LaTeX Example #1

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2023-01-03

1 First section

We can use the listing package to place source code into our documents from a file:

```
#
# A Rangoli Generator
#
# Author: Jeremy Pedersen
# Date: 2019-02-18
# License: "the unlicense" (Google it)
#

# Define letters for use in rangoli
alphabet = 'a b c d e f g h i j k l m n o p q r s t u v w x y z'.split()

# Read in rangoli size
size = int(input("Set size of Rangoli: "))

# Calculate maximum linewidth (how much fill do we need per line)
maxWidth = size * 2 - 1 + (size - 1) * 2

# Generate rangoli
for i in list(range(size - 1, 0, -1)) + list(range(0, size)):
  left = alphabet[1 + i : size]
  left.reverse()
  right = alphabet[0 + i : size]

  center = '-'.join(left + right)

  padding = '-' * ((maxWidth - len(center)) // 2)

  print(padding + center + padding)

```

Listing 1: Rangoli generator

Or we can quote a range of line numbers from the file (lines 19 and 20, for example):

```
for i in list(range(size - 1, 0, -1)) + list(range(0, size)):
  left = alphabet[1 + i : size]
```

Listing 2: Rangoli generator specific part

We can also place code directly into latex without importing it from a file:

```
print("Hi, I'm Python 3!")
```

Listing 3: Python example

1.1 First subsection

We can create and format mathematical expressions like so:

$$\begin{aligned} x' &= x \cdot s\cos(\theta) - y \cdot s\sin(\theta) + t_x \\ y' &= x \cdot s\sin(\theta) + y \cdot s\cos(\theta) + t_y \end{aligned} \tag{1}$$

We can also make a nice list:

1. I am the first thing in the list
2. I am the second thing in the list

Reference the previous equation with (**??**).
We can inline mathematical expressions such as this one "$4\sigma_0$" using the "$" sign. We can make mathematical expressions that occupy their own line, like this:

$$u = (x - x_0)\frac{1}{4\sigma_0}\cos(\theta_0) - (y - y_0)\frac{1}{4\sigma_0}\sin(\theta_0) + 4 = (0 - 16)\frac{1}{4} - 0 + 4$$

1.2 Second subsection

We can also make tables and charts using the array type like so.

Let θ_0 be a fixed, nonnegative real number smaller than 2π, let ϕ be a function of the real variable $\theta \in [0, 2\pi)$ defined as follows:

$$\phi(\theta) = \begin{cases} \theta_0 + \theta & \text{if } \theta_0 + \theta \in [0, 2\pi) \\ \theta_0 + \theta + 2\pi & \text{if } \theta_0 + \theta < 0 \\ \theta_0 + \theta - 2\pi & \text{if } \theta_0 + \theta \geq 2\pi \end{cases}$$

I can start an enumerated list of items here...

1. One thing
2. Another thing

And then...

2 Second section

...I can continue it here!

3. Yet more stuff
4. Some other things

Inserting figures is also relatively easy to do:

Figure 1: I can embed images too

We can make a table with centered elements:

$$\begin{bmatrix} 1.1754 & -0.8334 & 193.4191 \\ 0.2062 & 1.0380 & -141.0333 \\ -0.0008 & 0.0007 & 1.0000 \end{bmatrix}$$

There you go! That should be enough to get you started on LaTeX!

Listings