Simulation 환경구축 및 논리회로설계 실습

실습순서

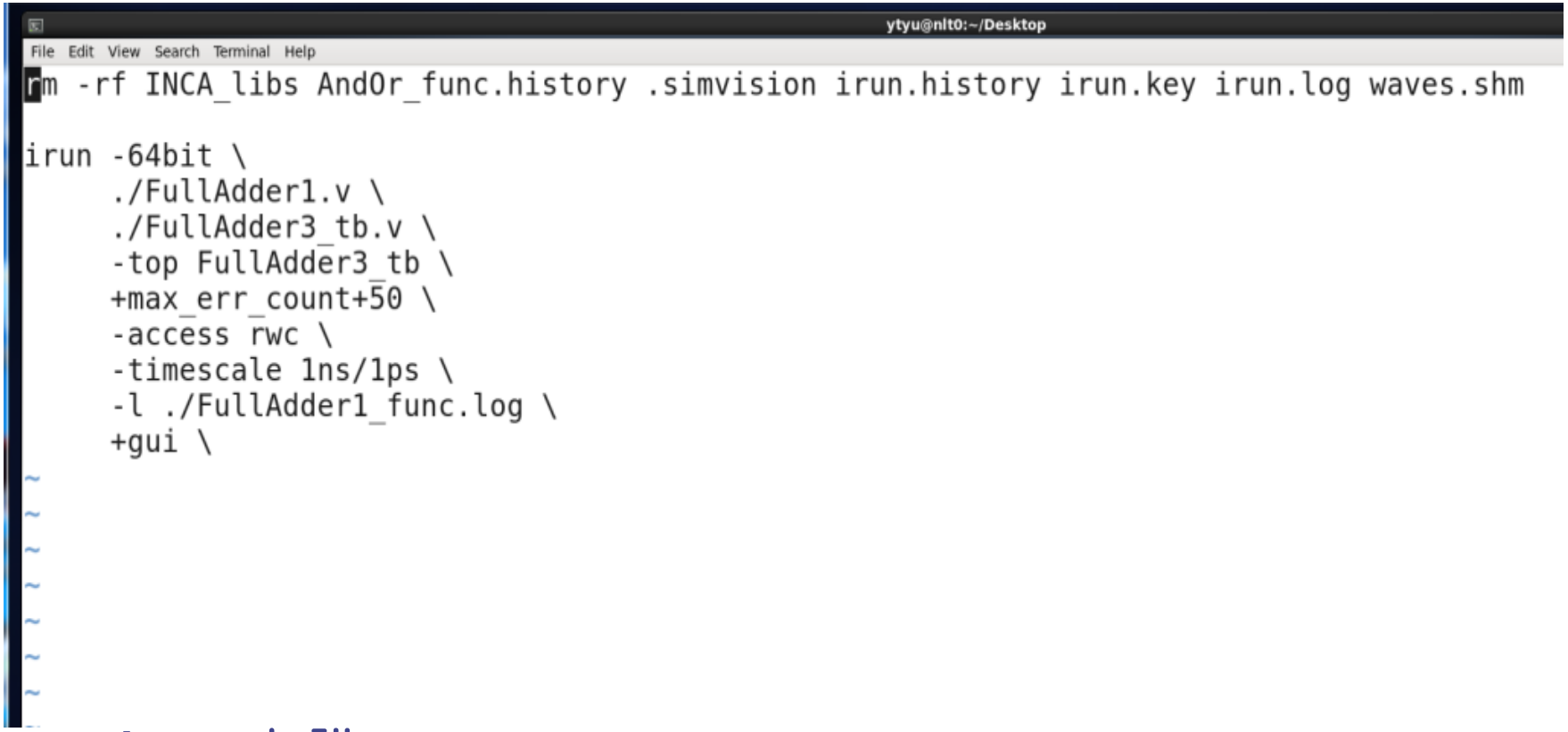
1. Simulation 환경
2. 조합논리회로 설계
3. 순차논리회로 설계
4. 기타 논리회로 설계

0. Simulation 환경

1. 기본 논리 게이트
2. 전가산기
3. 디코더
4. 입출력 장치
5. 멀티플렉서
6. 크기 비교기
7. n비트 가산/감산기
8. “1” 개수 카운터
9. 패리티 발생기
10. 리플 가산기

