Cover Page

This is a cover page.

TEX101: Introduction to FAST Template

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FAST

LaTeX Template

Abstract

This template demonstrates the baseline structure for FAST – the Coursework LaTeX toolkit focused on being Fast, Accessible, Stylish, and equipped as a Toolkit. Replace this text with your assignment abstract or a short summary of the work.

Contents

1 Introduction

This coursework template provides a clean starting point for producing reports and assignments using LaTeX.

It demonstrates a modular structure where metadata, configuration, and content live in clearly separated files.

Please confirm if LaTeX is acceptable for use with the module leader in advance.

1.1 Subsection Example

This section is designed to test the styling of subsections and subsubsections. You can also find the updated TOC (Table of Contents).

1.1.1 Subsubsection Example

TODO: If you notice me, you find the first customized command, `\todo{}`. You may use it to remind yourself of things to do.

2 Mathematics

Look, LaTeX supports math expressions by default! You can use inline math like $e^{i\pi} + 1 = 0$ or $a^2 + b^2 = c^2$ within `\(...\)` or `$...$`.

Or display full equations on their own line by using `\[...\]` or classically, using `$$...$$` like these:

$$\nabla \cdot \mathbf{E} = \frac{\rho}{\epsilon_0}$$

$$\int_a^b f(x)\,\mathrm{d}x = F(b) - F(a)$$

If you want to number equations for referencing, use the `equation` environment:

$$\sum_{i=1}^{n} \vec{F}_i = m \cdot \vec{a} \tag{1}$$

For multi-line derivations, use the `align` environment:

$$E = mc^2, \tag{2}$$

$$\frac{\mathrm{d}}{\mathrm{d}t} \int_V \rho \,\mathrm{d}V = -\int_S \rho \vec{v} \cdot \mathrm{d}\vec{S}. \tag{3}$$

3 Figures

Figure insertion is another basic and essential feature of LaTeX.However, the default syntax is quite verbose and not very user-friendly.

That's why **FAST** introduces some custom commands to simplify the process!
2 customized commands are provided for convenience.

3.1 `\picHere`: Full-featured figure insertion

`\picHere` wraps a full `figure` environment with caption and label support (4 arguments are required). (Figure 1 is an example.)
The following snippet and its output demonstrate how to use it:

```
1 \picHere{assets/images/github-icon.png}{0.8\textwidth}{Example figure included
    from external asset.}{fig:example-figure}
```

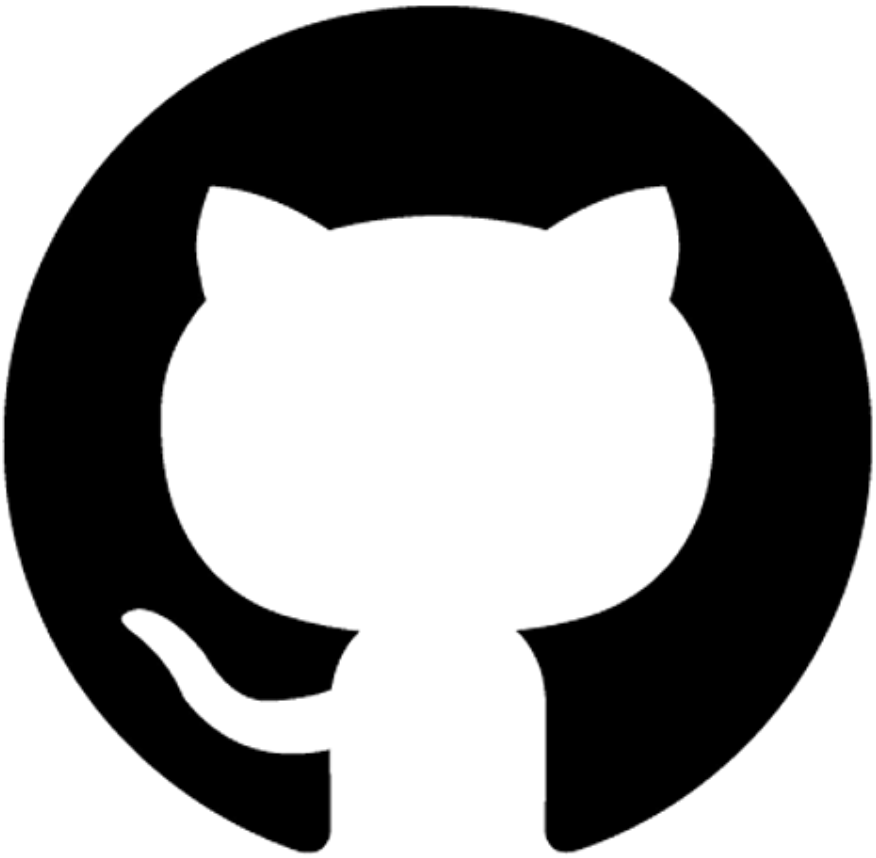
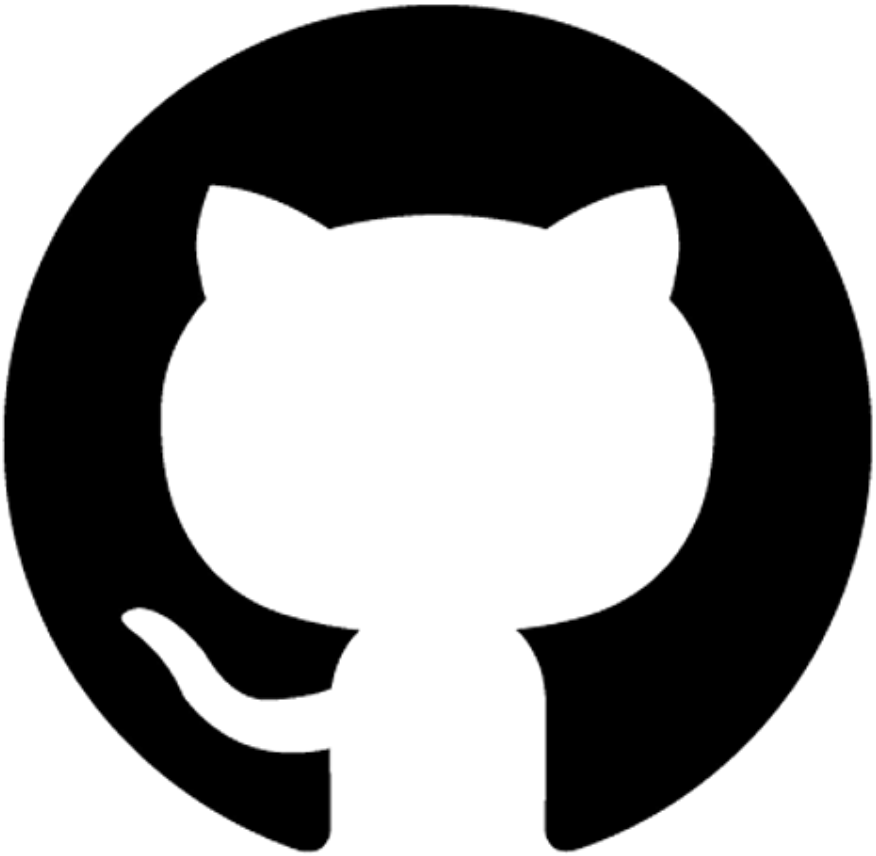


