



Field Pad

Getting Started with Data Collection

1 Introduction

Field Pad is an app for mobile data collection. The app is generic and has to be configured with descriptions of the variables to be collected, the page layouts to use, and the validation rules to apply. For simple forms, the variable list suffices.



1.1 Purpose

This document outlines the concepts required for getting started with the design of a Field Pad-based configuration bundle. While this is neither a detailed nor complete description of the configuration, the text is intended to provide an overview of all key concepts that need to be considered when embarking on a data collection project with Field Pad.

1.2 Audience

This document is written for first-time users of Field Pad wishing to specify a new data collection bundle. For a general overview of Field Pad, see [Introducing Field Pad](#).

1.3 Definitions

- App** Short for “application”. A program running on a tablet or smartphone. Field Pad is an app.
- Bundle** Group of control files that together configure Field Pad. Different bundles configure different sets of forms and store data separately. A bundle can be considered to be a Field Pad app.
- Form** Term used is used in this document to describe the contents of a screen within the Field Pad app. The contents of a form can be completely visible or partly hidden, but can be displayed by sweeping the contents up or down. A form may contain fields for data entry or maps with geo-located objects.
- Pane** A rectangular area in a page. Unlike a “window” on the screen, panes do not overlap and have no “blank” space between them. Panes split a page into subareas. These may scroll individually.

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2 Getting Started

When designing a data collection app with Field Pad, the first step is to decide what data will be collected. In the simplest case, this is just a list of variables, e.g., *x*, *y*, and *z*. In a more complex scenario, there are objects, e.g., plant species, where each particular species has variables, e.g., *height* or *coverage*. Variables can also be attached to shapes on maps.

Some variables can be filled with arbitrary values, others only with a value from a list (multiple choice).

Different aspects of variables are described in three control files – *variables*, *groups of objects*, and *alternative answers* – that describe variables, their grouping, and multiple choice answers. A fourth control file, containing control code, is described in another document (*Configuring Field Pad*). For simple forms, only the variables file is required. The other files can be auto-generated from this. See the document *Simple Field Pad Configuration*.

- *Variables.csv* lists the variable names, types, and allowed values.
- *Groups.csv* contains the objects the variables pertain to. Contents are optional. Variables can be free-standing without being associated with objects or belong to objects listed here.
- *Spinners.csv* lists more sophisticated use of multiple choice answers.

The sections below describe the concepts. The exact syntax and content of the control files is described in the document *Configuring Field Pad*.

2.1 Variables

Irrespective of how variables are arranged on the screen, they have to be listed. For each variable, the following has to be described:

- *Variable Name* – internal variable name used when reporting the data.
- *Variable Label* – display name of the variable used on screen. This may be the same as the internal variable name.
- *Type* – kind of variable. May be numeric (integer), decimal (floating point number), boolean (true/false), textual, or one of listed values (multiple choice).
- *Unit* – the unit of the variable, e.g., *m* or *deg*.
- *Group Name* – name of group of objects that will have this variable. If cars are the grouping concept, the value should be “cars”. If plants are considered, the object type may be “flowers” or “trees”. Different variables can belong to different object types. Ignore if this is not relevant.
- *Allowed values* – either a range (for numerical variables), a list of values, or a pointer to the *Spinners.csv* file, where more complex entries are possible. If the variable type is number or decimal, this limits what values are allowed to be entered in the associated field editor.
- *Description* – free text containing helpful notes about the variable. This text is shown when editing the variable. One or two short sentences will fit.
- *Time and/or space resolution* – variable name extension used when variable is entered repeatedly over time (e.g., every year or every day) or over map positions (e.g., GIS object

ID).

Derived variables, i.e., variables that are calculated from the entered values, should also be included.

While there is more to enter in the Variables.csv file, this is enough to get started. For a simple, variables-only configuration, see *Simple Field Pad Configuration*.

2.2 Species Lists

An optional second step is to describe the objects, types, species, or classes¹ that are used to group variables. This is done in the file Groups.csv. If not relevant, leave this empty. For every object, the following has to be gathered:

- *Object type* – this has to be the same as used in the *Group Name* above. If data is collected about plants, the value could be “plants”.
- *List of members*, i.e., the objects in the group. If data is collected about ferns, the list should contain names of the different ferns, e.g., Anemia, Stormesia, Antigramma, etc. If data pertains to supplies, the list should contain food, e.g., flour, sugar, pasta, etc.
- Same list as above, but with internal names – those that will be used when reporting the data. Those may be the same as member list names or different.

There is more to this list, but the above is enough to get going.