Lab 0 - irun Overview

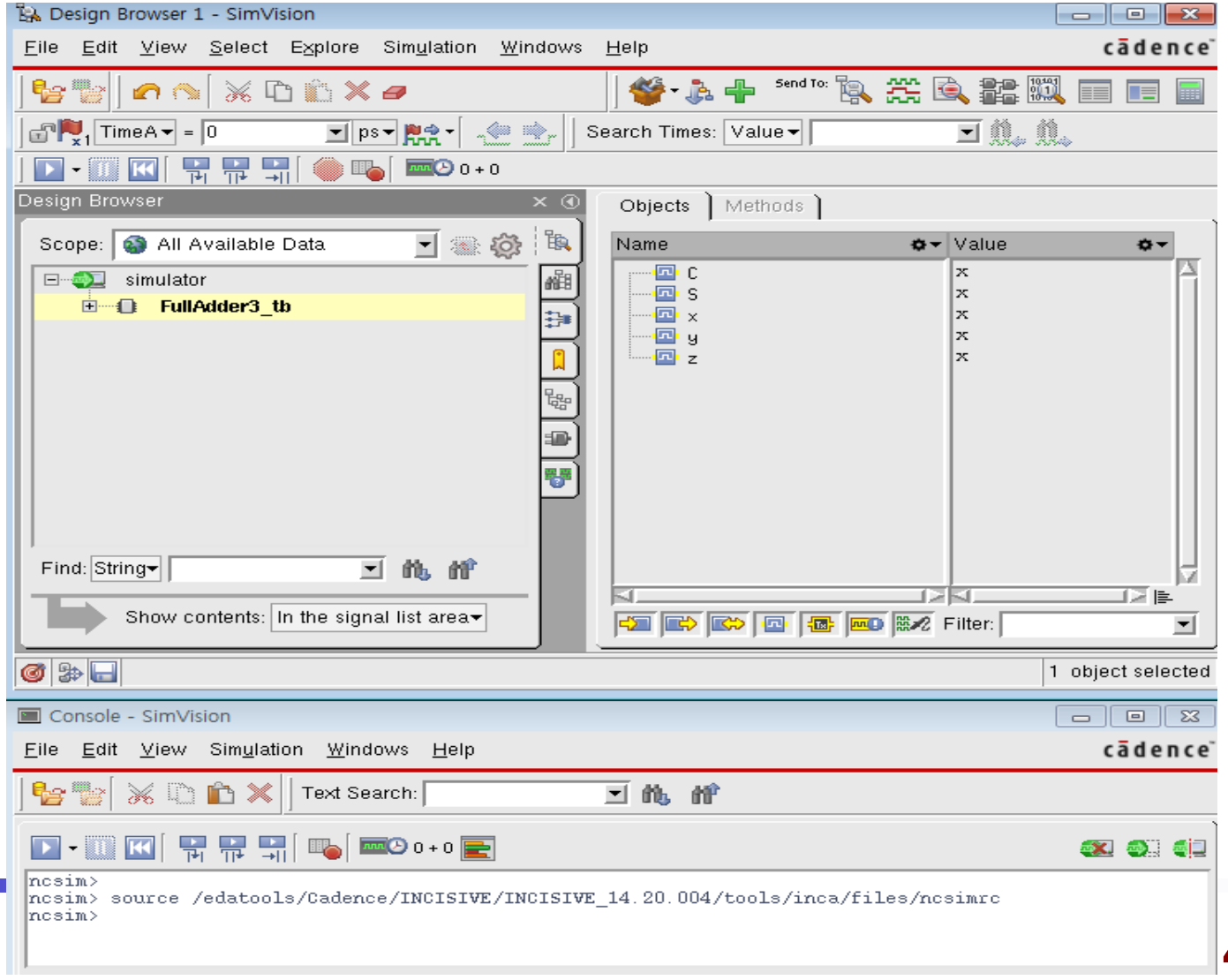
- **FullAdder1** in **DigitalDesign_Training** Directory
  - DigitalDesign_Training/FullAdder1
- vi run



