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Keon-Woong Moon

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Preface

You can use “Learn ggplot2” shiny app at <http://r-graph.com>. This app is for researchers, students, or professors who want to learn how to make a plot with ggplot2. With this app, you can make your plot step-by-step without coding. You can obtain beautiful plots in png or pdf format. You can also download the ppt file with or without R code with just one click.

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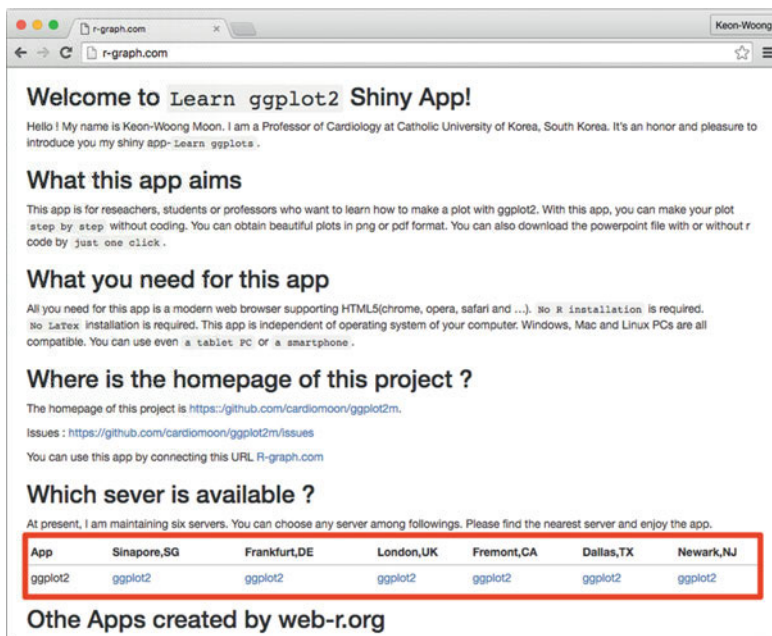
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Chapter 1

Make a Plot with a Click

Please select one of the six available servers at R-graph.com.



The screenshot shows a web browser window with the URL `r-graph.com`. The page content includes a welcome message from Keon-Woong Moon, a description of the app's purpose, and a table of servers. The table has columns for 'App', 'Singapore,SG', 'Frankfurt,DE', 'London,UK', 'Fremont,CA', 'Dallas,TX', and 'Newark,NJ'. The 'App' column contains the text 'ggplot2' for each row. A red rectangular box highlights the entire table.

App	Singapore,SG	Frankfurt,DE	London,UK	Fremont,CA	Dallas,TX	Newark,NJ
ggplot2	ggplot2	ggplot2	ggplot2	ggplot2	ggplot2	ggplot2

