

# Creating Slides

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<sup>1</sup>My University is somewhere in the middle of nowhere

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👉 Read instructions in left panel

# Contents

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2. Variety of Content Types to Display
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9. Code to Generate Slides

☰ Show Code

## Introduction

To see how commands work, use `Slides.docs()` to see the documentation. Here we will focus on using all that functionality to create slides.



### Note

This is inline markdown parsed by magic

Version: 3.4.3 as executed from below code in markdown.

Python

```
1 # get the slides instance under a python block in Markdown file, we will
2 myslides = get_slides_instance()
3 import ipyslides as isd
4 version = myslides.version
5 %xmd ##### This is inline markdown parsed by magic {.note .warning}
```

I was added at end by a given proxy, see the how it was done at the end of the slides

## IPySlides Online Running Sources



### Note

- Edit on Kaggle
- Launch example Notebook [launch binder](#)
- Watch a Youtube Video

1. Add references like this per slide. Use slides.cite() or in markdown citekey to add citations generally. ↵

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## IPython Display Objects

Any object with following methods could be in `write` command:

`_repr_pretty_, _repr_html_, _repr_markdown_, _repr_svg_, _repr_png_,  
_repr_jpeg_, _repr_latex_, _repr_json_, _repr_javascript_, _repr_pdf_` Such as  
`IPython.display.[HTML,SVG,Markdown,Code]` etc. or third party such as  
`plotly.graph_objects.Figure`.

## Plots and Other Data Types

These objects are implemented to be writable in `write` command:

`matplotlib.pyplot.Figure, altair.Chart, pygal.Graph, pydeck.Deck,  
pandas.DataFrame, bokeh.plotting.Figure, IPython.display.Image` Many will be  
extended in future. If an object is not implemented, use `display(obj)` to show  
inline or use library's specific command to show in Notebook outside `write`.

# Interactive Widgets

## Any object in ipywidgets

Link to ipywidgtes right here using textbox command

or libraries based on ipywidgtes such as bqplot,ipyvolume,plotly's FigureWidget<sup>1</sup>

(reference at end) can be included as well.

## Commands which do all Magic!

`Slides.write(*objs, widths=None)`

Write objs to slides in columns. To create rows in a column, wrap objects in a list or tuple.

You can optionally specify widths as a list of percentages for each column.

Write any object that can be displayed in a cell with some additional features:

- Strings will be parsed as as extended markdown that can have citations/python code blocks/Javascript etc.
- Display another function in order by passing it to a lambda function like `lambda: func()`. Only body of the function will be displayed/printed. Return value will be ignored.
- Dispaly IPython widgets such as ipywidgets or ipyvolume by passing them directly.
- Display Axes/Figure form libraries such as matplotlib, plotly altair, bokeh, ipyvolume ect. by passing them directly.
- Display source code of functions/classes/modules or other languages by passing them directly or using `Slides.source` API.
- Use `Slides.alt(widget, func)` function to display widget on slides and alternative content in exported slides/report, function should return possible HTML representation of widget.
- `ipywidgets.HTML` and its subclasses will be displayed as `Slides.alt(widget, html_converter_func)`. The value of exported HTML will be most recent.
- Other options include but not limited to:
  - Output of functions in `ipyslides.utils` module that are also linked to `Slides` object.

- PIL images, SVGs etc.
- IPython display objects such as Image, SVG, HTML, Audio, Video, YouTubeVideo, IFrame, Latex, Markdown, JSON, Javascript, etc.
- Any object that has a `_repr_html_` method, you can create one for your own objects/third party objects by:
  - Slides.serializer API. Use its `.get_metadata` or `.display` method to display object as it is and export its HTML representation from metadata when used as `display(obj, metadata = {'text/html': 'html repr by user' or by serializer.get_metadata(obj)'})` or `serializer.display(obj)`.
  - IPython.core.formatters API for third party libraries.

### Note

- `write` is a robust command that can handle most of the cases. If nothing works, `repr(obj)` will be displayed.
- You can avoid `repr(obj)` by `lambda: func()` e.g. `lambda: plt.show()`.
- You can use `display(obj, metadata = {'text/html': 'html repr by user'})` for any object to display object as it is and export its HTML representation in metadata.
- A single string passed to `write` is equivalent to `parse` command.
- You can add mini columns inside a column by markdown syntax or `Slides.cols`, but content type is limited in that case.