Figure 1: Example figure included from external asset.

3.2 \picHereSimple: Minimal decorative figure insertion

While \picHereSimple is a minimal drop-in for decorative images that do not require referencing. (No caption or label, just the image.)
The following snippet and its output demonstrate how to use it:

```
1    \picHereSimple{assets/images/github-icon.png}{0.8\textwidth}
```



4 Tables

Table, another essential feature of LaTeX, is supported via the `booktabs` package for better aesthetics. (Yes, the academic journal style!)

Refer to Table 1 for a simple `booktabs` example.

Table 1: Summary of template goals.

Goal	Description
FAST	Core — Quick compilation!
Accessible	Ready to use out of the box, easy to get started!
Stylish	Beautiful, no words needed!
Toolkit	Suitable for CW, practical, and sufficient!

5 Code Listings

Source code is rendered using the `listings` package with the default style defined in `config/style.tex`. Adjust `\TemplateCodeListingStyle` in `options.tex` to point to a different style.

Listing 1 demonstrates an inline listing embedded directly in the document for short examples. The more extensive Python and C++ modules now live in Appendix A.1, keeping the main narrative focused while still providing full source listings for reference.

Listing 1: Running total helper implemented in modern JavaScript.

```
export function runningTotal(values) {
  let total = 0;
  return values.map((value) => {
    total += value;
    return total;
  });
}

console.log(runningTotal([4, 8, 15, 16, 23, 42]));
```

6 Referencing (not References!)

Manage bibliography entries in `bib/references.bib`. The template uses `biblatex` with the `biber` backend for flexible citation styles.

You just need to use `\cite` to cite a reference [1]. And this command also support citing multiple references at once [1]–[3].

References

[1] D. E. Knuth, *The TEXbook*. Reading, MA: Addison-Wesley, 1990.

[2] S. Ahu, “A sample inbook,” in S. Ahu, Ed. Some Publisher, 2023, ch. 1, pp. 1–10.

[3] S. Ahu, “A sample article,” *Some Journal*, vol. 42, no. 1, 2023.

A Appendix Example

Appendices are input after `\appendix` is declared in `main.tex`. Use this space for supplementary derivations, raw data, or extended proofs that support the main text.

A.1 Supplementary Code Listings

The full Python and C++ utilities referenced in listing 1 are provided here for completeness.

Listing 2: Python helper for computing descriptive statistics.

```python
from statistics import median


def describe(values: list[float]) -> tuple[float, float]:
    mean = sum(values) / len(values)
    return mean, median(values)


if __name__ == "__main__":
    mean, med = describe([4, 8, 15, 16, 23, 42])
    print(f"mean={mean:.2f}, median={med}")
```

Listing 3: C++ program computing the arithmetic mean of a sample.

```cpp
#include <iostream>
#include <numeric>
#include <vector>

double mean(const std::vector<int>& data) {
    return std::accumulate(data.begin(), data.end(), 0.0) / data.size();
}

int main() {
    const std::vector<int> samples{4, 8, 15, 16, 23, 42};
    std::cout << "mean=" << mean(samples) << '\n';
}
```

A.2 Just some text

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exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat. Duis aute irure dolor in reprehenderit in voluptate velit esse cillum dolore eu fugiat nulla pariatur. Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.