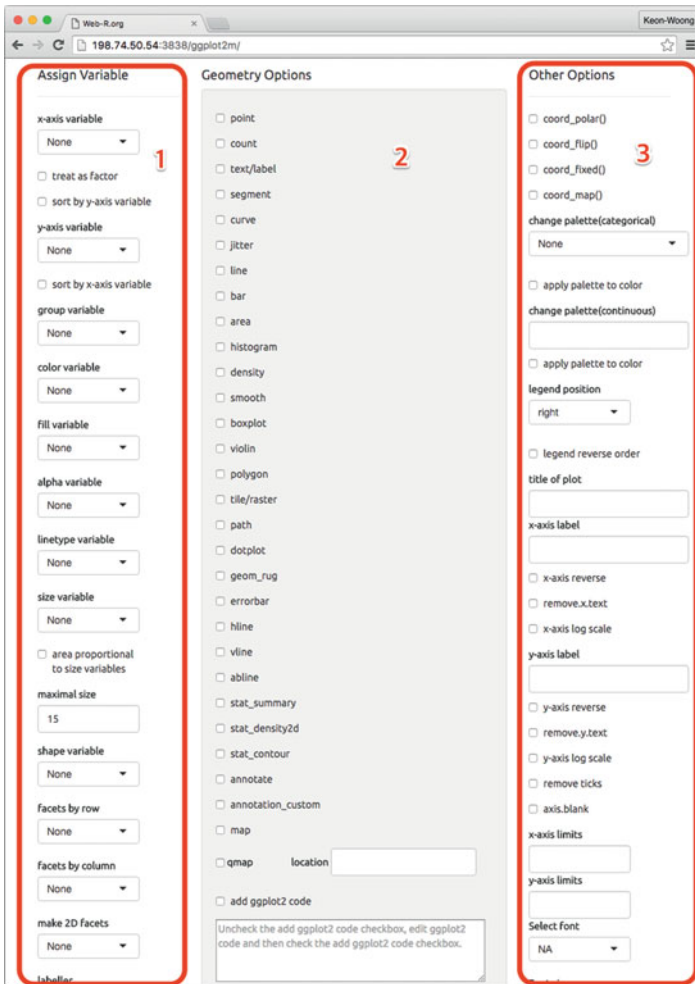
1.1 The First Plot

Wait for up to 5–6s. You can see the **Learn ggplot2** app. You can select language(green rectangle), upload your own data with *.xlsx, *.csv, *.dbf, *.sav, *.dta, or *.sas7dat formats(scarlet rectangle) or select one of the example data(arrow). In the right panel, you can enter preprocessing command, enter the name of data(1) or select one of the examples(2). If you can see the data table(blue rectangle), then the app is ready.

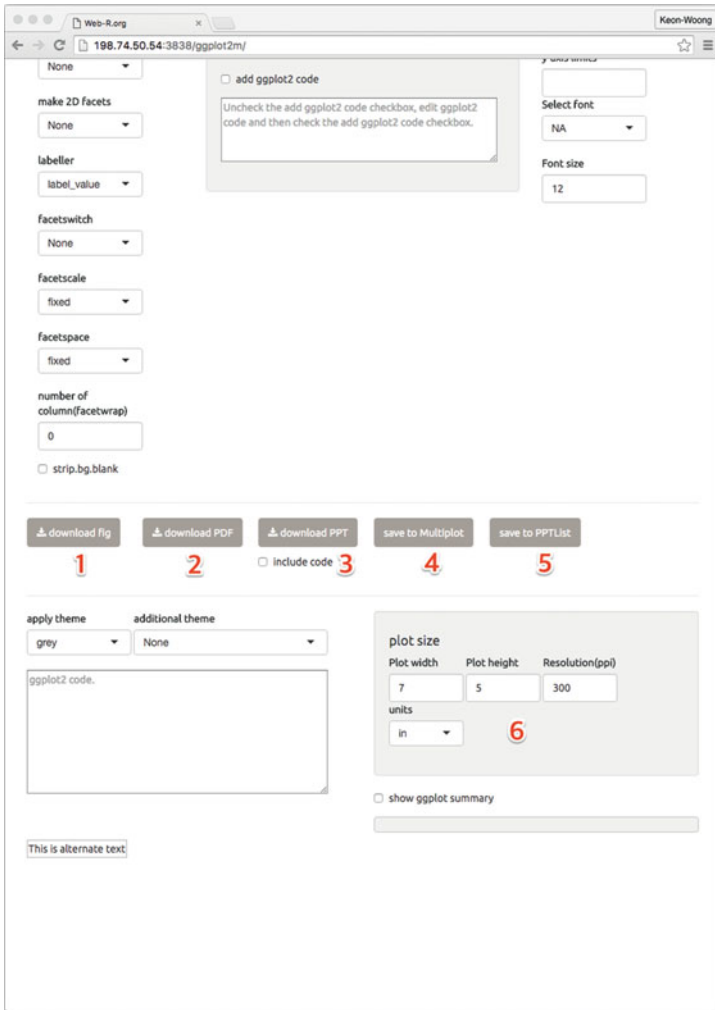
The screenshot shows the 'Learn ggplot2 by web-r.org' web application. At the top, there's a title and a brief description of the app's purpose. Below that, a language selector is highlighted with a green box, showing 'English' selected and '한국어(Korean)' as an option. A navigation bar contains 'Web-R.org', 'ggplot2', 'MultiPlot', 'Powerpoint List', 'Sessioninfo', and 'About'. The main content area has instructions on how to use the app. A section for 'Upload data(*.xlsx*.csv)' is highlighted with a red box, showing a 'Choose File' button and 'No file chosen' text. Below this, a 'Select data' section has radio buttons for 'Salaries', 'acs', 'radial', 'iris', and 'heightweight'. A red arrow points to the 'Salaries' option. To the right, there's a 'Do preprocessing' checkbox and a 'Reset preprocessing' button. Below that is a text area for entering R commands. Further down, there are input fields for 'Enter the name of data' (containing 'Salaries' with a red '1') and an 'Example gallery' dropdown (containing 'None' with a red '2'). At the bottom, there's a 'Select data preprocessing' dropdown (containing 'None') and 'Undo preprocessing' and 'Reset preprocessing' buttons. A checkbox 'always show data tables' is checked. A data table is displayed at the bottom, highlighted with a blue box, showing columns for rank, discipline, yrs.since.phd, yrs.service, sex, and salary.