## Slides.parse(xmd, display\_inline=True, rich\_outputs=False)

Parse extended markdown and display immediately. If you need output html, use `display_inline = False` but that won't execute python code blocks. Precedence of content return/display is `rich_outputs = True > display_inline = True > parsed_html_string`.

### Example

```

1 ````python run var_name
2 #If no var_name, code will be executed without assigning it to any variable
3 import numpy as np
4 ```
5 # Normal Markdown {.report-only}
6 ````multicol 40 60
7 # First column is 40% width

```

```
8 If 40 60 was not given, all columns will be of equal width, this paragra
9 {.info}
10 +++
11 # Second column is 60% wide
12 This \{\{var_name\}\} is code from above and will be substituted with the
13 ``
14
15 ````python
```

## Info

- Each block can have class names (separated with space or .) after all other options such as python .friendly or multicol .Success.info.
  - For example, python .friendly will be highlighted with friendly theme from pygments.
  - Pygments themes, however, are not supported with multicol.
  - You need to write and display CSS for a custom class.
- The block with ::: class\_type syntax accepts extra classes in quotes, for example ::: multicol "Success" "info".
- There are three special CSS classes report-only, slides-only and export-only that control appearance of content in different modes.

## Alert

Nested blocks are not supported.

## Info

- Find special syntax to be used in markdown by Slides.xmd\_syntax.
- Use Slides.extender or ipyslides.xmd.extender to add markdown extensions.

## Python

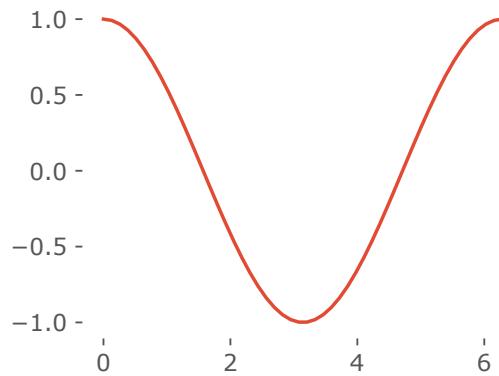
```
1 with last.proxies[0].capture():
2     write([slides.classe(slides.doc(write, 'Slides'), 'block-green'), slide
3 + 1 more lines ...
```

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## Plotting with Matplotlib



Python

```
1 import numpy as np, matplotlib.pyplot as plt
2 plt.rcParams['svg.fonttype'] = 'none' # Global setting, enforce same font
3 x = np.linspace(0,2*np.pi)
4 with plt.style.context('ggplot'):
5     fig, ax = plt.subplots(figsize=(3.4,2.6))
6     _ = ax.plot(x,np.cos(x))
7 write([ax, s.focus_lines([1,3,4])])
```

# Writing Pandas DataFrame

	sepal_length	sepal_width	petal_length	petal_width
count	150.000000	150.000000	150.000000	150.000000
mean	5.843333	3.057333	3.758000	1.199333
std	0.828066	0.435866	1.765298	0.762238
min	4.300000	2.000000	1.000000	0.100000
25%	5.100000	2.800000	1.600000	0.300000
50%	5.800000	3.000000	4.350000	1.300000
75%	6.400000	3.300000	5.100000	1.800000
max	7.900000	4.400000	6.900000	2.500000

Python

```
1 try:  
2     import pandas as pd  
3     df = pd.read_csv('https://raw.githubusercontent.com/mwaskom/seaborn-c  
4     df = df.describe() #Small for display  
5 except:  
6     df = '### Install `pandas` to view output'
```

# Writing Plotly Figure

## Install plotly to view output

Python

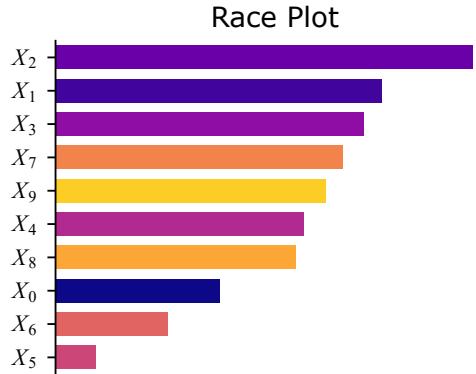
```
1 try:  
2     import plotly.graph_objects as go  
3     fig = go.Figure()  
4     fig.add_trace(go.Bar(y=[1,5,8,9]))  
5 except:  
6     fig = '### Install `plotly` to view output'
```

# Interactive Apps with Widgets

Use ipywidgets, bqplot,ipyvolume, plotly Figurewidget etc. to show live apps like this!

