

On Demand Café with Blockchain

중앙대학교 객체지향프로그램 E조

20171758 곽태욱

20170825 서신악

20171795 고가해



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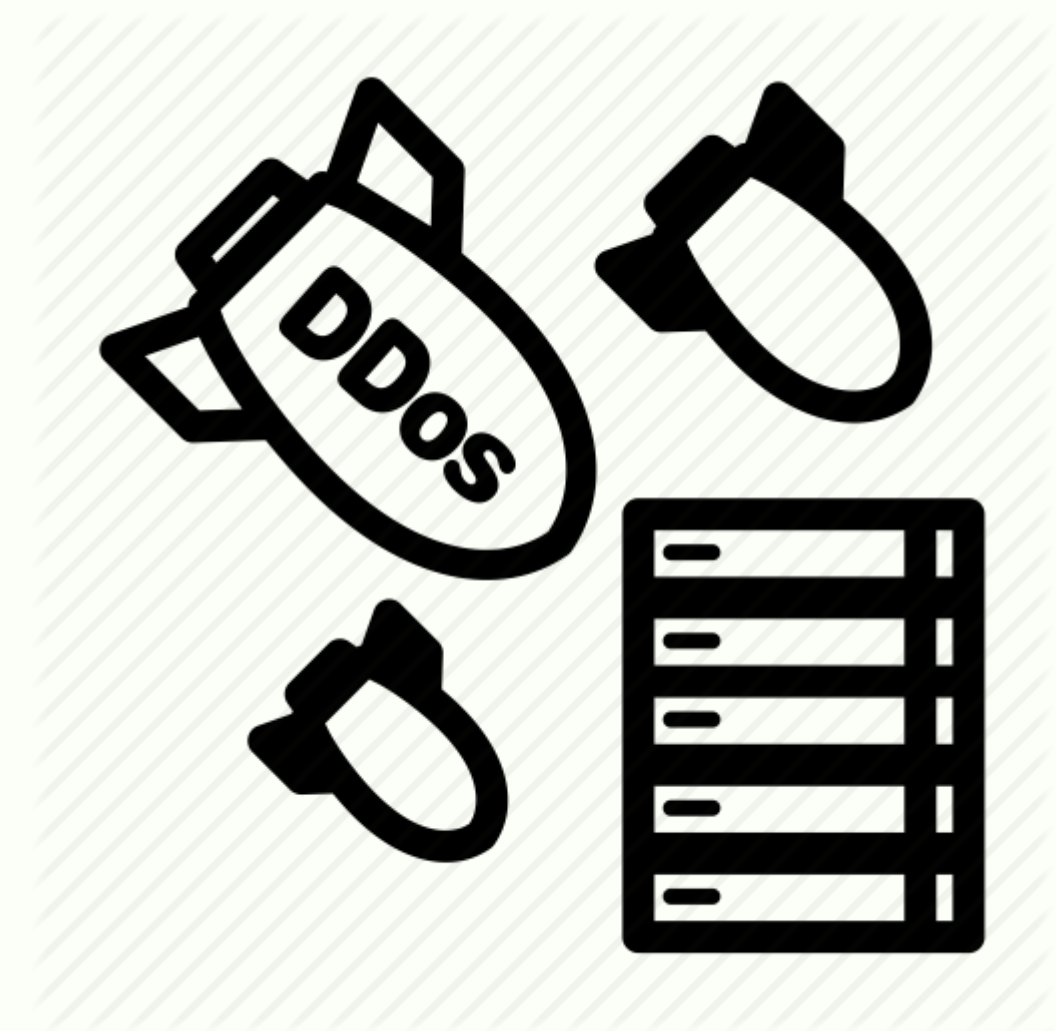
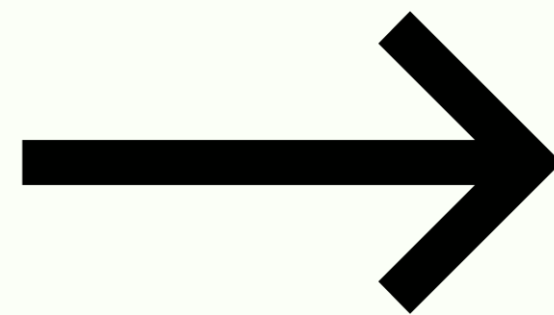
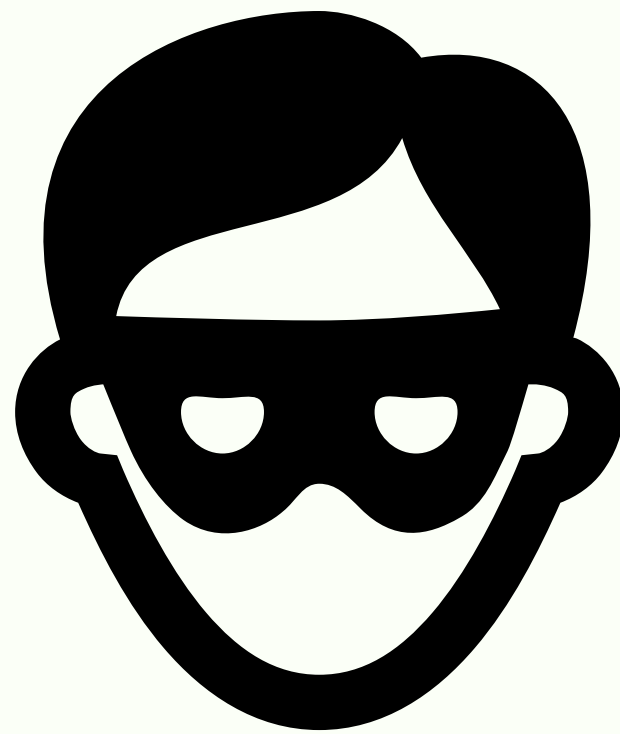
04 Vision