- **./run 수행**

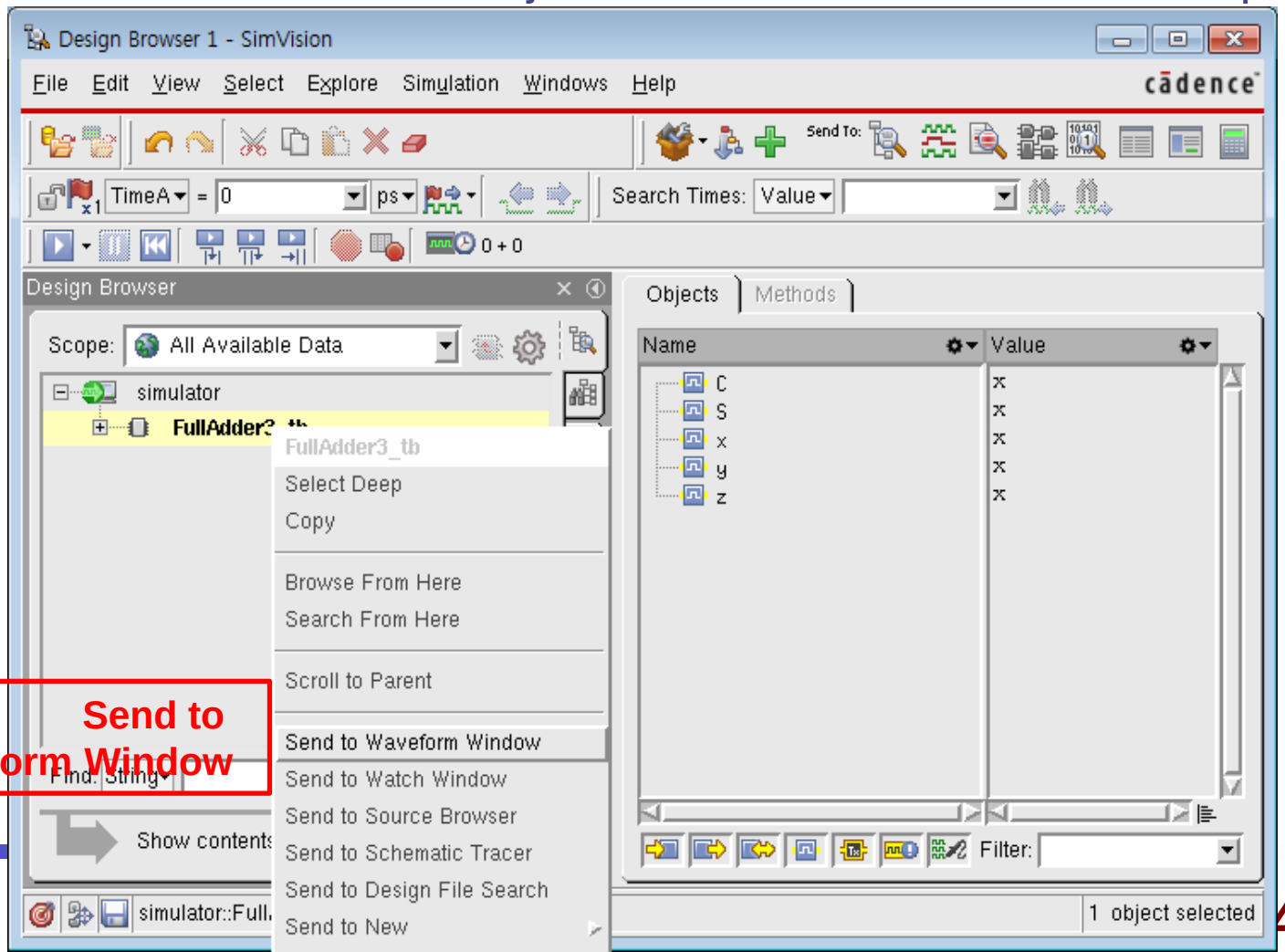
Lab 0 - irun 수행 후

- Open SimVision Design Browser window
- Open SimVision Console Window



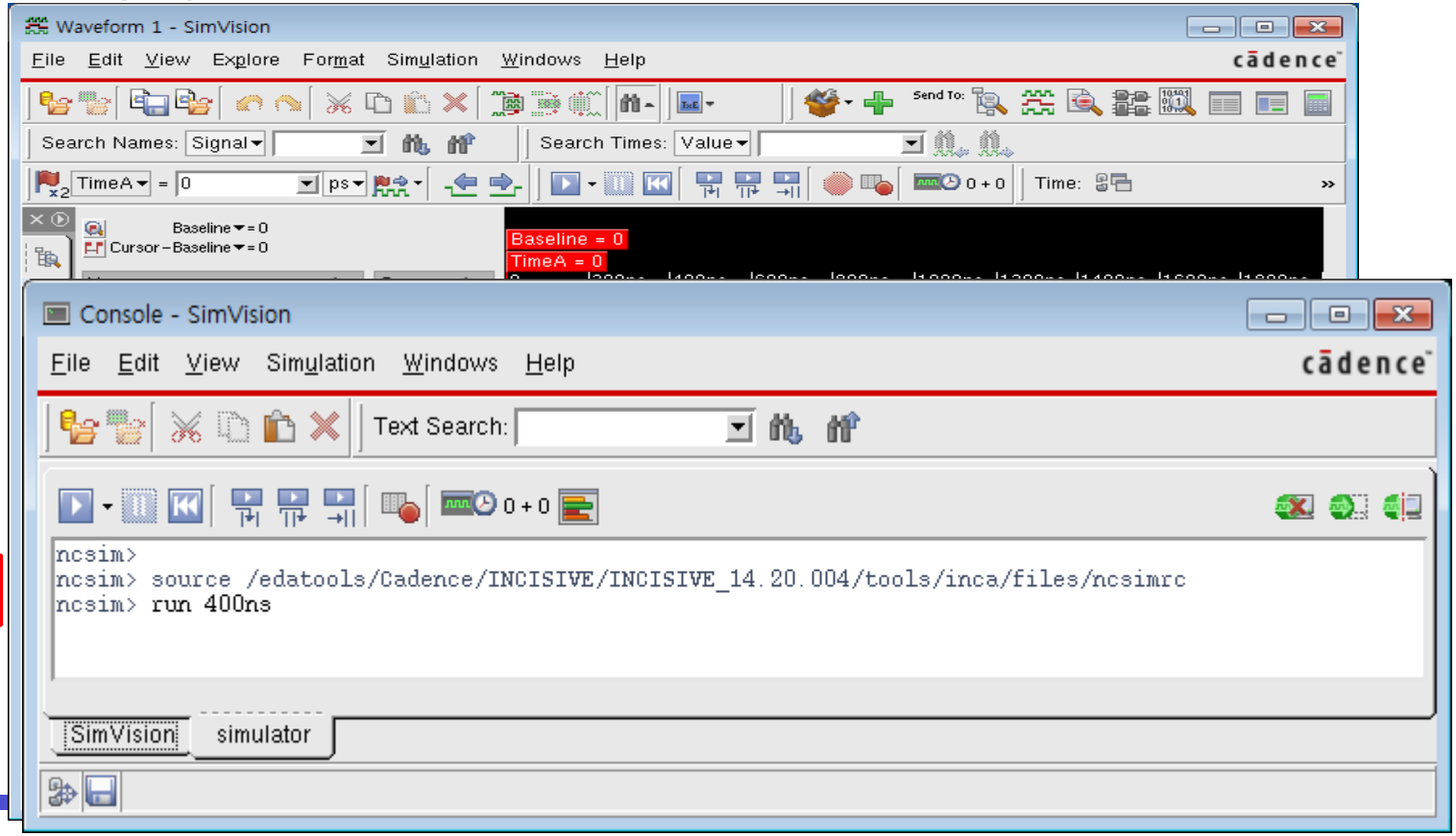
Lab 0 - Simvision Design Browser Window

- Open a SimVision Design Browser window
  - by invoking simvision
  - In this window, select objects to send to a Waveform display