 Tip

| Export to Slides/Report to see what happens to this slide and next slide!



A Silly Plot

Python

```
1 import ipywidgets as ipw
2
3 write('''
4     ## Interactive Apps with Widgets section`Interactive Widgets`
5     Use `ipywidgets`, `bqplot`, `ipyvolume`, `plotly Figurewidget` etc. to
6     ::: note-tip
7         Export to Slides/Report to see what happens to this slide and nex
8     ''')
9 plot_html = ipw.HTML('Plot will be here')
10 button = ipw.Button(description='Click me to update race plot', layout=ipw
11
12 write([plot_html, button], src)
13
14 def update_plot(btn):
15     plot_html.value = race_plot().value #Convert to html string
```

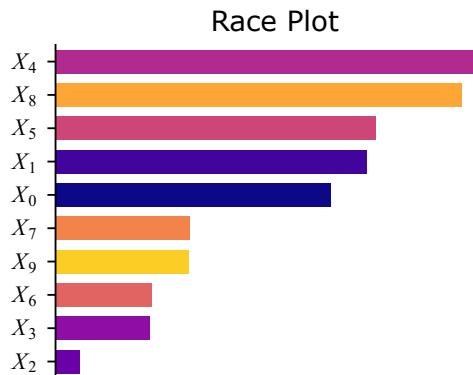
Python

```
1 def race_plot():
2     import numpy as np
3     import matplotlib.pyplot as plt
4
5     x = np.linspace(0, 0.9, 10)
6     y = np.random.random((10,))
7     _sort = np.argsort(y)
8
9     plot_theme = 'dark_background' if 'Dark' in slides.settings.theme_dd_
10    with plt.style.context(plot_theme):
11        fig, ax = plt.subplots(figsize=(3.4, 2.6))
```

```
12         ax.barrh(x,y[_sort],height=0.07,color = plt.colormaps['plasma'](x)
13
14     for s in ['right','top','bottom']:
15         if s == 'right':
```

## Dynamic Content without Widgets

Use refresh button below to update plot! Compare with previous slide!



A Silly Plot

Python

```
1 write('''
2     ## Dynamic Content without Widgets
3     Use refresh button below to update plot! Compare with previous slide!
4 ''')
5
6 def display_plot(): return race_plot().display()
7
8 write(lambda: slides.on_refresh(display_plot), rslide.get_source()) # Only
9 slides.source.from_callable(race_plot).display()
```

Python

```
1 def race_plot():
2     import numpy as np
3     import matplotlib.pyplot as plt
4
5     x = np.linspace(0,0.9,10)
6     y = np.random.random((10,))
7     _sort = np.argsort(y)
8
9     plot_theme = 'dark_background' if 'Dark' in slides.settings.theme_dd.
10    with plt.style.context(plot_theme):
```

```
11     fig,ax = plt.subplots(figsize=(3.4,2.6))
12     ax.barh(x,y[_sort],height=0.07,color = plt.colormaps['plasma'](x)
13
14     for s in ['right','top','bottom']:
15         ax.spines[s].set_visible(False)
```

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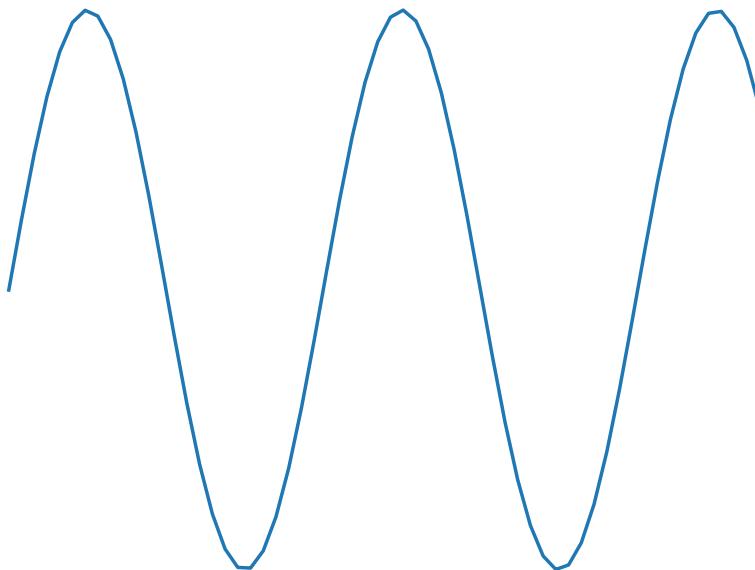
# This is Slide 16.0