rank	discipline	yrs.since.phd	yrs.service	sex	salary	
1	Prof	B	19	18	Male	139750
2	Prof	B	20	16	Male	173200
3	AsstProf	B	4	3	Male	79750
4	Prof	B	45	39	Male	115000
5	Prof	B	40	41	Male	141500
6	AssocProf	B	6	6	Male	97000
7	Prof	B	30	23	Male	175000
8	Prof	B	45	45	Male	147765
9	Prof	B	21	20	Male	119250

If you scroll down, you can see the following screen. In the left panel, you can assign variables(1). In the center panel, you can select the geometry options(2). You can select the other options in the right panel(3).



If you scroll down further, you can see several buttons. You can download figure as a png file(1), a pdf file(2), or as a ppt file(3). You can save your plot for a multiplot(4) or save to the PowerPoint list(5). You can adjust your plot size(6).



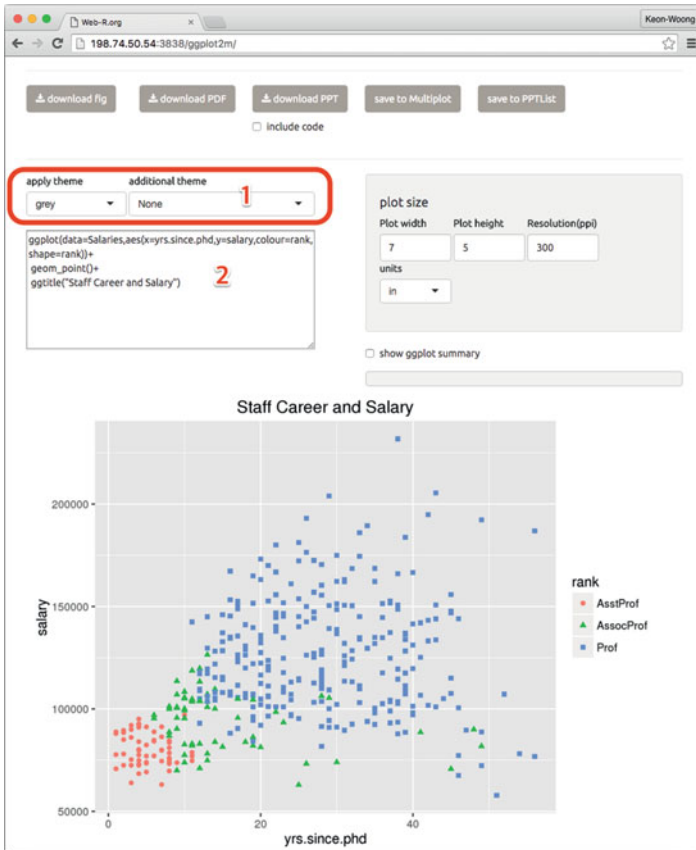
Select the **Salaries of Professors(1)** from the **Example gallery(1)** and wait for 2–3 s. You can see the plot instead of the data table. If the plot does not appear, press the **Reset Variables/Options button(2)** and select the example again.

