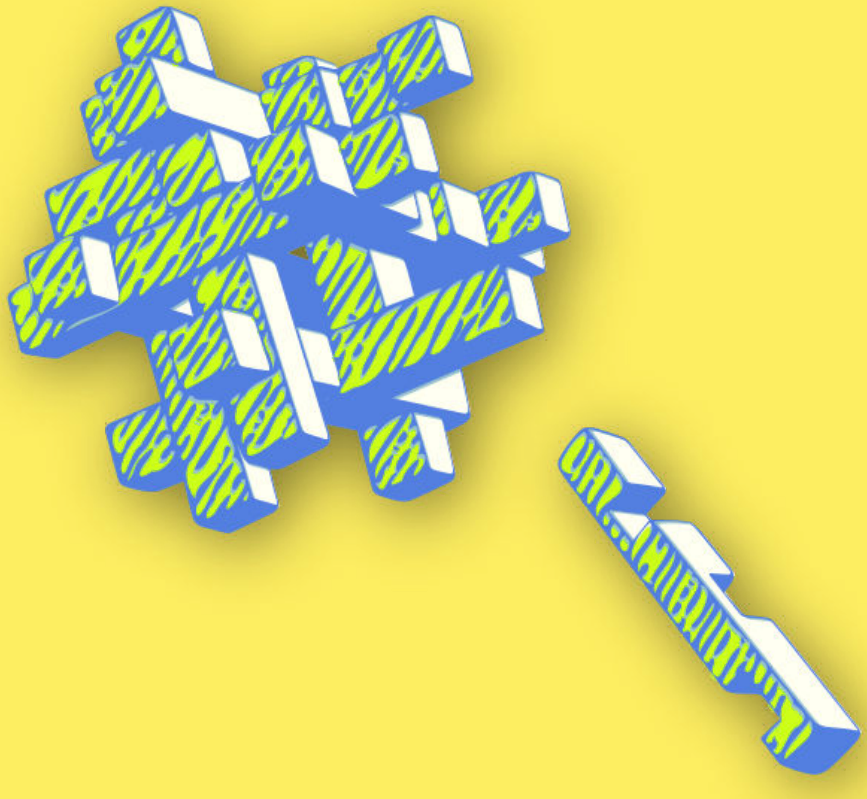
# CYBERWOMEN



## Encryption

# Introduction to encryption




https://iwpr.net/

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# Introduction to encryption

- **Objective(s):** To explain to participants the concept of encryption, as well as a brief overview of the different types of encryption available to users.
- **Length:** 50 minutes
- **Format:** Session
- **Skill level:** Intermediate
- **Required knowledge:**
  - Basic digital security concepts and/or previous training
- **Related sessions/exercises:**
  - Privacy[1]
  - Safe online campaigning[2]
  - Encrypted communication[3]
  - Storage and encryption[4]
- **Needed materials:**
  - Slides (with key points included below)
  - Laptop/Computer and Projector setup

[1] https://cyber-women.com/en/privacy/privacy/
[2] https://cyber-women.com/en/safe-online-advocacy/safe-online-campaigns/
[3] https://cyber-women.com/en/encryption/encrypted-communication/
[4] https://cyber-women.com/en/digital-security-basics-2/storage-and-encryption/

- Examples of encryption techniques (printed)

# Leading the session

## Part 1 - Have You Used Encryption Before?

1. Explain that this is an introductory session for encryption as a concept, so you will not yet be going into great depth on any of the encryption tools that participants have likely heard about before (GPG/PGP in particular).
2. Split participants up into pairs, and then start the session by demonstrating a few examples of encryption techniques. Here are a few examples that you can prepare ahead of time to share with the group:

#### The BLUEPRINTS Code

Each of the letters in the word Blueprints is assigned a number.

```
B  L  U  E  P  R  I  N  T  S
0  1  2  3  4  5  6  7  8  9
```

This is a specific example using a specific word, but can be broadly applied to any number and letter sequence - for instance, if you use the same system as above, the sequence of numbers 8 2 5 7 9 would spell T U R N S when “decrypted”.

You could also switch the order of the numbers, so that instead of the above sequence, it now goes:

```
B  L  U  E  P  R  I  N  T  S
9  8  7  6  5  4  3  2  1  0
```

In this instance, the sequence of numbers 8 2 5 7 9 would now spell L N P U B (which isn’t a word) when “decrypted”; however, you could now “decrypt” the sequence 4 3 2 0 6 as R I N S E.

**Old-Fashioned Text Messaging**

Use an image of an older-style phone keypad (see below) to demonstrate another kind of "encryption" that participants may be familiar with.


Old-Fashioned Text Messaging

Ask participants how they would use this keypad to spell different words – one example you could use would be to have each participant explain how they would use the keypad to spell their name. For instance, a participant named Luisa would spell her named by typing the sequence 5 5 5 8 8 4 4 4 7 7 7 7 2.

3. Once you've completed the above examples, ask participants if they have ever used other kinds of encryption – either like the above, or any other examples they can think of (e.g. a common instance of encryption used by many people every day is HTTPS).

4. Close this part of the session by following-up with another question: What are the common elements they can identify from these different examples of encryption?

## Part 2 - Explaining Encryption

5. Building on the common elements of encryption identified by participants in Part 1, you should now expand on some further basics and practices for the group:

   **Encryption Methods:** Take time to explain how encryption works, referring back to the examples from Part 1 as well as by showing a few example screenshots of what a GPG-encrypted email looks like. Highlight common implementations of encryption – in particular, spend time reviewing HTTPS, end-to-end encryption and GPG/PGP encryption.

   **Keys and Keypairs:** Explain how encryption keypairs work, and the algorithmic relationship between public and private keys. Go back through the example implementations previously mentioned (HTTPS, end-to-end and GPG/PGP) and explain for each of these where their respective keys are stored and/or visible to the user.

   **Encryption Practices:** Highlight some of the critical best practices associated with common implementations of encryption, such as fingerprint verification and key-signing. To demonstrate, ask participants to locate where within Signal one can verify another user's fingerprint; similarly, if participants already have GPG/PGP keys you can discuss the benefits and disadvantages of signing and distributing public keys. This is also a good time to discuss end-to-end encrypted messaging for chat apps such as Signal, Telegram and Whatsapp – remind participants that end-to-end encryption on some of these services is not always enabled by default.

   **Encrypted Backups:** Building off the GPG/PGP example above, ask participants whether they think it is a good idea to backup their GPG pri-

vate key, and if so, how might they go about doing so?

## References

- https://www.gnupg.org/gph/en/manual/book1.html