and we are animating matplotlib

Python

```
1 fig, ax = plt.subplots()  
2 + 5 more lines ...
```

$$f(x) = \sin(x), 0 < x < 1$$



Python

```
1 + 5 more lines ...  
2 slides.notes.insert(f'## This is under @frames decorator!')
```

2

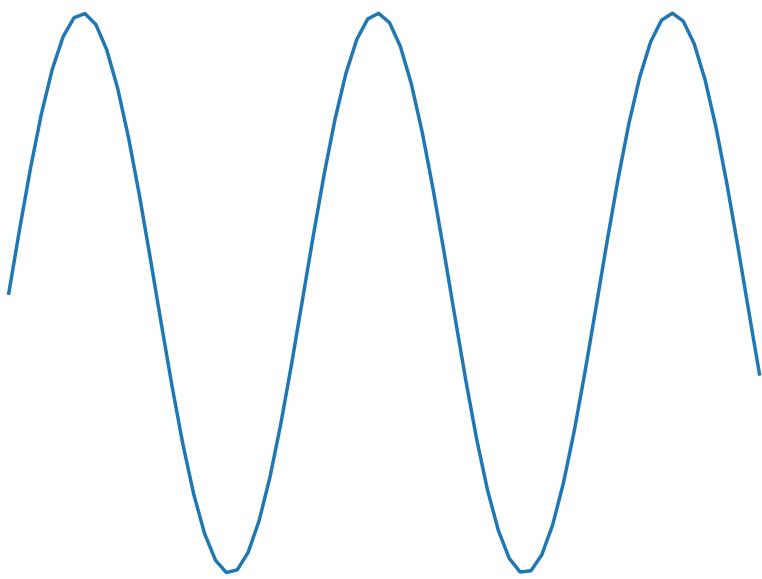
# This is Slide 16.1

and we are animating matplotlib

Python

```
1 + 1 more lines ...
2 x = np.linspace(0,obj+1,50+10*(idx+1))
3 + 4 more lines ...
```

$$f(x) = \sin(x), 0 < x < 2$$



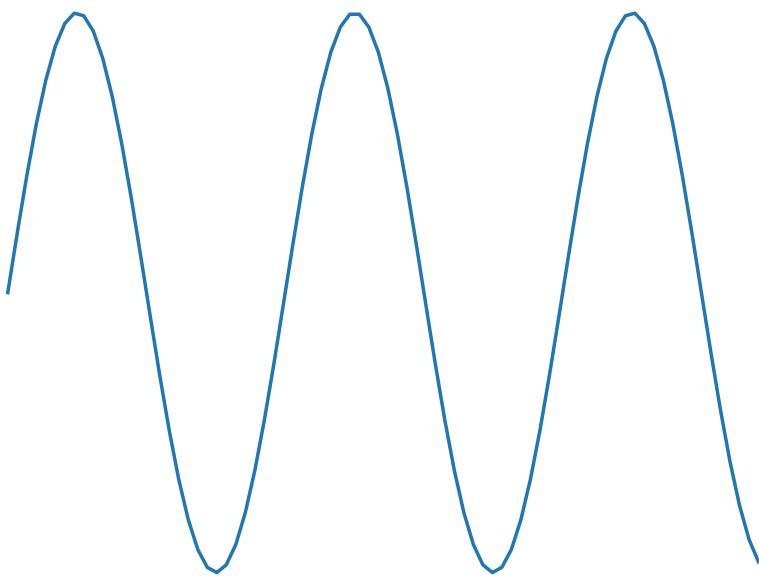
# This is Slide 16.2

and we are animating matplotlib

Python

```
1 + 2 more lines ...
2 ax.plot(x,np.sin(x));
3 + 3 more lines ...
```