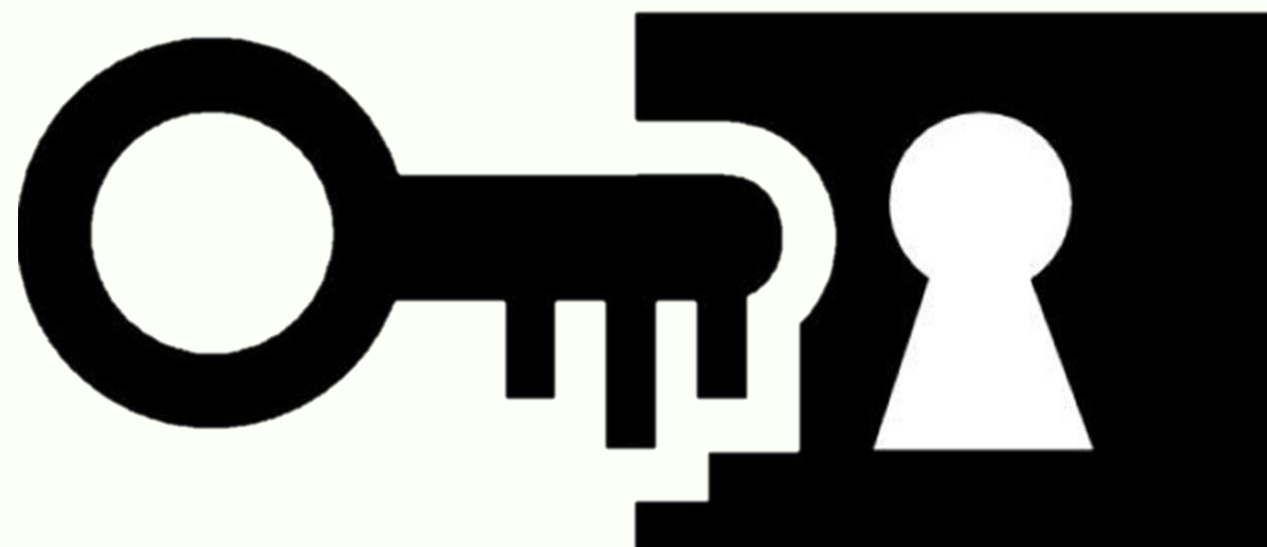
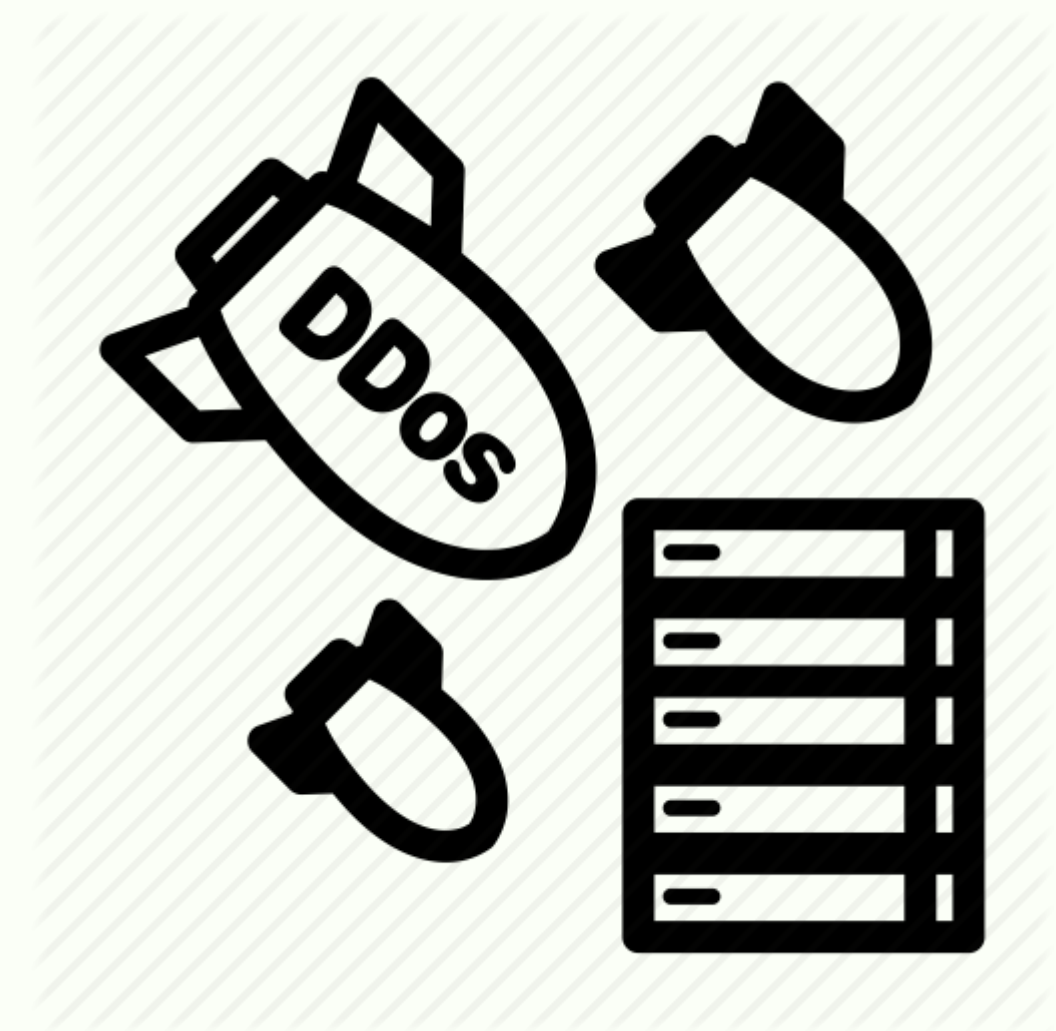
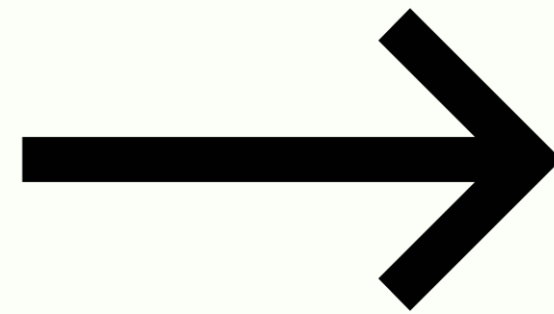
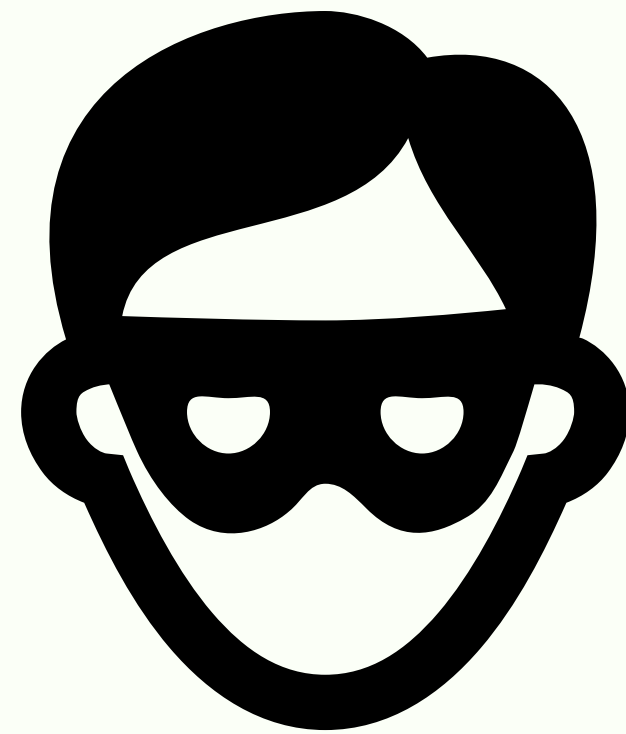


