CESS

Cumulus Encrypted Storage System

CESS Course Week 2 - Episode 4

dAapp Development

Ink! Smart Contract

CESS Official Website

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dApp Development using Ink!

What is Ink!?

- Rust-based Language
- Compiles to WebAssembly (Wasm)
- Support for Complex Logic
- Runtime Environment

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Ink! Smart Contract

Flipper

Prerequisites

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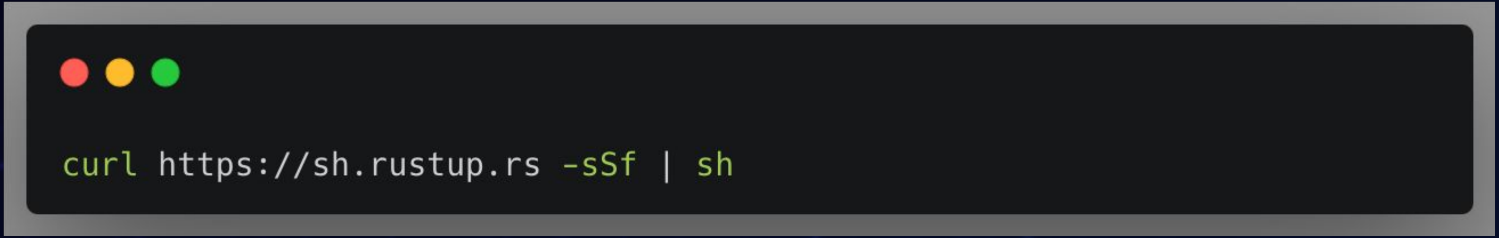
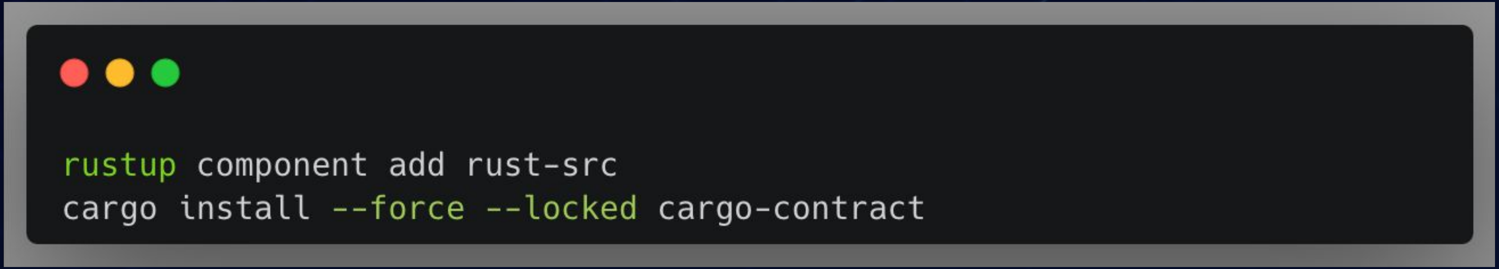
❖ Rust & Cargo



```
curl https://sh.rustup.rs -sSf | sh
```