The screenshot shows the Web-R.org web interface. At the top, there are navigation links: Web-R.org, ggplot2, MultiPlot, Powerpoint List, SessionInfo, and About. Below the navigation bar, there is a header with the text: "Please select one of sample data or upload your own. You can upload data as a csv, xlsx (Microsoft Excel), dbf (dbase 3+), sav (SPSS), dta (STATA), sas7bdot (SAS) format. If you have any error, please upload as a csv format."

The main interface is divided into several sections:

- Upload data(*.xlsx,*.csv):** Includes a "Choose File" button and the text "No file chosen".
- Select data:** A list of radio buttons with "Salaries" selected. Other options include "acs", "radial", "iris", and "heightweight".
- Preprocessing:** A checkbox for "Do preprocessing" (unchecked) and a "Reset preprocessing" button. Below it is a text area for entering R commands.
- Enter the name of data:** A text input field containing "Salaries".
- Example gallery:** A dropdown menu with "Salaries of Professors(1)" selected. This dropdown is highlighted with a red box and a red arrow pointing to the plot.
- Select data preprocessing:** A dropdown menu with "None" selected.
- Buttons:** "Undo preprocessing" and "Reset preprocessing" buttons are located at the bottom of the preprocessing section.
- Reset Variables/Options:** A button with a red "2" next to it, located in the left sidebar. Below it is a checkbox for "show help for data".
- Plot:** A scatter plot titled "Staff Career and Salary". The y-axis is labeled "salary" and ranges from 0 to 200,000. The x-axis is labeled "yrs.since phd" and ranges from 0 to 40. The plot shows a positive correlation between years since receiving a PhD and salary. Data points are colored by rank: AssocProf (red), AssocProf (green), and Prof (blue). A legend on the right side of the plot identifies these colors.
- Options:** At the bottom, there are sections for "Assign Variable", "Geometry Options" (with a checked "point" option), and "Other Options" (with a checked "coord_polar()" option).

If you scroll down, you can see the following screen. You can apply one of the basic theme of ggplot2 package or additional themes from ggthemes package(1). You can see the R code of the plot(2). On the right panel, you can adjust the size and resolution of your plot. You can see the plot(a bigger plot) here. This plot is created using the following steps. (1) The R code for plot is generated by your selection of variables, geometries, and other options. (2) With this code, a **png** plot of a predetermined size and resolution is made. (3) **png** file is read and shown as figure. This plot looks somewhat different from the preview image in the position of table especially the ratio of figures and letters. This figure is a **what you see is what you get (WYSIWYG)** one.

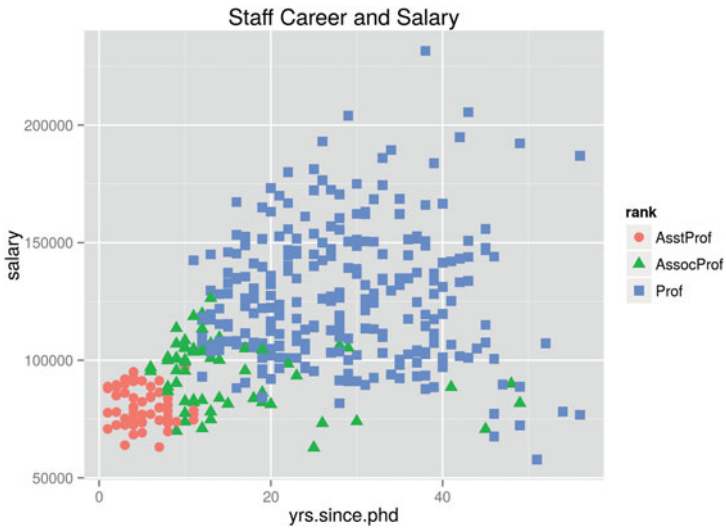


1.2 Apply Themes and Save to Multiplot

In this section, you can learn how to apply themes and how to make a multiplot containing up to four plots.