Problem

PROBLEMS



PROBLEMS



PROBLEMS

Current Problem

01 보안성 취약

서버의 보안이 취약하면 해킹의 대상이 될 수 있다.
해킹이 이루어진다면 서버가 마비되어 서비스를
제공할 수 없게 된다.



PROBLEMS

Current Problem

02 안정성 위험

해킹이 이루어진다면 서버에 저장된 데이터가 위변조될 수 있다.



THE SITUATION



THE SITUATION



THE SITUATION



Or



DIRECTIONS

편리성

신뢰성

시간 및 비용 절감



편리성

Current System

편리하지 않다.

STcoffee System

고객은 앱을 사용하며 편리함을 느끼고,
기업은 앱의 유지보수(기능 추가, 수정,
확장)에서 편리함을 느낀다.



신뢰성

Current System

고객은 자신의 주문이 위.변조되어 있는지 쉽게 확인할 수 없다.

STcoffee System

블록해시에 있는 0의 개수만 보면 쉽게 확인이 가능하다.



시간 및 비용 절감

Current System

기업은 서버 보안에 항상 신경써야 하며 서버가 공격을 받으면 시간적.금전적인 손해가 발생한다.

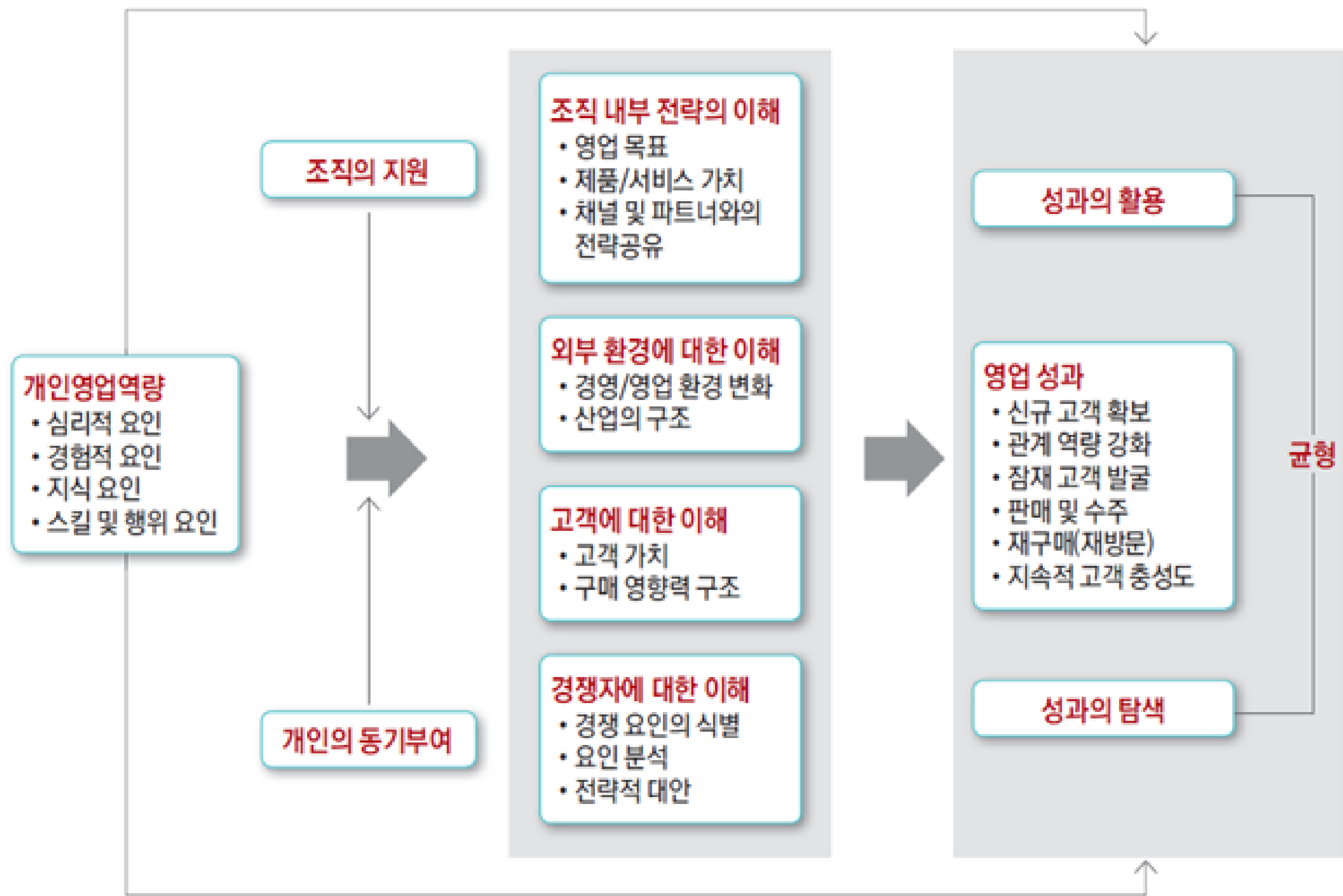
STcoffee System

한 번 채굴된 블록을 공격하기 위해선 채굴에 걸린 만큼의 시간이 필요하다.