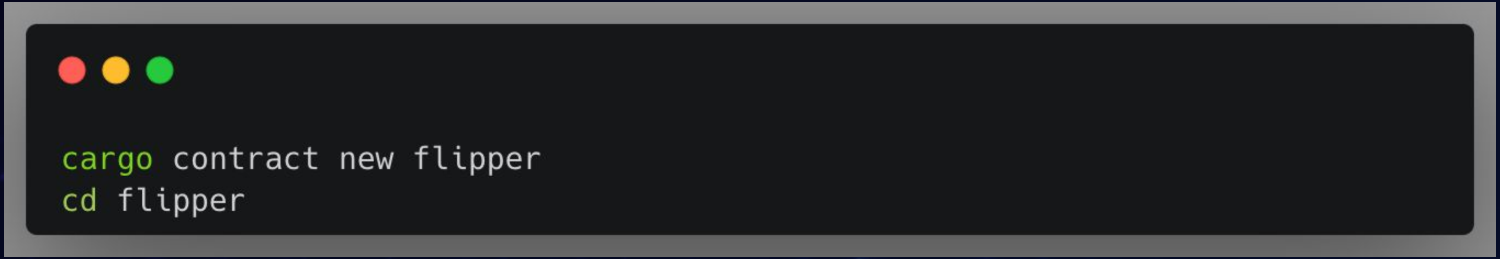
❖ Ink! CLI



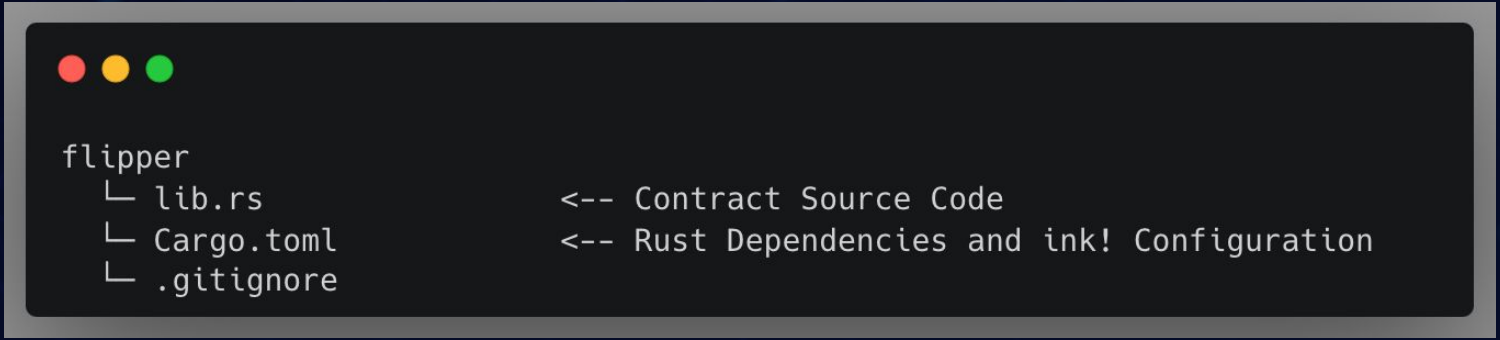
```
rustup component add rust-src
cargo install --force --locked cargo-contract
```

Walkthrough a simple ink! Smart Contract

Flipper Project



```
cargo contract new flipper
cd flipper
```



```
flipper
  └ lib.rs                   <-- Contract Source Code
  └ Cargo.toml               <-- Rust Dependencies and ink! Configuration
  └ .gitignore
```

Lib.rs Structure

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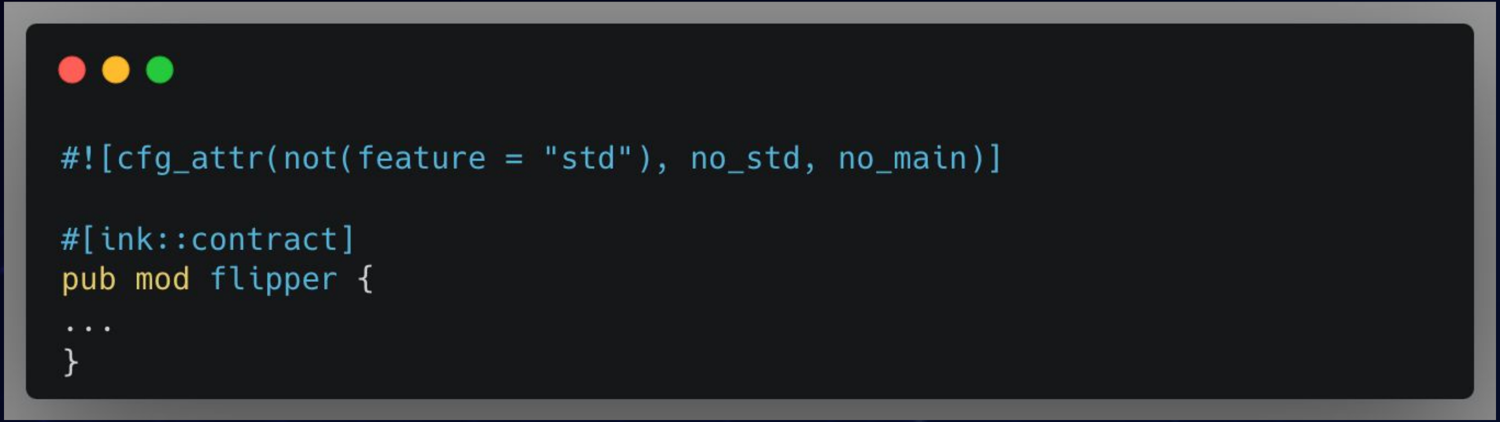
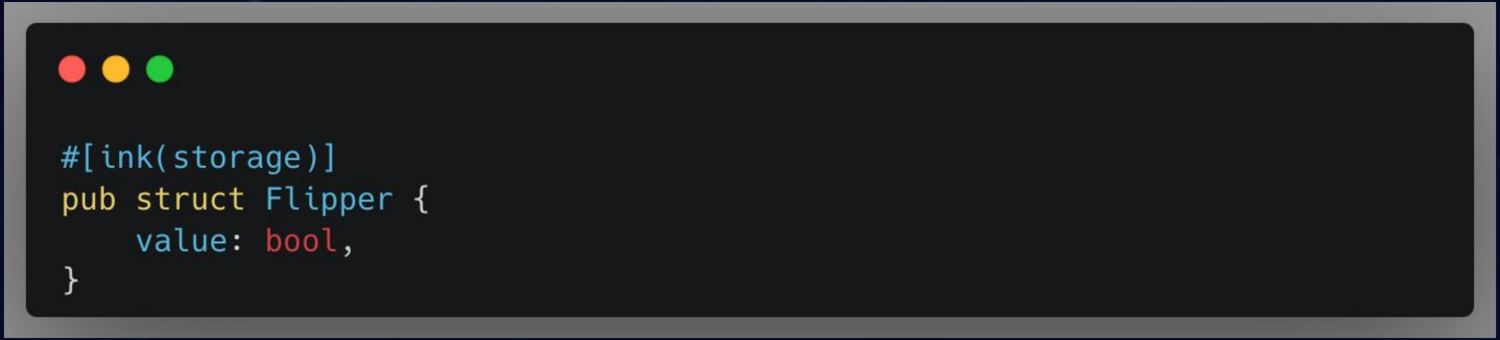