$$f(x) = \sin(x), 0 < x < 3$$



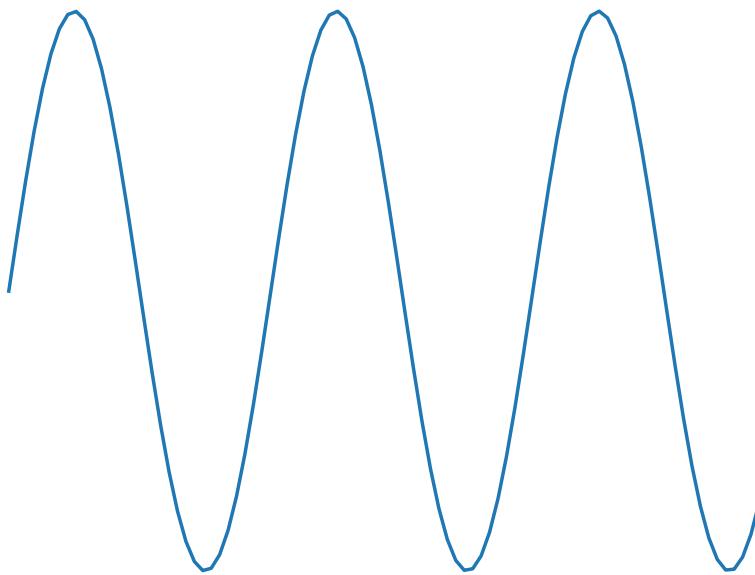
# This is Slide 16.3

and we are animating matplotlib

Python

```
1 + 3 more lines ...
2 ax.set_title(f'$f(x)=\sin(x)$, $0 < x < {idx+1}$')
3 + 2 more lines ...
```

$$f(x) = \sin(x), 0 < x < 4$$



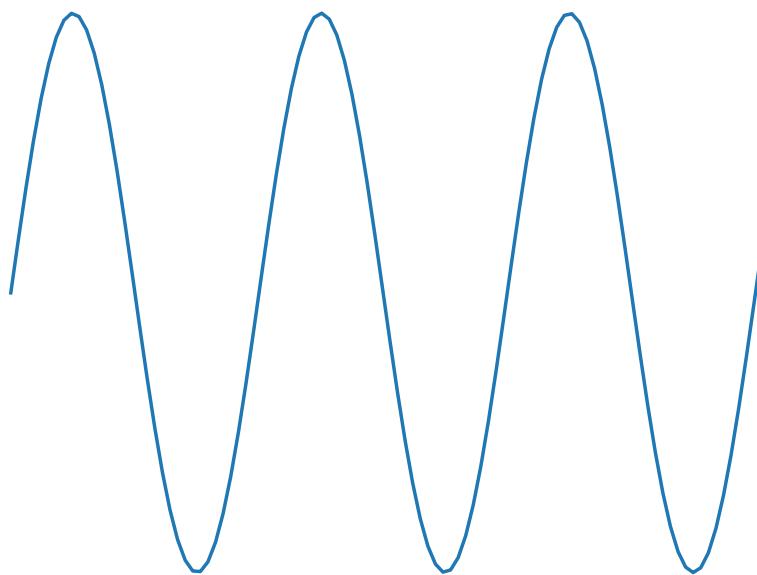
# This is Slide 16.4

and we are animating matplotlib

Python

```
1 + 4 more lines ...
2 ax.set_axis_off()
3 + 1 more lines ...
```

$$f(x) = \sin(x), 0 < x < 5$$



2

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# Frames with

**repeat = False**

1

# Frames with

**repeat = False**

2

# Frames with

**repeat = False**

3

# Frames with

**repeat = False**

4

# Frames with

**repeat = True and Fancy Bullet List**



1

# Frames with

**repeat = True and Fancy Bullet List**



1



2

# Frames with

**repeat = True and Fancy Bullet List**



1



2



3

# Frames with

**repeat = True and Fancy Bullet List**



1



2



3



4

## Frames with

```
repeat = [(0,1),(2,3)]
```

1

2

Python

```
1 slides.write('# Frames with \n#### `repeat = [(0,1),(2,3)]`')
2 slides.write(*obj)
```

## Frames with

```
repeat = [(0,1),(2,3)]
```

3

4

Python

```
1 slides.write('# Frames with \n#### `repeat = [(0,1),(2,3)]`')
2 slides.write(*obj)
```

# Displaying image from url from somewhere in Kashmir (شیخ)



Python

```
1 backward_skipper.display()
2 forward_skipper.set_target()
3 slides.format_css({'.goto-button .fa.fa-minus': slides.icon('arrow',color
4 slides.write('## Displaying image from url from somewhere in Kashmir colo
5 try:
6     slides.image(r'https://assets.gqindia.com/photos/616d2712c93aeaf2a32d
7 except:
8     slides.write('Could not retrieve image from url. Check internet connec
9 s.get_source().display()
```

## Watching Youtube Video?

Want to do some drawing instead? Click on pencil icon and draw something on tldraw!