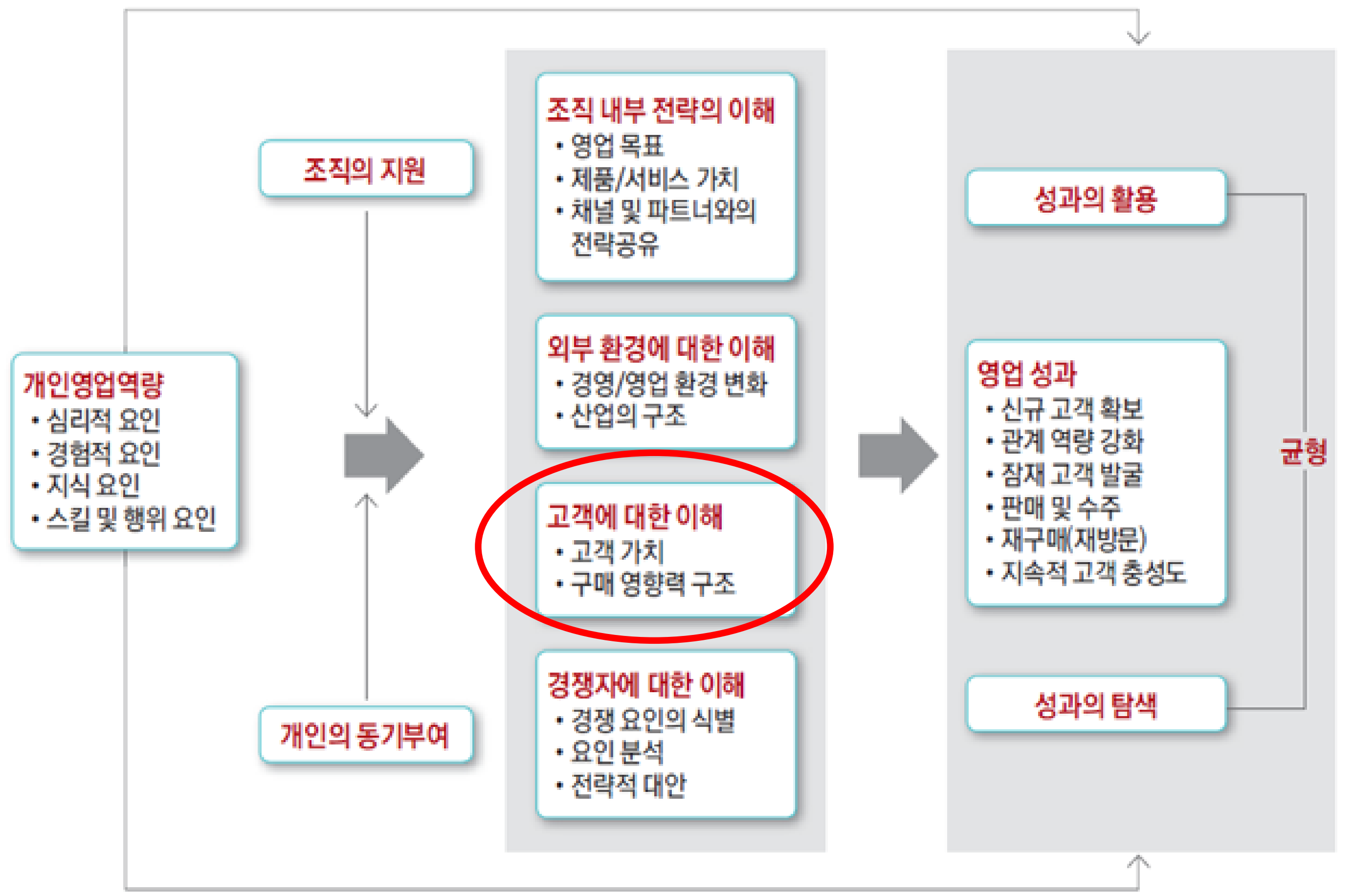
Needs

그림1 SPC 모델

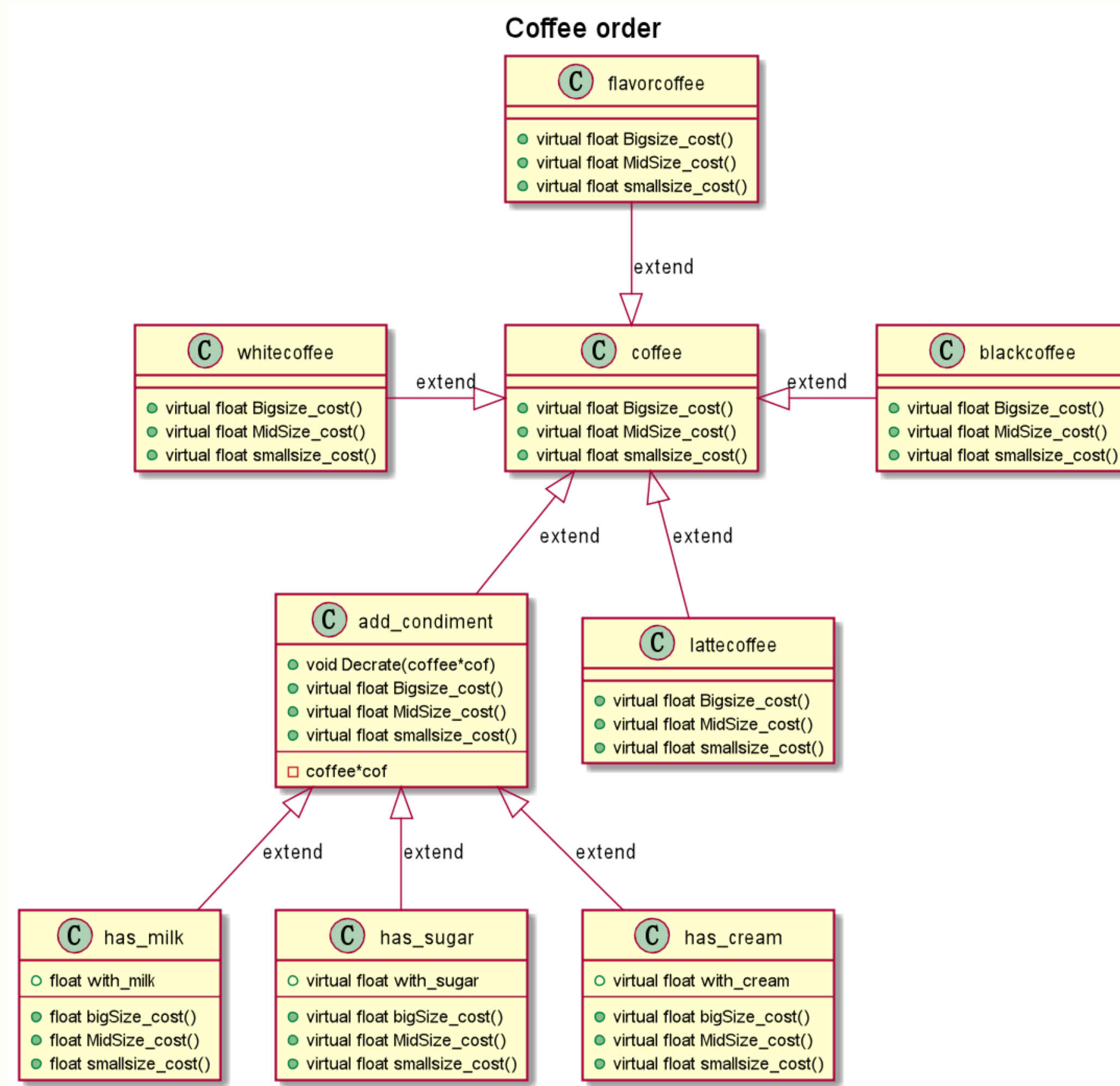


Needs

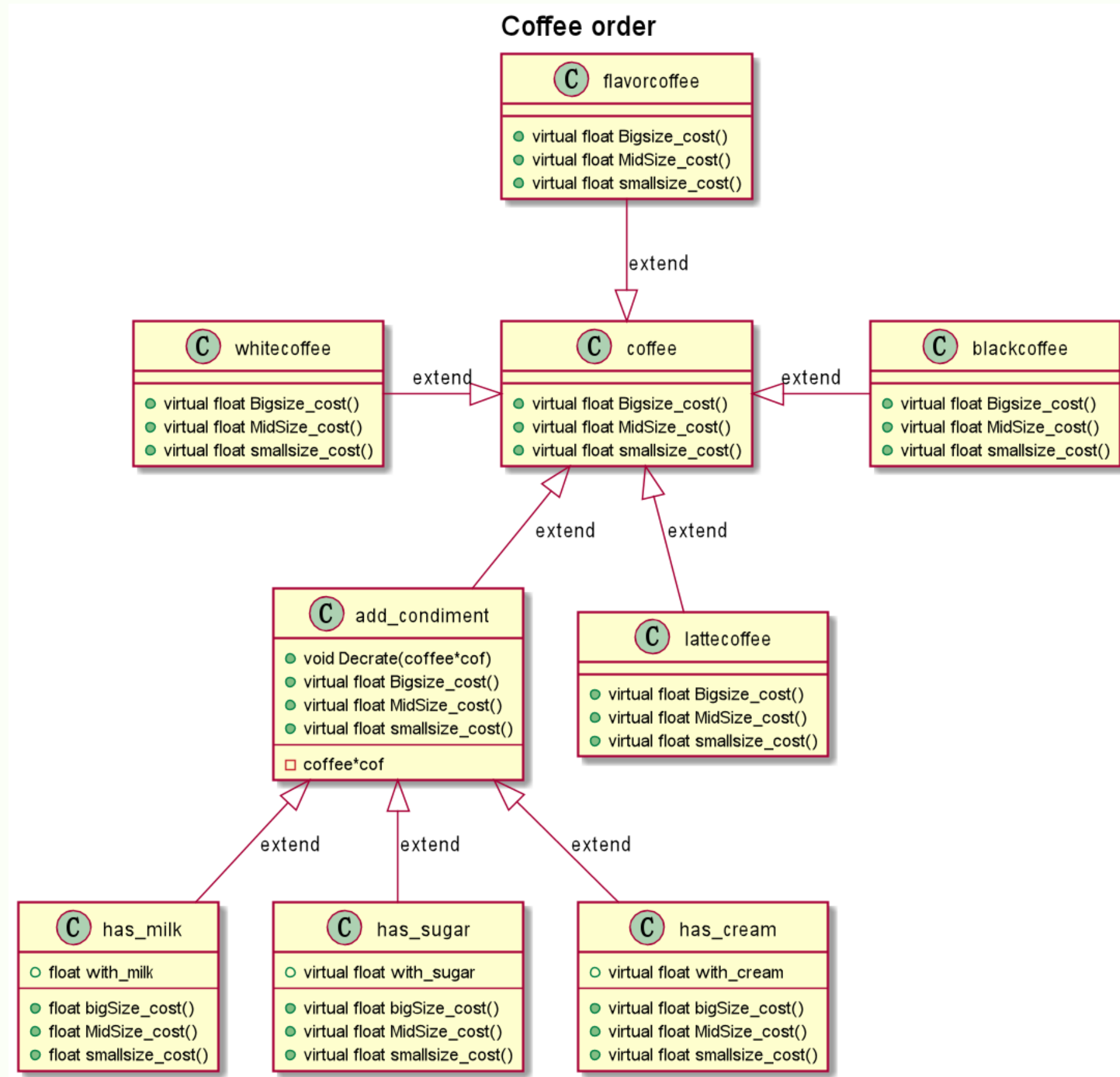
그림1 SPC 모델



Rival



Rival's Weakness



라떼에 크림을 넣을 때 객체를 2개 생성해야 함

런타임 시점 때 클래스 간의 관계를 유연하게 변경