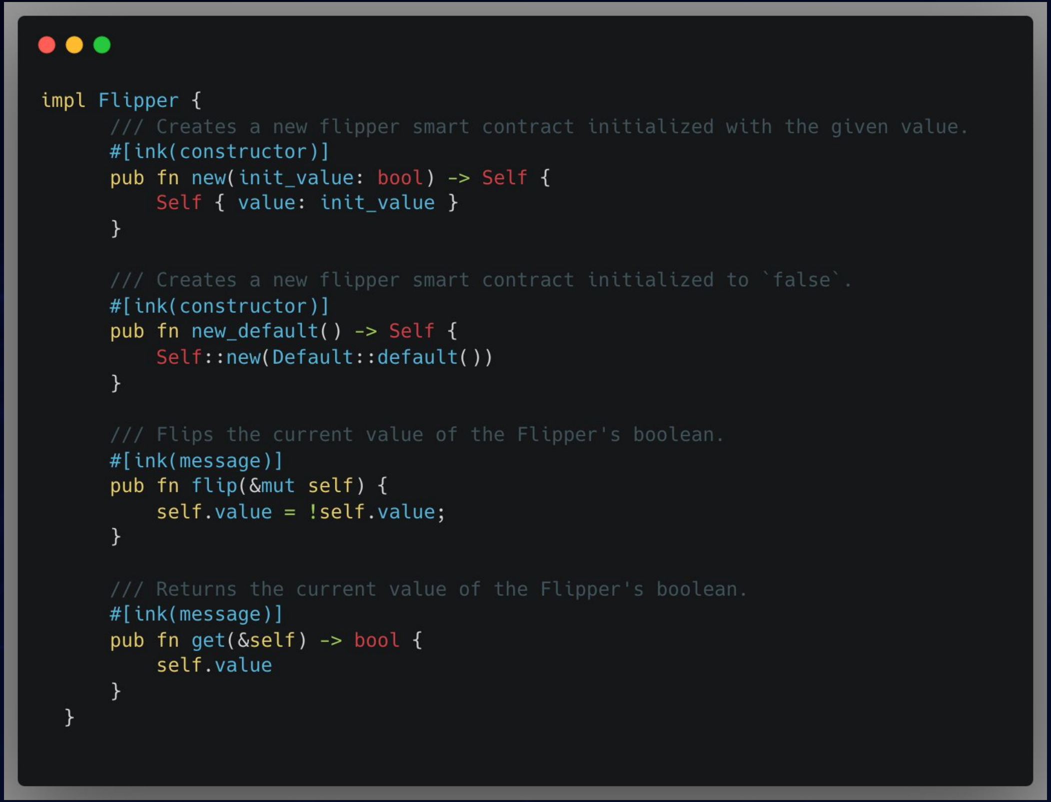
```
#![cfg_attr(not(feature = "std"), no_std, no_main)]

#[ink::contract]
pub mod flipper {
...
}
```



```
#[ink(storage)]
pub struct Flipper {
    value: bool,
}
```