2.3 Multiple Choice Answers

A third optional step is to describe answer alternatives. This is only relevant if you want to use multiple choice answers for your variables. For example, if a variable should hold the status of an observed car, the alternatives being “parked”, “transported”, or “sold”. The description may also hold encodings of the alternatives, e.g., parked=0, transported=1, and sold=2. While the main alternatives are displayed on the screen, the encoding values are used when reporting the answers.

This is listed in the file Spinners.csv.

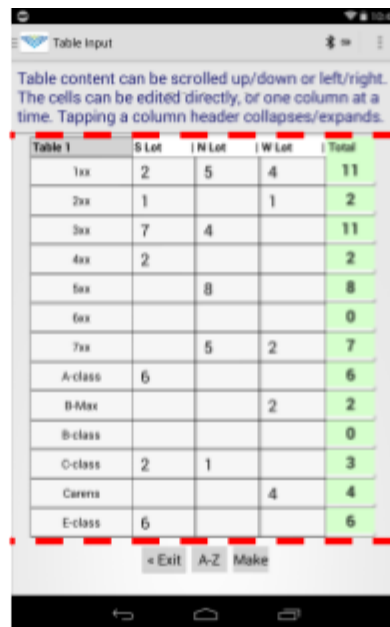
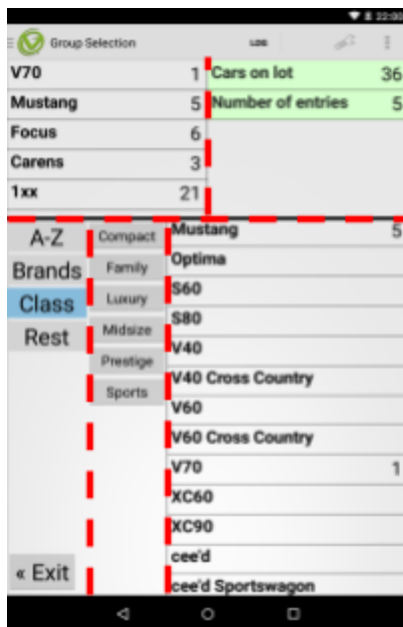
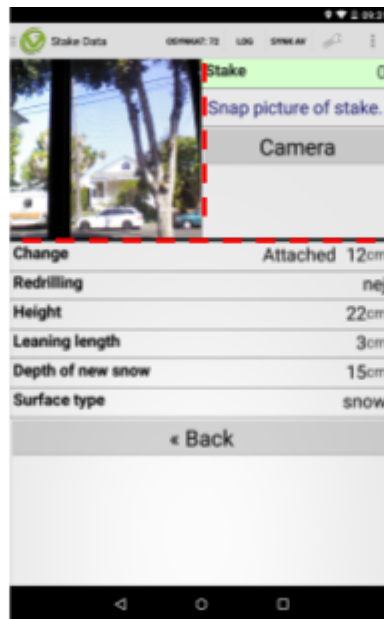
- Variable names – names of the multiple choice variables.
- Display values – the values that are displayed in the multiple choice list of each variable.
- Reported values – the corresponding values that are used when reporting the answer.
- Description – explanatory text that appears when a choice has been made.

2.4 Page Layout

Field Pad knows a number of form types² – plain page, two-pane page, three-pane page, five-pane page, table page, and GIS page. A bundle can hold any number and combination of forms. Examples of the forms are shown below. Each page has one or more containers (panes) for content. The pane borders are indicated in red.

¹ The app does not support a proper object-oriented class system. Rather, this is to show that different domains use different names to mean “grouping”.

² It actually knows more page types than what is listed here, but these do not add to clarity at this time.



While other form types are possible to create, this requires modification of Field Pad. The contents – fields, buttons, texts, displays, etc. – of the panes can be freely configured, so the choice of page type for a form depends more on other requirements than pure data entry.

1. The first page type is suitable for most common linear forms, where fields are added top to bottom.
2. The second form type lends itself to situations where running calculations or supporting text or pictures are to be displayed in the upper panes and the data entry is done in the large bottom pane.
3. The third form type is a variation of the first two, having two linear **side-by-side** panes. Can be used for narrow entries or one pane can be used for display of results or other calculated

values and the other for data entry.

4. The fourth type is used for a special situation – when entering **species/object values**. Here, the object names are listed in the bottom right pane and the objects where entries have been made are posted in the top left. Top right pane is used to display calculated values, e.g., sums of entered values, number of entries made, etc. The two bottom left panes are used to display configurable filter buttons.
5. The fifth type is a three-pane form specially designed for **tables** with rows and columns. The top pane extends vertically to hold its content. It does not scroll. The middle pane will hold a table. If the table is too large, the contents scroll vertically and horizontally. The bottom pane can hold exit and filter buttons. The rows are filled with species/object names.
6. The sixth page type is suitable for **GIS** displays or other forms with a picture background. Objects can be placed manually or via import files on the page. Fields can't be added to this page. However, the GIS objects can have forms attached to them.