할 수 없음

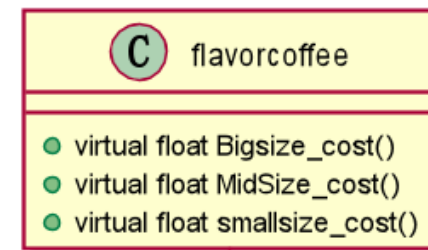
부모 클래스의 구현에 변경이 생기면 그에 따라
자식 클래스도 변경해줘야 함

클래스를 이용하는 입장에서 부모와 자식 클래스
중 어떤 메소드를 호출해야 할 지 개념적으로 모
호해질 수 있음

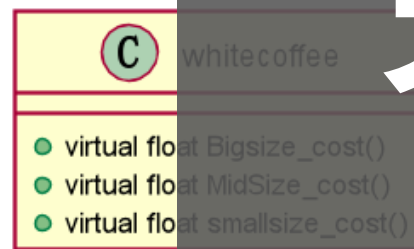


Rival's Weakness

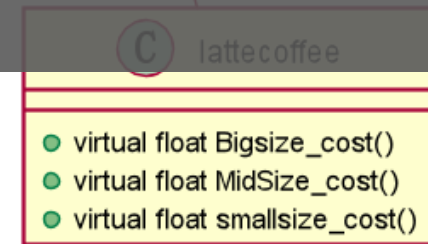