Lab 0 - Console Window

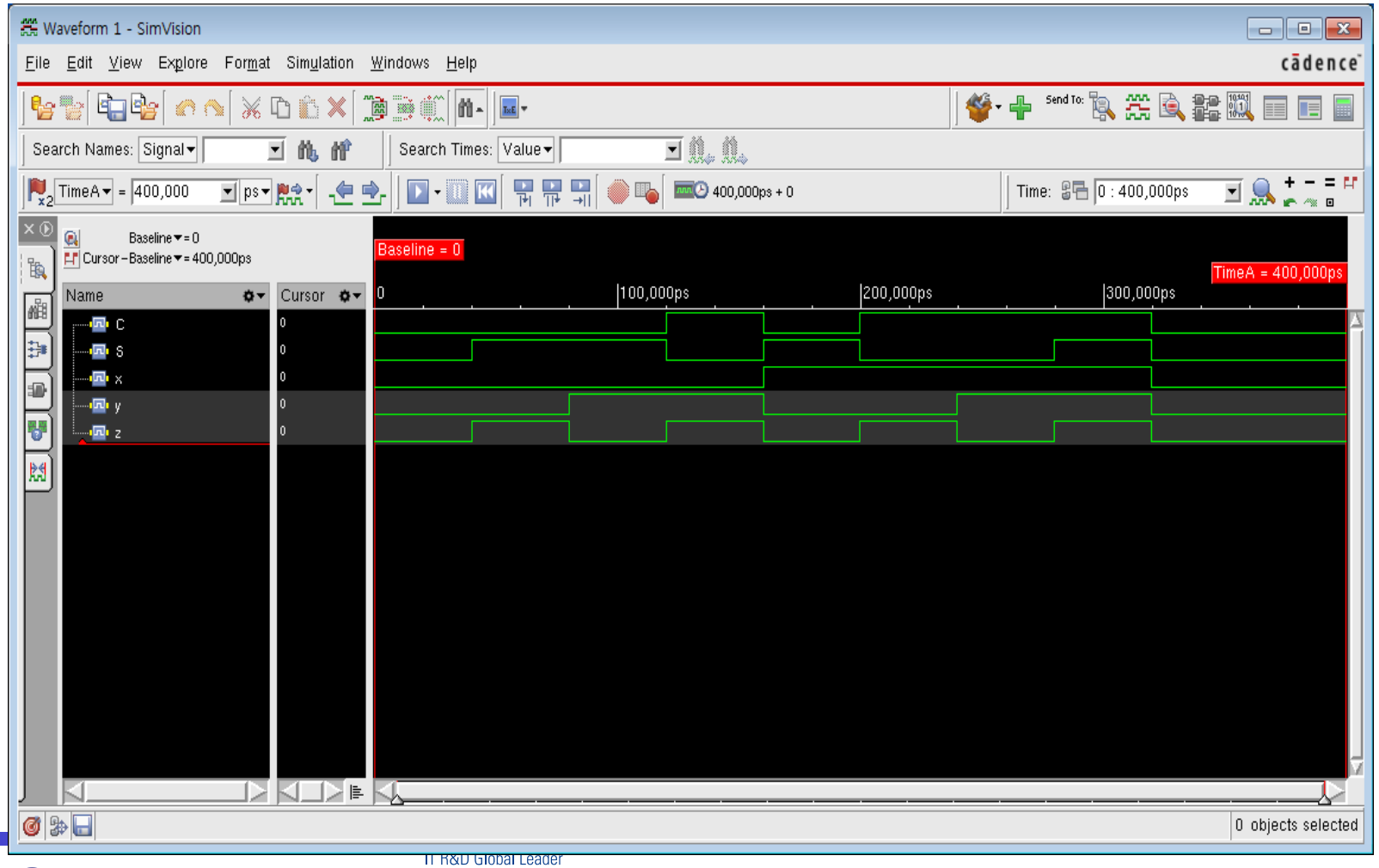
- Use the Console window
  - to interact with the simulator and the SimVision simulation analysis environment
  - Example) run 400ns