## IPySlides-Demo



Python

```
1 write(f"### Watching Youtube Video?")
2 write(**Want to do some drawing instead?**\nClick on pencil icon and dra
3
4 write(YouTubeVideo('thgLG14-tg',width='100%',height='266px'))
5
6 @slides.on_load
7 def push():
8     t = time.localtime()
9     slides.notify(f'You are watching Youtube at Time-{t.tm_hour:02}:{t.tm
10
11 ys.get_source().display()
```

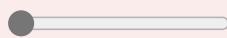
## Block API

New block API is as robust as `write` command. On top of it, it makes single unit of related content.

## Table

h1	h2	h3
d1	d2	d3
r1	r2	r3

## Widgets



Click to do nothing

Python

```

1 write('## Block API\nNew `block` API is as robust as `write` command. On
2 slides.block_red(
3     [
4         '### Table',
5         '''
6         |h1|h2|h3|
7         |-----|
8         |d1|d2|d3|
9         |r1|r2|r3|
10        ''',
11    ],
12    [
13        '### Widgets',
14        slides.alt(ipw.IntSlider(),lambda w: f'<input type="range" min="0" max="100">',lambda: display(ipw.Button(description='Click to do nothing')),met
15

```

## *LATEX* in Slides

### ⚠ Alert

Use \$ \$ or \$\$ \$\$ to display latex in Markdown, or embed images of equations *LATEX* needs time to load, so keeping it in view until it loads would help.

$$\int_0^1 \frac{1}{1-x^2} dx$$

### Python

```

1 slides.write('## Built-in CSS styles')
2 slides.css_styles.display()

```

## Built-in CSS styles

Use any or combinations of these styles in className argument of writing functions:

---

className	Formatting Style
-----------	------------------

---

'align-center'	-----Text-----
'align-left'	Text-----
'align-right'	-----Text
'rtl'	----- عربی، اردو
'info'	Blue text. Icon  for note-info class.

'tip'	Blue Text. Icon  for note-tip class.
'warning'	Orange Text. Icon  for note-warning class.
'success'	Green text. Icon  for note-success class.
'error'	Red Text. Icon  for note-error class.
'note'	 Text with note icon.
'slides-only'	Text will not appear in exported html report.
'report-only'	Text will not appear on slides. Use to fill content in report.

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## Serialize Custom Objects to HTML

This is useful for displaying user defined/third party objects in slides

0  
1  
2  
3  
4  
5  
6  
7  
8  
9

Python

```

1 slides.write('## Serialize Custom Objects to HTML\nThis is useful for dis
2 with slides.suppress_stdout(): # suppress stdout from register fuction be
3     @slides.serializer.register(int)
4     def colorize(obj):

```

```

5         color = 'red' if obj % 2 == 0 else 'green'
6         return f'{color}'>{obj}</span>
7     slides.write(*range(10))
8
9 some_slide.get_source().display()

```

## This is all code to generate slides

Python

```

1 def demo(self):
2     "Demo slides with a variety of content."
3     self.close_view() # Close any previous view to speed up loading 10x if
4     self.clear() # Clear previous content
5
6     with self.set_dir(os.path.split(__file__)[0]):
7         file = '../_demo.py'
8         raw_source = self.source.from_file(file).raw
9         N = raw_source.count('auto.') + raw_source.count('\n---') + 1 # Create
10        self.create(*range(N)) # Create slides first, this is faster
11        self.shell.run_line_magic('run', file) # Run demo in same namespace
12
13    return self #_demo.demo(self) # Run demo

```

e:\development\ipyslides\ipyslides\\_demo.py

```

1 # Author: Abdul Saboor
2 # This demonstrates that you can generate slides from a .py file too, which
3 import time
4
5 from ipyslides.core import Slides
6 from ipyslides.writer import write
7 from ipyslides.formatters import libraries, __reprs__, plt2html
8
9
10 slides = Slides() # It returns running slides instance or creates a new one
11
12 auto = slides.AutoSlides() # Does not work inside Jupyter notebook (should
13
14 slides.settings.set_footer('Author: Abdul Saboor (عبدالصبور')
15 slides._citation_mode = 'global' # This could be changed by other functions

```



Slides keep their full code if they are not made by @frames decorator!