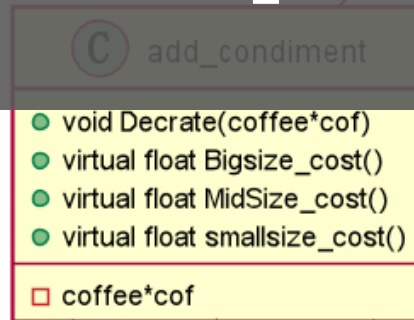
Coffee order



extend



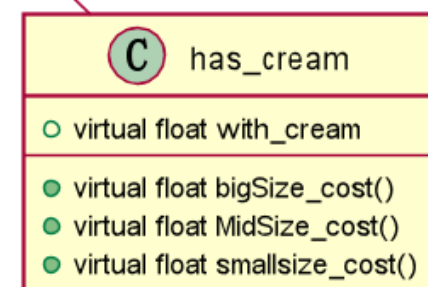
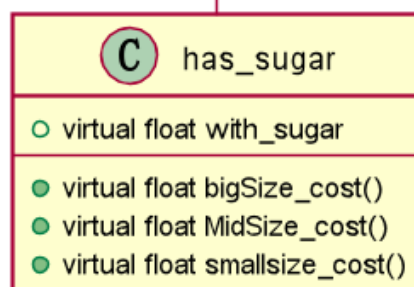
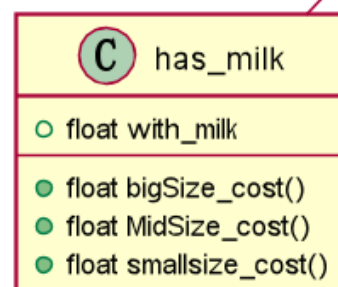
결정적으로 제3자의 공격에 의한
데이터 위변조의 가능성이 존재함