1.2.1 Gray Theme

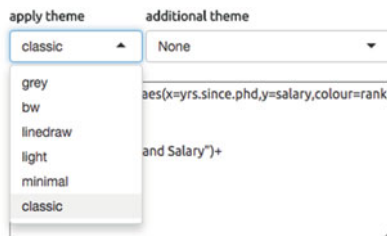
The gray theme is the default theme in the **apply theme** select input. You can download this figure by pressing the **download figure** button.



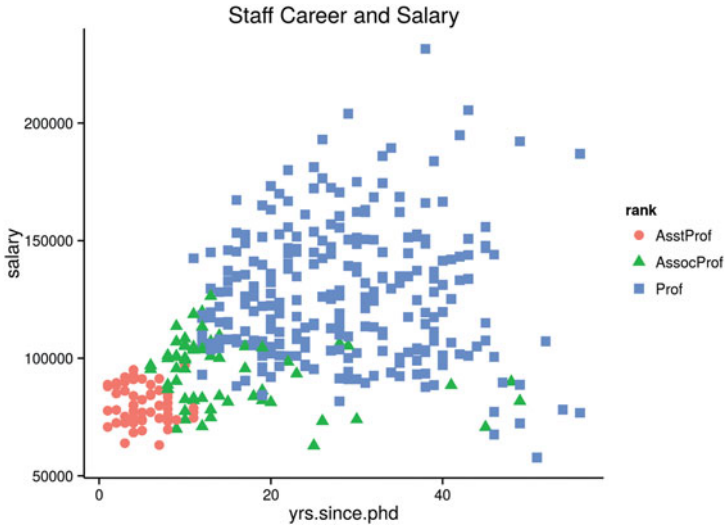
After downloading this plot, press the **save to Multiplot** button.

1.2.2 Classic Theme

Select **classic** theme among **Apply theme** as input. And wait for some time.

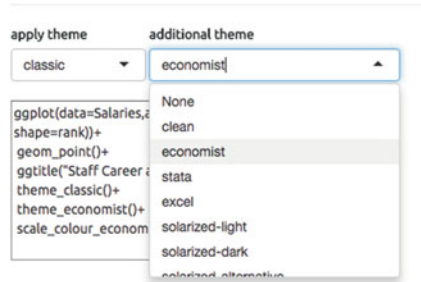


Wait until the plot is changed. Press the **download pdf** button to download the figure as a pdf file. Press the **save to Multiplot** button.

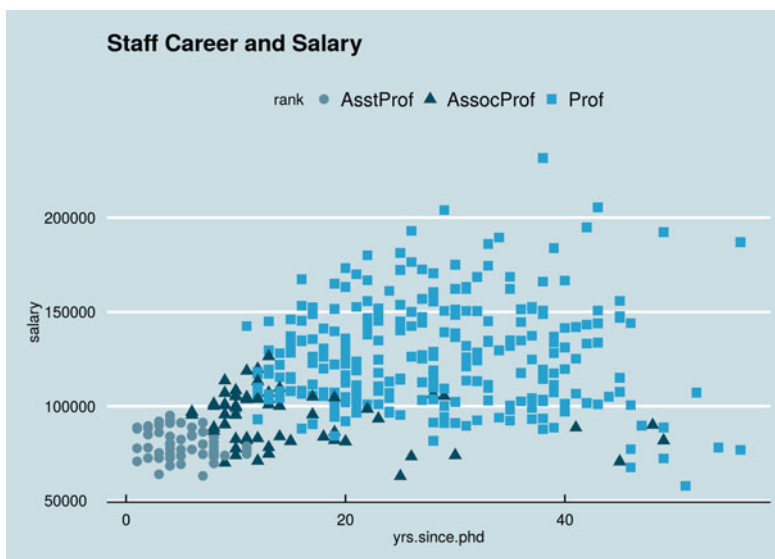


1.2.3 Economist Theme

Select the **economist** theme among the **additional theme**. And wait for several seconds.