run 400ns

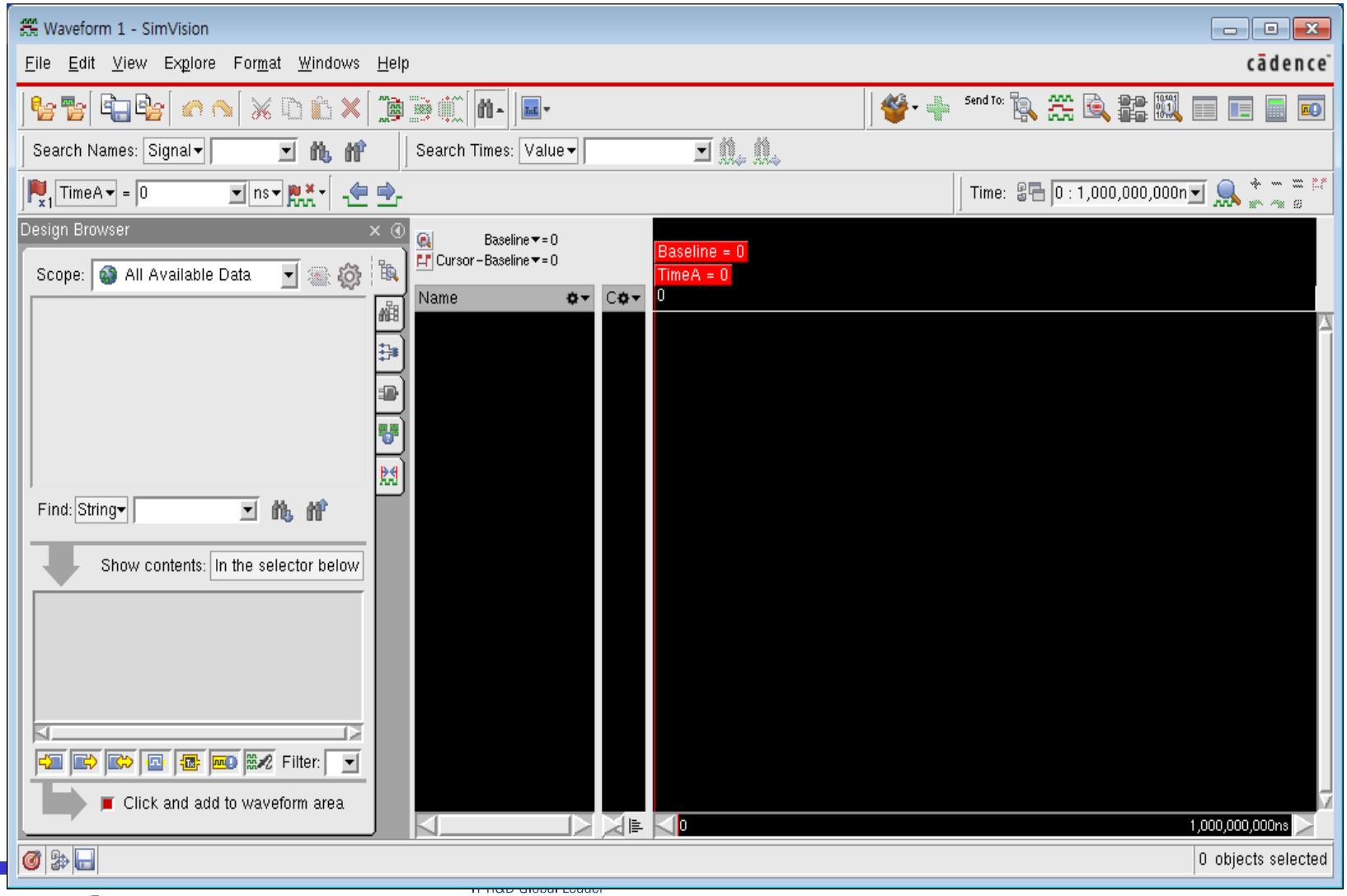
Lab 0 - Simvision Waveform Window

- Start with a SimVision Waveform window
  - by invoking simvision -waves



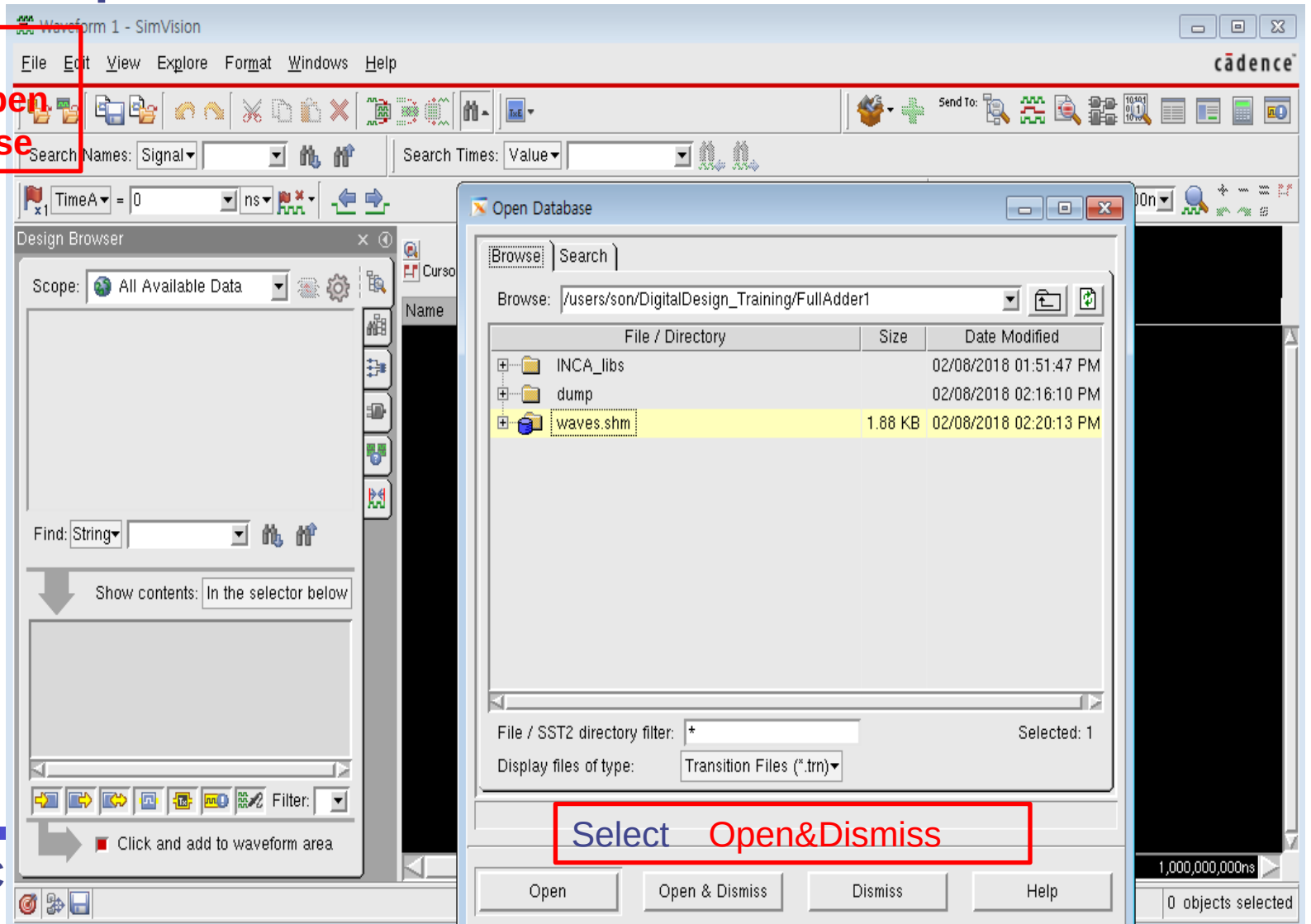
Lab 0 - Analyze Waveform

- DigitalDesign_Training/FullAdder1>**simvision &** 수행



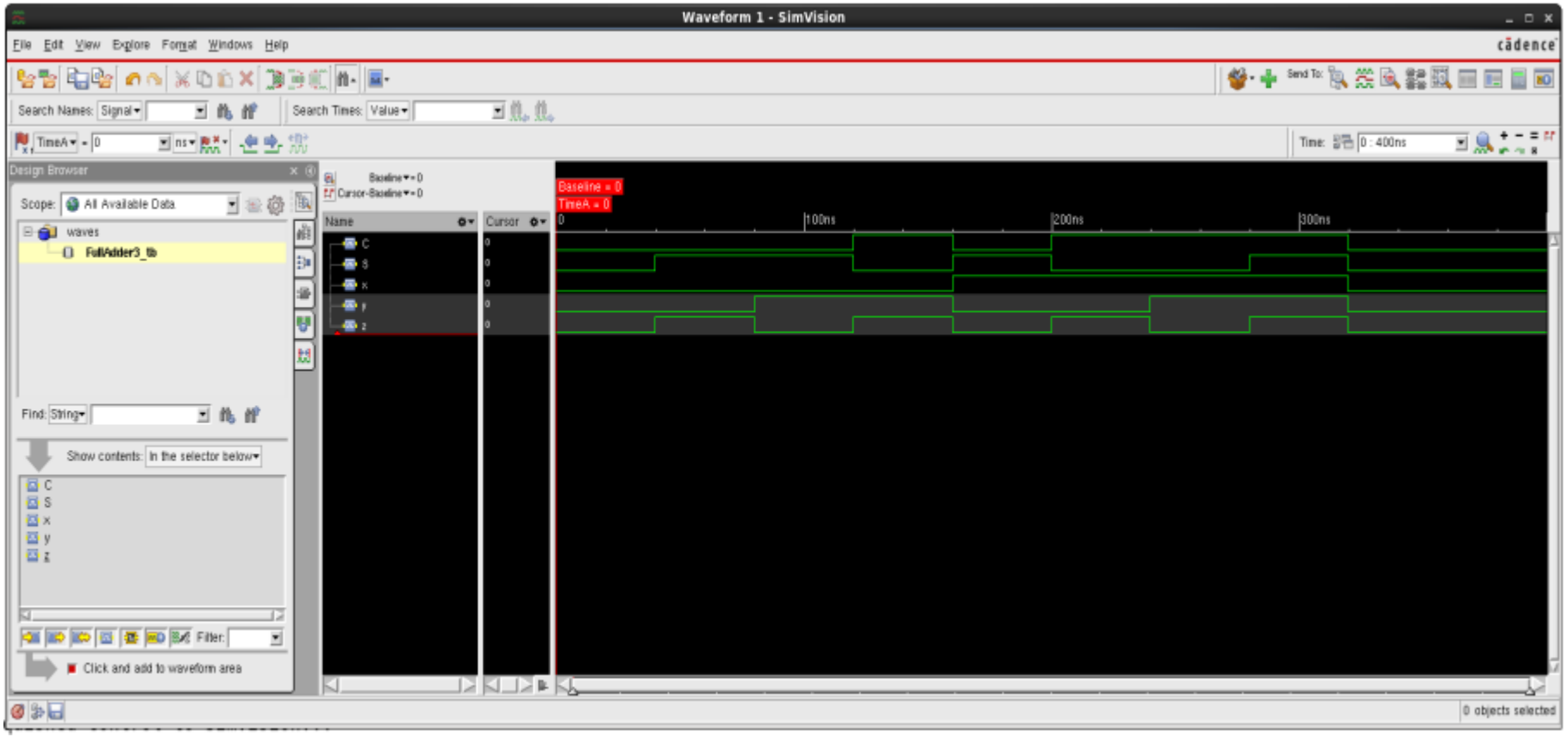
Lab 0 - Analyze Waveform

- simvision & 수행
- File- Open Database



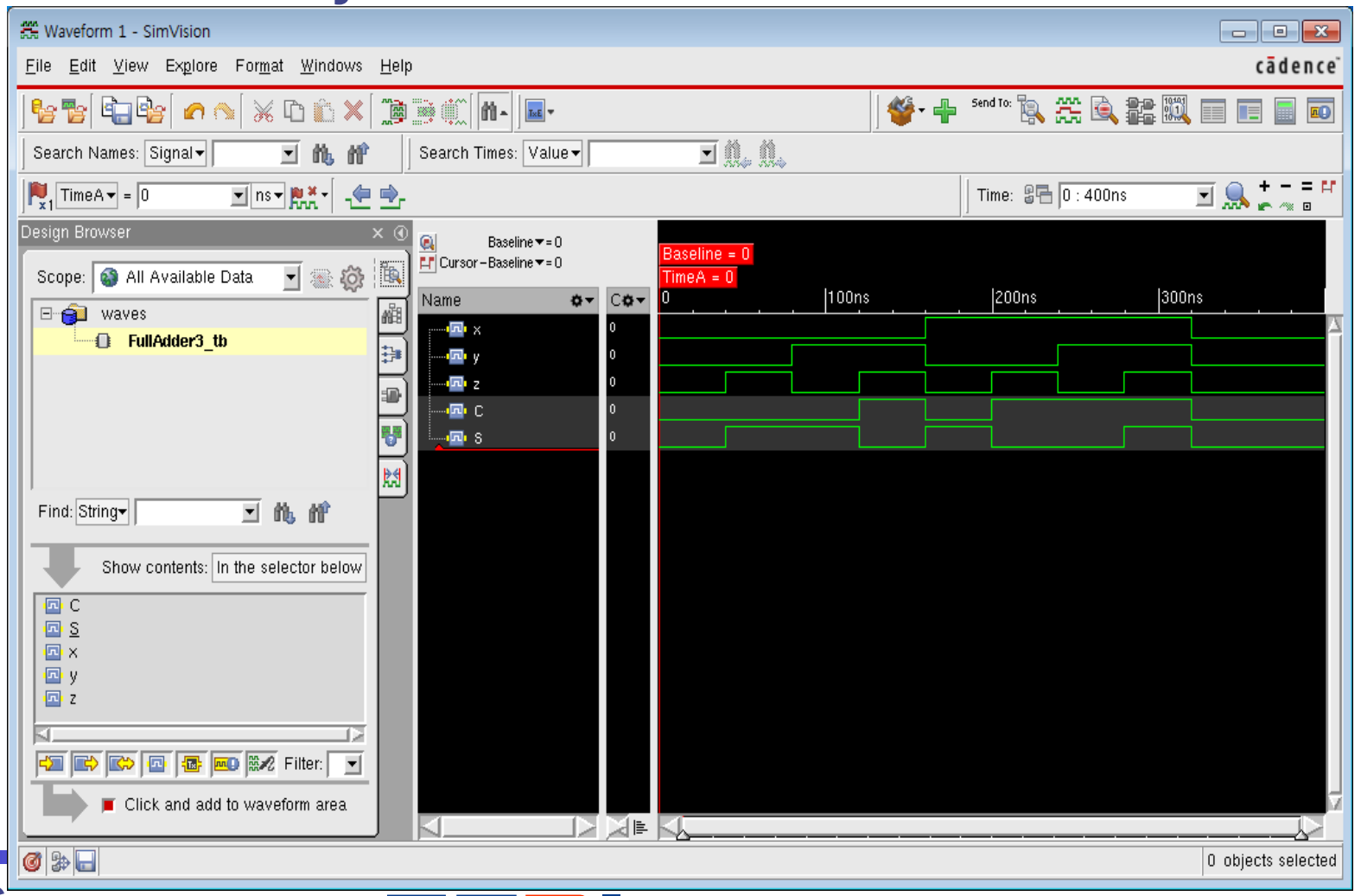
Lab 0 - Analyze Waveform

- Select Signal Waveform within Database
- Waveform Analysis



Lab 0 - Analyze Waveform

- Select Signal Waveform within Database
- Waveform Analysis



0. Simulation 환경

1. 기본 논리 게이트

2. 전가산기

3. 디코더

4. 입출력 장치

5. 멀티플렉서

6. 크기 비교기

7. n비트 가산/감산기

8. “1” 개수 카운터

9. 패리티 발생기

10. 리플 가산기

◆ AND, OR, Invertor(not) 게이트 구현 및 검증

1) Directory 위치: DigtaiDesign-Training/AndOr
2) **AndOr.v Coding**
3) **AndOr_tb.v Coding**
4) **Run File(run) 작성**
5) Simulation & WaveForm Analysis