extend

extend

extend



라떼에 크림을 넣을 때 객체를 2개 생성해야 함

런타임 시점 때 클래스 간의 관계를 유연하게 변경

클래스를 이용하는 입장에서 부모와 자식 클래스
중 어떤 메소드를 호출해야 할 지 개념적으로 모
호해질 수 있음



Solution

Solution

고객

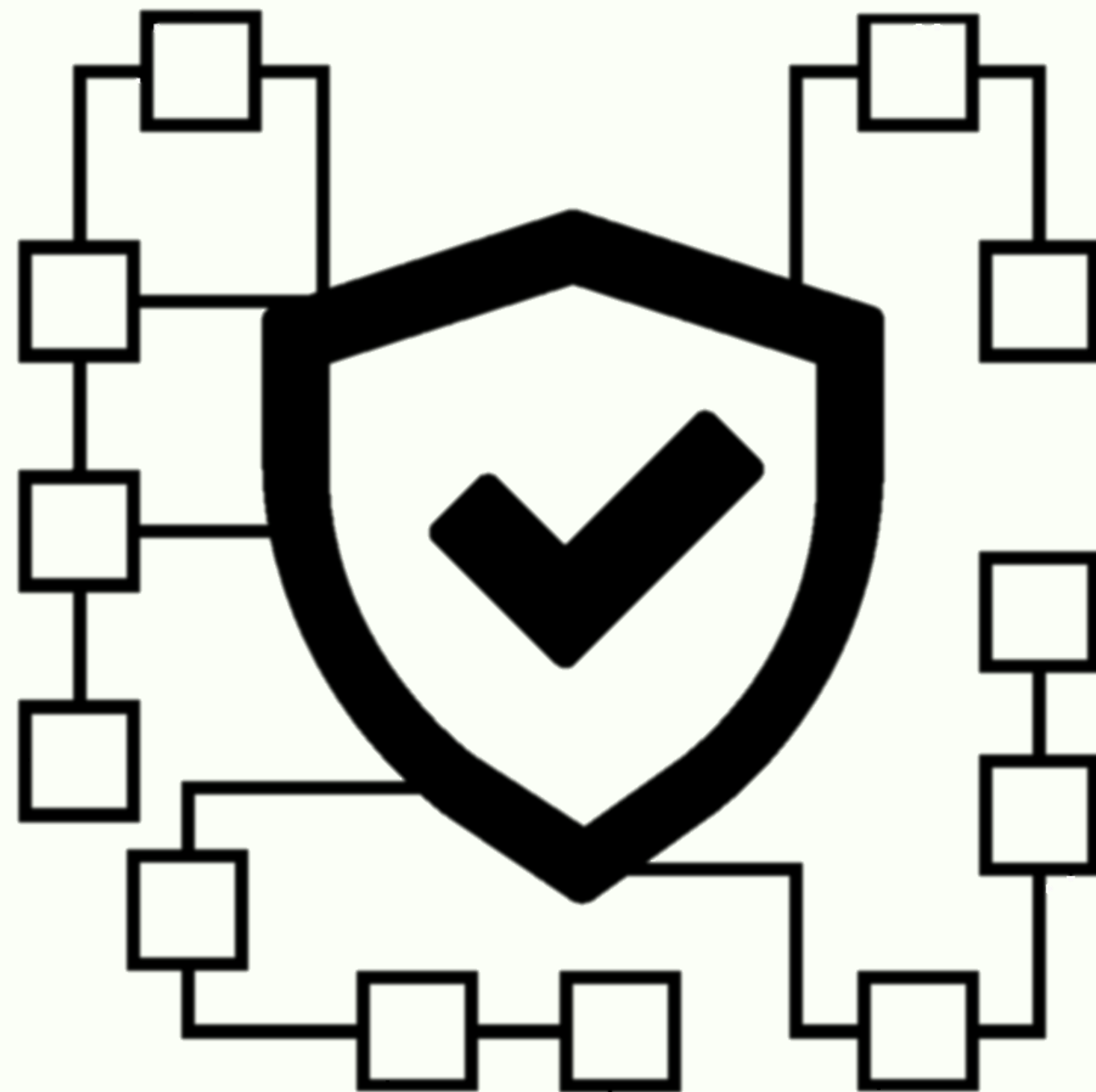
한번 주문을 완료하면 주문 내용이
변경되지 않는다는 걸 믿을 수 있음.

기업

고객의 주문을 서버(블록체인)에 저장하면 해커의
공격을 받아도 데이터 무결성을 증명할 수 있음.
해커의 디도스 공격을 방어할 수 있음.