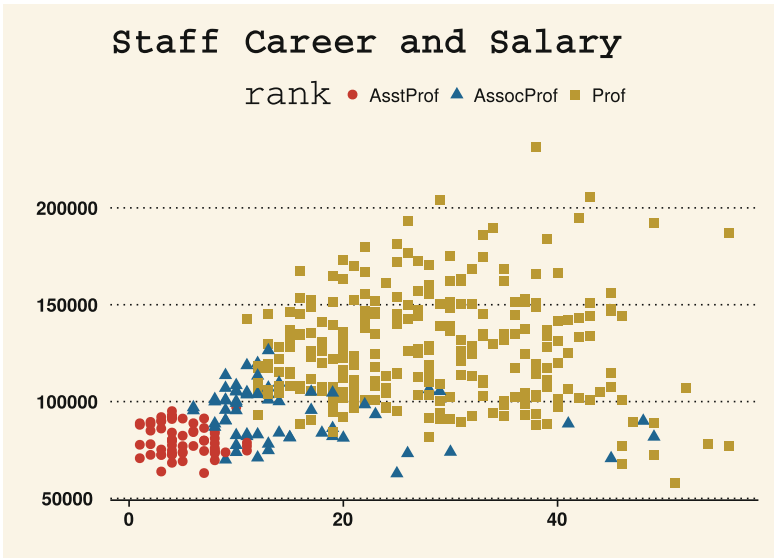


Wait until the plot is changed. Press the **download pdf** button to download figure as a pdf file. Press the **save to Multiplot** button.



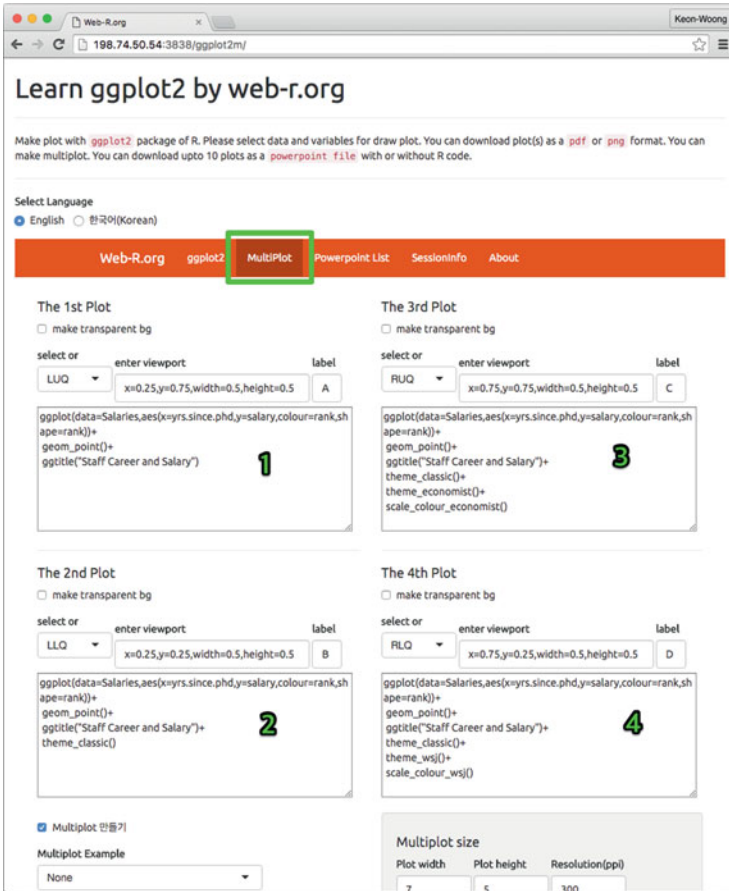
1.2.4 Wall Street Journal(wsj) Theme

Select the **wsj** theme from the **additional theme**. Wait until the plot is changed. Press the **download pdf** button to download figure as a pdf file. Press the **save to Multiplot** button.



1.3 Make a Multiplot

Press the **Multiplot**(green rectangle) tab in the main menu.



The code for four plots are placed in the left upper(1), left lower(2), right upper(3), and the right lower(4) parts of screen respectively. The viewport selected are LUQ(left upper quadrant), LLQ(left lower quadrant), RUQ(right upper quadrant), and RLQ(right lower quadrant). The four codes for four plots are entered by pressing **save to Multiplot** button.