- **./run** 수행
- Use SimVision Design Browser window
  . Select **Send to Waveform Window**
- Use SimVision Console Window
  . Example) ncsim> **run 400ns** write
- WaveForm Analysis

◆ Full-Adder 구현 및 검증

1) Directory 위치: DigitalDesign_Training/FullAdder1(and 2, and 3)
2) **FullAdder1.v Coding**
3) **FullAdder1_tb.v Coding**
4) **Run File(run)** 작성
5) Simulation & WaveForm Analysis
   - **./run** 수행
   - Use SimVision Design Browser window
     . Select **Send to Waveform Window**
   - Use SimVision Console Window
     . Example) ncsim> **run 400ns** write
   - **WaveForm Analysis**

◆ Decoder 구현 및 검증

1) Directory 위치: DigitalDesign_Training/Decoder
2) **Decoder.v Coding**
3) **Decoder_tb.v Coding**
4) **Run File(run) 작성**
5) Simulation & WaveForm Analysis
   - **./run** 수행
   - Use SimVision Design Browser window
     . Select **Send to Waveform Window**
   - Use SimVision Console Window
     . Example) ncsim> **run 400ns** write
   - **WaveForm Analysis**

- SwitchEncoder 구현 및 검증
  1) Directory 위치: DigitalDesign_Training/SwitchEncoder
  2) SwitchEncoder.v Coding /확인

◆ Mutiplexer 구현 및 검증

1) Directory 위치:
   DigitalDesign_Training/Mutiplexer/UsingCase(and UsingIf)
2) **Mutiplexer.v Coding**
3) **Mutiplexer_tb.v Coding**
4) **Run File(run)** 작성
5) Simulation & WaveForm Analysis
   - **./run** 수행
   - Use SimVision Design Browser window
     . Select **Send to Waveform Window**
   - Use SimVision Console Window
     . Example) ncsim> **run 400ns** write
   - **WaveForm Analysis**

◆ 크기 비교기 구현 및 검증

1) Directory 위치: DigitalDesign_Training/Comparator
2) **Comparator.v Coding**
3) **Comparator_tb.v Coding**
4) **Run File(run) 작성**
5) Simulation & WaveForm Analysis
   - **./run** 수행
   - Use SimVision Design Browser window
     . Select **Send to Waveform Window**
   - Use SimVision Console Window
     . Example) ncsim> **run 400ns** write
   - **WaveForm Analysis**