Flipper Implementation



```
impl Flipper {
      /// Creates a new flipper smart contract initialized with the given value.
      #[ink(constructor)]
      pub fn new(init_value: bool) -> Self {
          Self { value: init_value }
      }

      /// Creates a new flipper smart contract initialized to `false`.
      #[ink(constructor)]
      pub fn new_default() -> Self {
          Self::new(Default::default())
      }

      /// Flips the current value of the Flipper's boolean.
      #[ink(message)]
      pub fn flip(&mut self) {
          self.value = !self.value;
      }

      /// Returns the current value of the Flipper's boolean.
      #[ink(message)]
      pub fn get(&self) -> bool {
          self.value
      }
  }
```

Test Module

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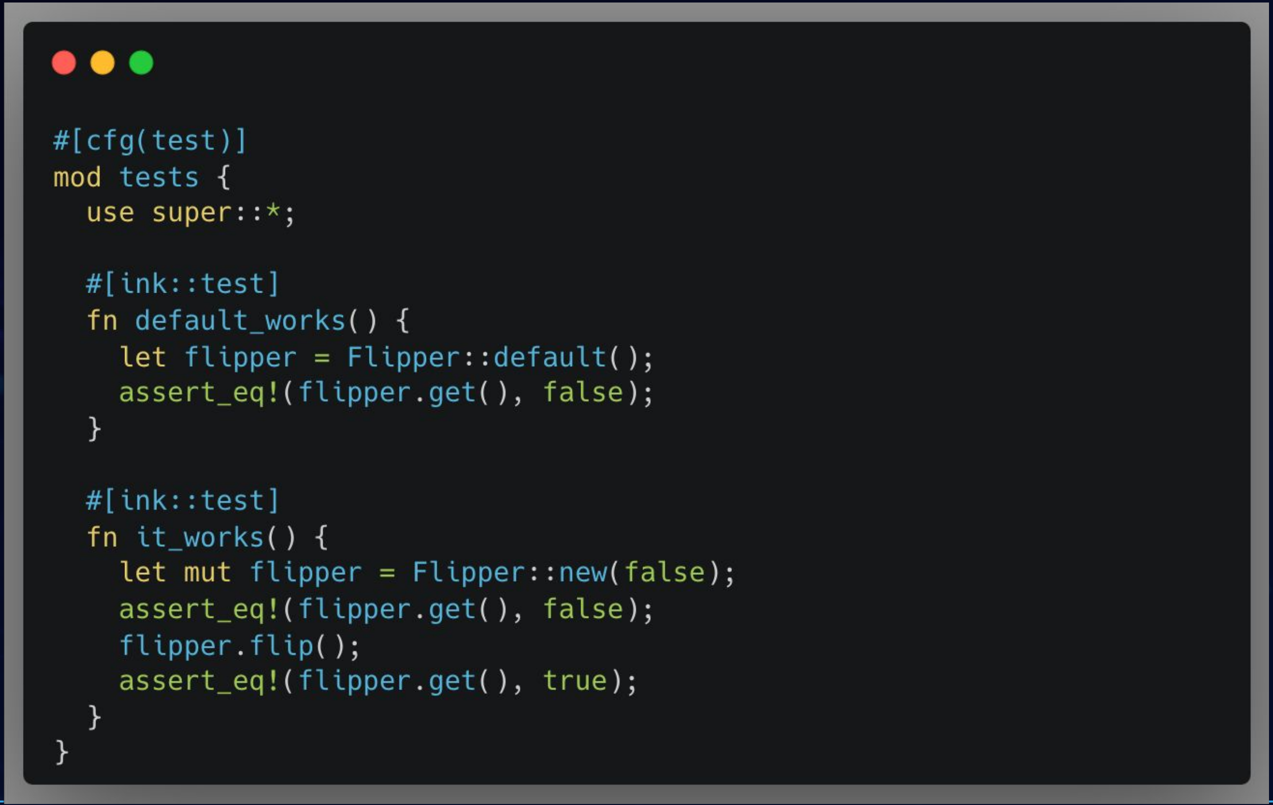

```
#[cfg(test)]
mod tests {
  use super::*;

  #[ink::test]
  fn default_works() {
    let flipper = Flipper::default();
    assert_eq!(flipper.get(), false);
  }

  #[ink::test]
  fn it_works() {
    let mut flipper = Flipper::new(false);
    assert_eq!(flipper.get(), false);
    flipper.flip();
    assert_eq!(flipper.get(), true);
  }
}
```