# Source Code

Markdown: Slide 0

```
1 # Creating Slides
2 :::: align-center
3     alert`Abdul Saboor`sup`1` , Unknown Authorsup`2`
4     center`today```
5 :::: text-box
6     sup`1`My University is somewhere in the middle of nowhere
7     sup`2`Their University is somewhere in the middle of nowhere
8 <h4 style=""color:green;">  Read instructions in left panel</h4>
```

Markdown: Slide 1

## 1 section`Introduction` toc`### Contents`

Markdown: Slide 2

```
1 proxy`something will be here in start`  
2 # Introduction  
3 To see how commands work, use `Slides.docs()` to see the documentation.  
4 Here we will focus on using all that functionality to create slides.  
5 ````python run source  
6 # get the slides instance under a python block in Markdown file, we will  
7 myslides = get_slides_instance()  
8 import ipyslides as isd  
9 version = myslides.version  
10 %xmd ##### This is inline markdown parsed by magic {.note .warning}  
11 ````  
12 Version: {{version}} as executed from below code in markdown.  
13 {{source}}  
14 proxy`something will be here in end`
```

Markdown: Slide 3

```
1 # IPySlides Online Running Sources
2 :::: note
3 - [Edit on Kaggle](https://www.kaggle.com/massgh/ipyslides)
4 - Launch example Notebook ![[Binder]](https://mybinder.org/badge_logo)
5 - Watch a [Youtube Video](https://www.youtube.com/watch?v=ytfWIYbJteF
```

```
6
7 [^1]: Add references like this per slide. Use slides.cite() or in markdown
```

Markdown: Slide 4

```
1 section`Variety of Content Types to Display` toc`### Contents`
```

Markdown: Slide 5

```
1 ## IPython Display Objects
2 ##### Any object with following methods could be in`write` command:
3 `__repr_pretty__`, `__repr_html__`, `__repr_markdown__`, `__repr_svg__`, `__repr_ip__
4 Such as color[fg=navy,bg=skyblue]`IPython.display.[HTML,SVG,Markdown,C
```

Markdown: Slide 6

```
1 ## Plots and Other **Data**{style='color:var(--accent-color);'} Types
2 ##### These objects are implemented to be writable in `write` command:
3 `matplotlib.pyplot.Figure`, `altair.Chart`, `pygal.Graph`, `pydeck.Deck`,
4 Many will be extended in future. If an object is not implemented, u
5 command to show in Notebook outside color[fg=teal,bg=whitesmoke]`write
```

Markdown: Slide 7

```
1 ## Interactive Widgets
2 ##### Any object in `ipywidgets`<span class='text-box' style = 'display:inline-block; width: 100%; border: 1px solid #ccc; padding: 2px; border-radius: 5px;'> can be included as well.
3 or libraries based on ipywidgtes such as color[red]`bqplot`,color[gree
4 can be included as well.
5 {.warning}
```

Markdown: Slide 8

```
1 ## Commands which do all Magic!
2 proxy`Add functions here`
```

Markdown: Slide 9

```
1 section`Plotting and DataFrame` toc`
```

Python: Slide 10

```
1 write('## Plotting with Matplotlib')
2 with slides.source.context(auto_display = False) as s:
3     import numpy as np, matplotlib.pyplot as plt
4     plt.rcParams['svg.fonttype'] = 'none' # Global setting, enforce same
5     x = np.linspace(0,2*np.pi)
6     with plt.style.context('ggplot'):
7         fig, ax = plt.subplots(figsize=(3.4,2.6))
```

```
8         _ = ax.plot(x,np.cos(x))
9     write([ax, s.focus_lines([1,3,4])])
10
11 sl.set_css({'background':'linear-gradient(to right, #FFDAB9 0%, #F0E68C 1
```