◆ n비트 가산/감산기 구현 및 검증

1) Directory 위치: DigitalDesign_Training/nBitAddSub1(and nBitAddSub2)
2) **nBitAddSub1.v Coding**
3) **nBitAddSub1_tb.v Coding**
4) **Run File(run)** 작성
5) Simulation & WaveForm Analysis
   - **./run** 수행
   - Use SimVision Design Browser window
     . Select **Send to Waveform Window**
   - Use SimVision Console Window
     . Example) ncsim> **run 400ns** write
   - **WaveForm Analysis**

◆ "1" 개수 카운터 구현 및 검증

1) Directory 위치: DigitalDesign_Training/OneCounter
2) **OneCounter.v Coding**
3) **OneCounter_tb.v Coding**
4) **Run File(run) 작성**
5) Simulation & WaveForm Analysis
   - **./run** 수행
   - Use SimVision Design Browser window
     . Select **Send to Waveform Window**
   - Use SimVision Console Window
     . Example) ncsim> **run 400ns** write
   - **WaveForm Analysis**

◆ Parity Generator 구현 및 검증

1) Directory 위치: DigitalDesign_Training/ ParityGenerator/ UsingBitwise(and UsingFunction)
2) **ParityGenerator.v Coding**
3) **ParityGenerator _tb.v Coding**
4) **Run File(run) 작성**
5) Simulation & WaveForm Analysis

- **./run** 수행
- Use SimVision Design Browser window
  . Select **Send to Waveform Window**
- Use SimVision Console Window
  . Example) ncsim> **run 400ns** write
- **WaveForm Analysis**

◆ Ripple Adder 구현 및 검증

1) Directory 위치: DigitalDesign_Training/ RippleAdder
2) **RippleAdder.v Coding**
3) **RippleAdder _tb.v Coding**
4) **Run File(run) 작성**
5) Simulation & WaveForm Analysis

- **./run** 수행
- Use SimVision Design Browser window
  . Select **Send to Waveform Window**
- Use SimVision Console Window
  . Example) ncsim> **run 400ns** write
- **WaveForm Analysis**

1. 순차논리회로 설계

1) 간단한 상태도의 구현

2) 레지스터의 구현

3) Up-down 카운터

4) 순차 검출기

2. 기타 논리회로 설계

1) 클럭을 사용하는 회로와 사용하지 않는 회로

2) 스텝 클럭(펄스) 발생회로

3) 양방향 버스

◆ 간단한 상태도 구현 및 검증

1) Directory 위치: DigitalDesign_Training/ SimpleStateMachine/MealyModel(and MooreModel)
2) **SimpleStateMachine.v Coding**
3) **SimpleStateMachine_tb.v Coding**
4) **Run File(run)** 작성
5) Simulation & WaveForm Analysis

- **./run** 수행
- Use SimVision Design Browser window
  . Select **Send to Waveform Window**
- Use SimVision Console Window
  . Example) ncsim> **run 400ns** write
- **WaveForm Analysis**

◆ 레지스터구현 및 검증

1) Directory 위치: DigitalDesign_Training/RegisterInference_no_tb

2) RegisterInference.v Coding/확인

◆ Up-Down Counter 구현 및 검증

1) Directory 위치: DigitalDesign_Training/ UpDownCounter
2) **UpDownCounter.v Coding**
3) **UpDownCounter_tb.v Coding**
4) **Run File(run) 작성**
5) Simulation & WaveForm Analysis
   - **./run** 수행
   - Use SimVision Design Browser window
     . Select **Send to Waveform Window**
   - Use SimVision Console Window
     . Example) ncsim> **run 400ns** write
   - **WaveForm Analysis**

Sequence Detector 구현 및 검증

1) Directory 위치: DigitalDesign_Training/SequenceDetector
2) **SequenceDetector.v Coding**
3) **SequenceDetector _tb.v Coding**
4) **Run File(run) 작성**
5) Simulation & WaveForm Analysis
   - **./run** 수행
   - Use SimVision Design Browser window
     . Select **Send to Waveform Window**
   - Use SimVision Console Window
     . Example) ncsim> **run 400ns** write
   - **WaveForm Analysis**

◆ 클럭을 사용하는 회로와 사용하지 않는 회로구현 및 검증

1) Directory 위치: DigitalDesign_Training/ClockSync
2) **ClockSync.v Coding**
3) **ClockSync _tb.v Coding**
4) **Run File(run)** 작성
5) Simulation & WaveForm Analysis
   - **./run** 수행
   - Use SimVision Design Browser window
     . Select **Send to Waveform Window**
   - Use SimVision Console Window
     . Example) ncsim> **run 400ns** write
   - **WaveForm Analysis**

Step Clock구현 및 검증

1) Directory 위치: DigitalDesign_Training/StepClock
2) **StepClock.v Coding**
3) **StepClock _tb.v Coding**
4) **Run File(run) 작성**
5) Simulation & WaveForm Analysis

- **./run** 수행
- Use SimVision Design Browser window
  . Select **Send to Waveform Window**
- Use SimVision Console Window
  . Example) ncsim> **run 400ns** write
- **WaveForm Analysis**

◆ 양방향 버스구현 및 검증

1) Directory 위치: DigitalDesign_Training/BidirBus
2) **BidirBus.v Coding**
3) **BidirBus _tb.v Coding**
4) **Run File(run) 작성**
5) Simulation & WaveForm Analysis
   - **./run** 수행
   - Use SimVision Design Browser window
     . Select **Send to Waveform Window**
   - Use SimVision Console Window
     . Example) ncsim> **run 400ns** write
   - **WaveForm Analysis**

Q & A

수고하셨습니다.