Choice of page types depends largely on the requirement to display species/groups/objects (→ forms type four or five) or need to display text/values/pictures/charts in the upper part while the bottom part of the form may be scrolling (→ form type two). Multiple parallel object/group lists can be displayed in form type five, and GIS-related data entry in page type six.

3 Examples

This section contains two sample specifications for bundles. While not syntactically correct, the relevant concepts are described.

3.1 Example 1 – Weather Observation

Consider a simple bundle for weather data entry. Of interest is the date, temperature, cloud type, visibility, and precipitation.

The variables list will contain one row for each variable. The associated object type (Group name) is not used.

Time Resolution	Variable Name	Variable Label	Type	Unit	List Values	Limits
year, month, day	T	Temp	numeric	deg C		-40-40
year, month, day	C	Cloud type	list		@file	
year, month, day	Vis	Visibility	list		good, limited, poor	
year, month, day	Precip	Precipitation	numeric	mm		0-5000

In this example, the Group Name will not be used, so the Groups.csv file will not have any entries. The variables Cloud type and Visibility are list types (multiple choice). Visibility has a short list of values, so it is practical to enter it directly in the variables list. Cloud type (C), however, has a longer list, so the spinner control file is used. Here is an excerpt.

SpinnerID	Value	Spinnervalues	Description
C	Sc	Stratocumulus	Large dark, rounded masses, usually in groups, lines, or waves, at a lower altitude, usually below 2,400 m
C	St	Stratus	Low horizontal layers having a ragged or uniform base
C	Ac	Altostratus	Middle cloud forms from 2 to 7 km, not always associated with a weather front but can still bring precipitation
C	As	Altostratus	Middle cloud forms from 2 to 7 km, form when a large convectively stable airmass is lifted to condensation in the middle of the troposphere, usually along a frontal system

3.2 Example 2 – Lot Count

Consider a simple bundle for counting the car types on the lot of a dealership. Of interest is the number of cars of a certain make/type.

The variables list will contain one variable, *count*, of type numeric, and no unit. The internal and display names will be the same. The associated object type will be “cars”. The allowed values will be a range 1 to 99. The description will be “Number of cars on the lot”.

Time Resolution	Group Name	Internal Name	Display Name	Type	Unit	Allowed values
year, month, day	cars	count	count	numeric		1-99

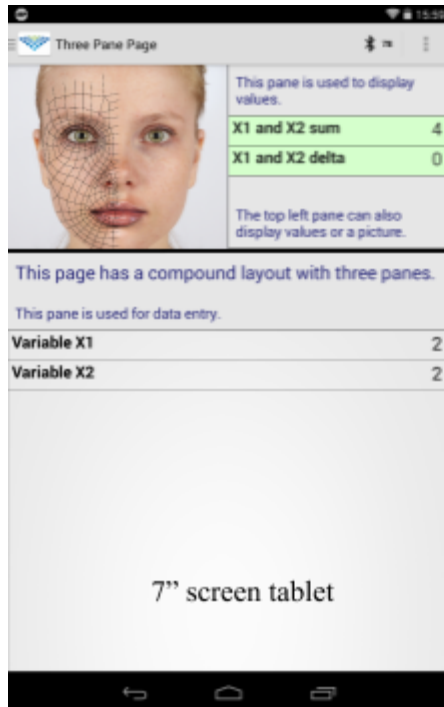
The Groups.csv list will contain one row for each car type the dealership sells. The property column **P_type** is used to be able to filter the list based on car body type. An arbitrary number of property columns can be defined and used for filtering.

Group name	Display name	Internal name	P_type
cars	Volvo S40	S40	sedan
cars	Volvo V40	V40	station wagon
cars	Volvo S60	S60	sedan
cars	Volvo V60	V60	station wagon

This example does not make use of multiple choice answers, so the third file will have no entries.

4 Tablet Platform

Field Pad will run on any Android smartphone or tablet with Android versions 4.0.x (“*Ice Cream Sandwich*”) or newer. However, the screen layout and dialog size has been optimised for a “mini tablet” device with a 7” screen. While most content will be fine, long variable labels or values will not fit on the smaller screens and will be truncated. So, when planning the above contents – GIS or regular forms – the intended target device should be considered.



To some extent the Android operating system’s font size setting (Settings → Display → Font size) can be used to compensate screen size or make fields more readable.