As you scroll down to the bottom of the screen, you can see the multiplot. But it looks different. Because the default width and height is 7 and 5 in. respectively. Change the width of the plot to 14 in. and the height to 10 in. and you can get this plot.

The screenshot shows a web browser window with the URL `198.74.50.54:3838/ggplot2m/`. At the top, there are two code editors. The left editor contains the following R code:

```
ggplot(data = df) +  
  aes(rank(),  
       geom_point() +  
       ggtitle("Staff Career and Salary") +  
       theme_classic())
```

The right editor contains:

```
ggplot(data = df) +  
  aes(rank(),  
       geom_point() +  
       ggtitle("Staff Career and Salary") +  
       theme_classic() +  
       theme_ws() +  
       scale_colour_ws())
```

Below the code editors is a control panel. It starts with a checked checkbox labeled 'Multiplot 만들기'. Underneath is a 'Multiplot Example' dropdown menu currently set to 'None'. There are three buttons: 'download Multiplot', 'download pdf', and 'download PPT'. To the right is a 'Multiplot size' section with a table:

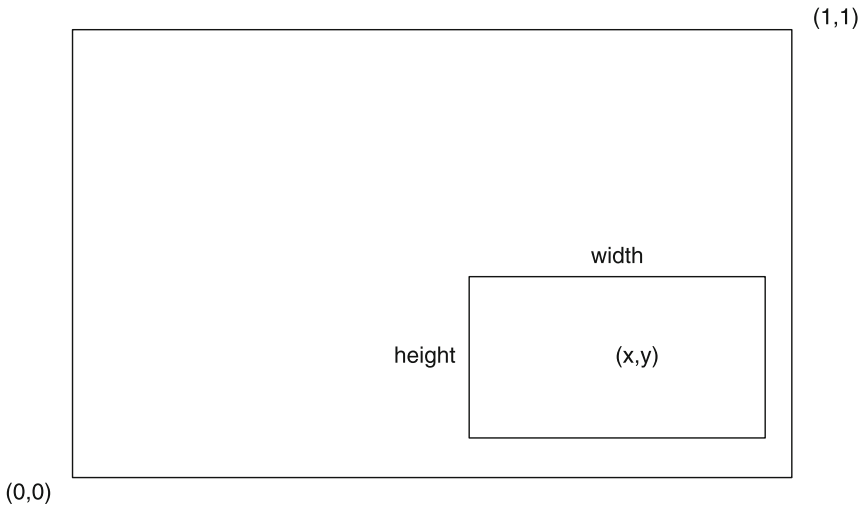
Plot width	Plot height	Resolution(ppi)
14	10	300

Below the table is a 'Units' dropdown menu set to 'in'. The bottom half of the page displays four scatter plots, labeled A, B, C, and D, all titled 'Staff Career and Salary'. The y-axis is 'salary' (ranging from 50,000 to 200,000) and the x-axis is 'yrs.since.phd' (ranging from 0 to 40). The data points are colored by rank: AssProf (red), AssocProf (green), and Prof (blue). Plot A is the default size. Plot B is larger. Plot C has a light blue background and a legend. Plot D has a light yellow background and a legend.

You can save the multiplot by pressing the **download Multiplot** button or download as a ppt file by pressing the **download PPT** button.

1.3.1 Adjust of the Viewport

The whole screen width is defined from 0 to 1 and the height is defined from 0 to 1 too. Each viewport is defined as x , y position of center, width, and length. The full viewport is defined as $x = 0.5$, $y = 0.5$, width = 1 and height = 1. Left upper quadrant is defined as $x = 0.25$, $y = 0.75$, width = 0.5 and height = 0.5. The upper which is the sum of LUQ and RUQ is defined as $x = 0.5$, $y = 0.75$, width = 1, height = 0.5. The full, upper, lower, left, right, LUQ, LLQ, and RUQ are predefined for your convenience. The viewports used for inset LUQs(LUQ small) or LLQs are also predefined. You can adjust the viewport by yourself when you need the fine control of viewports.



1.3.2 Multiplot Examples

You can select one of the **Multiplot example** and see how the layout and viewports of the multiplot changes.

