West Beqaa	2	
districts	106	Zahle	2	
sdlocations	201	Achrafieh	1	101
sdlocations	202	Tarek Jadedeh	1	101
sdlocations	203	Msaytbi	1	101
sdlocations	204	Mazraa	1	101
sdlocations	205	Arseal	2	102
sdlocations	206	Labweh	2	102

Required Questions

- By default, users are able to skip questions in a form. To make a question required, put yes in the required column.

- Required questions are marked with a small asterisk to the left of the question label. You can optionally include a **required_message** which will be displayed to the user who tries to advance the form without answering the question.

type	name	label	required	required_message
text	name	What is your name?	yes	Please answer the question.

Advanced xlsform Authoring

Constraint

To validate or restrict response values, use the **constraint** column.

The constraint expression will be evaluated when the user advances to the next screen.

If the expression evaluates to **True**, the form advances as usual. If **False**, the form does not advance and the **constraint_message** is displayed.

The entered value of the response is represented in the expression with a single dot (.).

Constraint expressions often use comparison operators and regular expressions.

For example:
the basic syntax is: ". RULE"
. >= 18   True if response is greater than or equal to 18.
. < 20 and . > 200   True if the response is between 20 and 200.
${VARIABLE}.RULE

type	name	constraint	constraint_message::English (en)
integer	tuberNr	.>=0	Value should be larger than or equal to zero.
decimal	tuberFW	.>=0 and .<400	Enter the weight in kg, and enter '0' (zero) if there is no yield.

Advanced xlsform Authoring

Comparison operators in constraint

Comparison operators are used to compare values. The result of a comparison is always True or False.

Warning!!!!
The relational operators (>, >=, <, <=) only work with numbers.

Operator	Explanation	Example	Notes
=	equal to	${enrolled} = 'yes'	Can compare numbers or strings.
!=	not equal to	${enrolled} != 'yes'	Can compare numbers or strings.
>	greater than	${age} > 17	
>=	greater than or equal to	${age} >= 18	
<	less than	${age} < 65	
<=	less than or equal to	${age} <= 64	

Advanced xlsform Authoring

Boolean operators in constraints

Boolean operators combine two True or False values into a single True or False value.

	Explanation	Example
and	True if the expressions before and after are True	${age} > -1 and ${age} < 120
or	True if either of the expressions before or after are True	${age} < 19 or ${age} > 64

Multiple Language Support

- It is possible to add multiple languages to a survey using in xlsform.

- To do this, you have to essentially create a difference label column for each of your languages.

- For example a form with the columns **label::English** and **label::French** it will allow the surveyors to choose between English and French on ODK Collect, in order to select a different language press the Menu key and the "Change Language" option.

- Make sure that your column headers in the "choices" sheet match those in the "survey" sheet (i.e. there will be errors if you columns are "label::English" on the survey and "label" on the choices worksheet)

survey worksheet

	A	B	C	D	E	F
1	type	name	label::English	label::Spanish	hint::english	hint::spanish
	select_one yes_no	select_odk	Have you tried the ODK before?	Has probado alguna vez el ODK en anteriores ocasiones?	Select one of the choices	Selecciona una de las opciones
12						

survey / choices / settings

choices worksheet

	A	B	C	D
1	list_name	name	label::English	label::Spanish
2	yes_no	yes	Yes	Si
3	yes_no	no	No	No

survey / **choices** / settings

Advanced xlsform Authoring

Adding Metadata

Add the following rows at the top of the survey (they can be anywhere but it is a best practice to put metadata fields at the beginning of the file):

	A	B	C
1	type	name	label
25	start	start	Start Time
26	end	end	End Time
27	today	today	Date of Survey
28	deviceid	deviceid	Phone Serial Number
29	subscriberid	subscriberid	Subscriber Identifier
30	imei	simserial	SIM serial
31	phonenumber	phonenumber	Phone number

survey / choices / settings

Metadata literally means "data about data". The user does not enter or see anything. The information is automatically recorded. You can add metadata to the beginning of your XLS form. Below you can find few **types***:*

start (recording the start time of the interview)
end (recording the end time of the interview)
today (recording the date of the interview)
deviceid IMEI (International Mobile Equipment Identity)
Phonenumber *Phone number (if available).*

Exercise III

- More literature: https://docs.getodk.org/ , https://xlsform.org/en/

- Practice using different advanced xlsform authoring functions