E2E(End to End) Test

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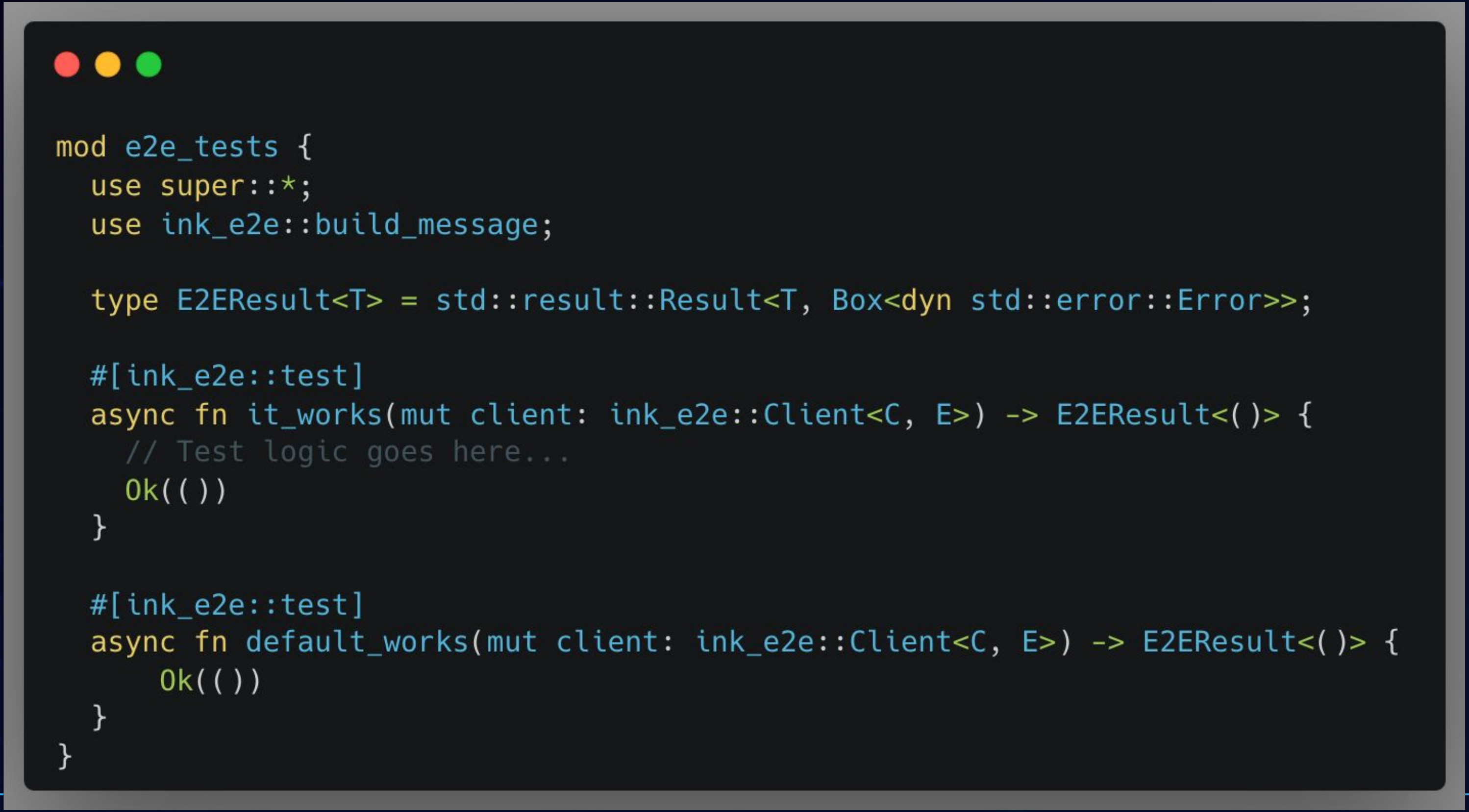

```
mod e2e_tests {
  use super::*;
  use ink_e2e::build_message;

  type E2EResult<T> = std::result::Result<T, Box<dyn std::error::Error>>;

  #[ink_e2e::test]
  async fn it_works(mut client: ink_e2e::Client<C, E>) -> E2EResult<()> {
    // Test logic goes here...
    Ok(())
  }

  #[ink_e2e::test]
  async fn default_works(mut client: ink_e2e::Client<C, E>) -> E2EResult<()> {
      Ok(())
  }
}
```

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Deploy Ink! Smart Contract On CESS

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Interacting with Ink! Smart Contract Using The

useink Library

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NFT Marketplace
Example

Contract Features

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- ★ Minting NFTs
- ★ Listing and Purchasing
- ★ Owner Controls
- ★ Withdrawal of Funds
- ★ Flexible