# Your Presentation

You 韩喆

Where You're From

Date of Presentation

### Introduction

- ▶ Your introduction goes here! 是韩喆
- ▶ Use itemize to organize your main points.

### **Examples**

Some examples of commonly used commands and features are included, to help you get started.

# Tables and Figures

- 1. Use tabular for basic tables see Table 3, for example.
- 2. You can upload a figure (JPEG, PNG or PDF) using the files menu.
- To include it in your document, use the includegraphics command (see the comment below in the source code).

## Readable Mathematics

Let  $X_1, X_2, \ldots, X_n$  be a sequence of independent and identically distributed random variables with  $\mathsf{E}[X_i] = \mu$  and  $\mathsf{Var}[X_i] = \sigma^2 < \infty$ , and let

$$S_n = \frac{X_1 + X_2 + \dots + X_n}{n} = \frac{1}{n} \sum_{i=1}^{n} X_i$$

denote their mean. Then as n approaches infinity, the random variables  $\sqrt{n}(S_n - \mu)$  converge in distribution to a normal  $\mathcal{N}(0, \sigma^2)$ .

## Goal

Main goal that we want to prove.

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- ► Something more.

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- ▶ and more!.

## Goal

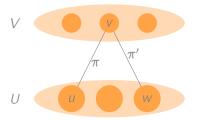
Main goal that we want to prove.

- ► Something.
- ► Something more.
- ▶ and more!.

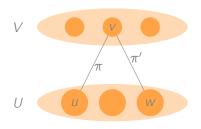
#### Relaxed Goal

relaxation

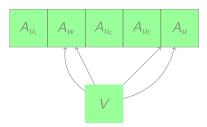
using Long Code Reduction



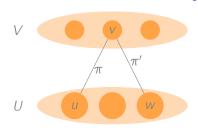
using Long Code Reduction



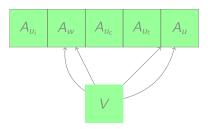
$$A_u: (\mathbb{F}_2)^{\mathbb{F}_2^{3r}} \to \mathbb{F}_2$$



#### using Long Code Reduction



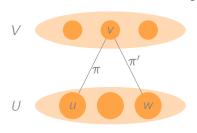
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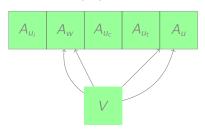
#### Query

- 1.  $A_u(e)$ ,  $A_u(e + f \circ \pi + 1 + \eta)$
- 2.  $A_w(e')$ ,  $A_w(e' + f \circ \pi' + \eta')$
- ▶ Where
  - 1.  $e, e' : \mathbb{F}_2^{3r} \to \{0, 1\}, f : \mathbb{F}_2^r \to \{0, 1\}$
  - 2.  $\eta$ ,  $\eta'$  from noise distribution.

#### using Long Code Reduction



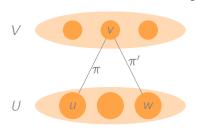
$$A_u: (\mathbb{F}_2)^{\mathbb{F}_2^{3r}} \to \mathbb{F}_2$$



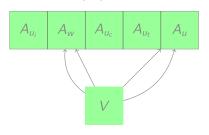
- Query
  - 1.  $A_u(e)$ ,  $A_u(e + f \circ \pi + 1 + \eta)$
  - 2.  $A_w(e'), A_w(e' + f \circ \pi' + \eta')$
- Where
  - 1.  $e, e' : \mathbb{F}_2^{3r} \to \{0, 1\}, f : \mathbb{F}_2^r \to \{0, 1\}$
  - 2.  $\eta$ ,  $\eta'$  from noise distribution.
- ► Correct proofs are Long Code encodings of labels to *U* given by

$$A_u = (f(a))_{f \in (\mathbb{F}_2)^{\mathbb{F}_2^{3r}}}$$

#### using Long Code Reduction



$$A_u: (\mathbb{F}_2)^{\mathbb{F}_2^{3r}} \to \mathbb{F}_2$$



Query

1. 
$$A_u(e)$$
,  $A_u(e + f \circ \pi + 1 + \eta)$ 

2. 
$$A_w(e'), A_w(e' + f \circ \pi' + \eta')$$

▶ Where

1. 
$$e, e' : \mathbb{F}_2^{3r} \to \{0, 1\}, f : \mathbb{F}_2^r \to \{0, 1\}$$

2.  $\eta$ ,  $\eta'$  from noise distribution.

► Correct proofs are Long Code encodings of labels to *U* given by

$$A_u = (f(a))_{f \in (\mathbb{F}_2)^{\mathbb{F}_2^{3r}}}$$

**Bottleneck!**: Proof size is  $2^{2^{3r}}n^r$ . Cannot go beyond  $r = O(\log \log n)$ .