Python: Slide 11

```
1 write(['## Writing Pandas DataFrame', df, source])
```

Python: Slide 12

```
1 write(['## Writing Plotly Figure',fig, s])
```

Python: Slide 13

```
1 with slides.source.context(auto_display = False) as src:
2     import ipywidgets as ipw
3
4     write('''
5         ## Interactive Apps with Widgets section`Interactive Widgets`
6         Use `ipywidgets`, `bqplot`, `ipyvolume`, `plotly Figurewidget` etc
7         ::: note-tip
8             Export to Slides/Report to see what happens to this slide and
9         ''')
10    plot_html = ipw.HTML('Plot will be here')
11    button = ipw.Button(description='Click me to update race plot',layout=
12
13    write([plot_html,button], src)
14
15    def update_plot(btn):
```

Python: Slide 14

```
1 write('''
2     ## Dynamic Content without Widgets
3     Use refresh button below to update plot! Compare with previous slide!
4 ''')
5
6 def display_plot(): return race_plot().display()
7
8 write(lambda: slides.on_refresh(display_plot), rslide.get_source()) # Only
9 slides.source.from_callable(race_plot).display()
```

Markdown: Slide 15

```
1 section`Simple Animations with Frames` toc`### Contents`
```

Markdown: Slide 17

```
1 section`Controlling Content on Frames` toc`### Contents`
```

Python: Slide 21

```
1 backward_skipper.display()
2 forward_skipper.set_target()
3 slides.format_css({'.goto-button .fa.fa-minus': slides.icon('arrow',color
4 slides.write('## Displaying image from url from somewhere in Kashmir colo
5 try:
6     slides.image(r'https://assets.gqindia.com/photos/616d2712c93aeaf2a32d
7 except:
8     slides.write('Could not retrieve image from url. Check internt connec
9 s.get_source().display()
```

Python: Slide 22

```
1 write(f"## Watching Youtube Video?")
2 write('**Want to do some drawing instead?**\nClick on pencil icon and dra
3
4 write(YouTubeVideo('thgLG14-tg',width='100%',height='266px'))
5
6 @slides.on_load
7 def push():
8     t = time.localtime()
9     slides.notify(f'You are watching Youtube at Time-{t.tm_hour:02}:{t.tm
10
11 ys.get_source().display()
```

Python: Slide 23

```
1 write('## Block API\nNew `block` API is as robust as `write` command. On
2 slides.block_red(
3     [
4         '## Table',
5         '',
6         '|h1|h2|h3|',
7         '|---|---|---|',
8         '|d1|d2|d3|',
9         '|r1|r2|r3|',
10        '',
11    ],
12    [
```

```
13     '### Widgets',
14     slides.alt(ipw.IntSlider(),lambda w: f'<input type="range" min="1' + str(w) + '" max="100">')
```

Markdown: Slide 24

```
1 ## $\LaTeX$ in Slides
2 Use `$$` or `$$` to display latex in Markdown, or embed images of e
3 $\LaTeX$ needs time to load, so keeping it in view until it loads woul
4 {.note-warning}
5
6 $$\int_0^1 \frac{1}{1-x^2} dx$$
```

Python: Slide 25

```
1 slides.write('## Built-in CSS styles')
2 slides.css_styles.display()
```

Markdown: Slide 26

```
1 section`Custom Objects Serilaization` toc`### Contents`
```

Python: Slide 27

```
1 slides.write('## Serialize Custom Objects to HTML\nThis is useful for dis
2 with slides.suppress_stdout(): # suppress stdout from register fuction be
3     @slides.serializer.register(int)
4     def colorize(obj):
5         color = 'red' if obj % 2 == 0 else 'green'
6         return f'<span style="color:{color};">{obj}</span>'
7     slides.write(*range(10))
8
9 some_slide.get_source().display()
```

Python: Slide 28

```
1 slides.write('## This is all code to generate slides section`Code to Gene
2 slides.source.from_callable(slides.demo).display()
3 slides.source.from_file(__file__).display()
```

Python: Slide 29

```
1 slides.write('Slides keep their full code if they are not made by @frames
2 slides.get_source().display()
```

## Reference via Markdown

1. This is refernce to FigureWidget using slides.cite command

## 2. I was cited for no reason

Python

```
1 slides.write('citations`## Reference via Markdown\n---\n')  
2 bib_slide.get_source().display()
```