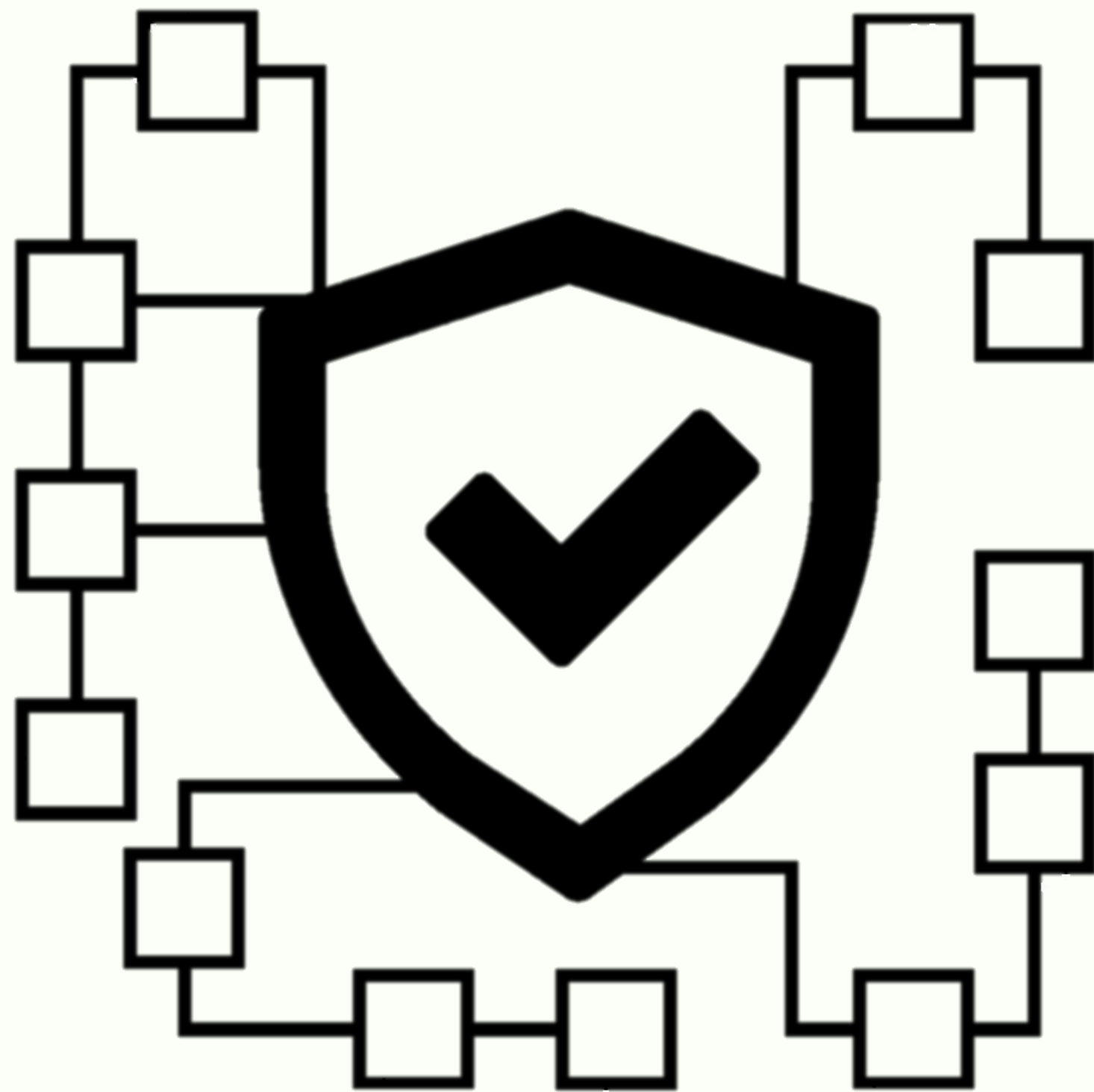
Core Technology



블록체인(Blockchain)



Core Technology



거래를 전달받아 서버에 저장하는 과정에서 엄청난 연산력이 필요함.

데이터는 블록체인에 단방향 연결 리스트 형태로 저장됨. (1노드 = 1블록)

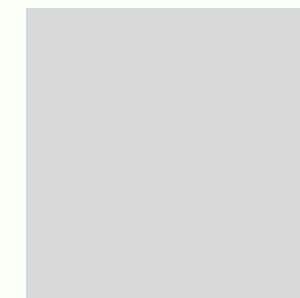
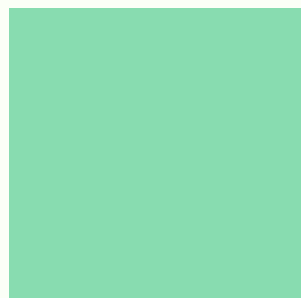
따라서 예전 데이터를 수정하기 위해선 (블록 생성시 필요한 연산량 x 그때부터 생성된 블록개수)만큼의 연산력이 필요함.



Progress

1

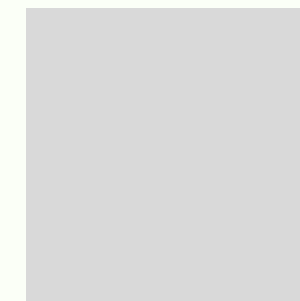
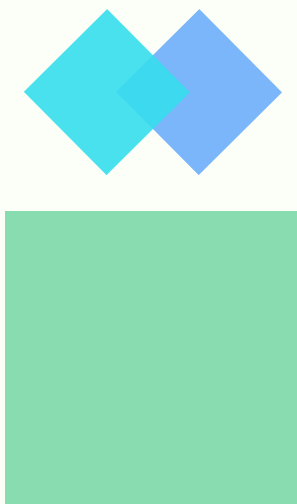
사용자가 앱에 접속해 주문을 합니다.



Progress

1

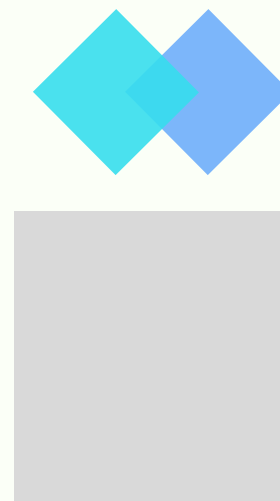
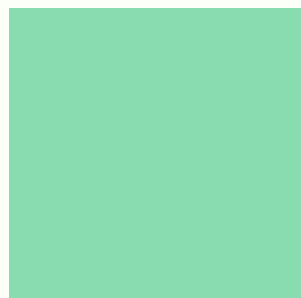
사용자가 앱에 접속해 주문을 합니다.



Progress

2

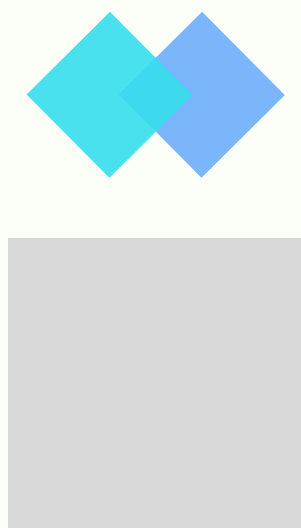
블록체인의 채굴 노드가 사용자의 주문을 받습니다.



Progress

3

채굴 노드는 사용자의 주문을 모아 블록에 넣습니다.



BLOCK



Progress

3

채굴 노드는 사용자의 주문을 모아 블록에 넣습니다.

BLOCK

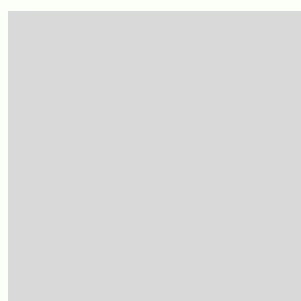
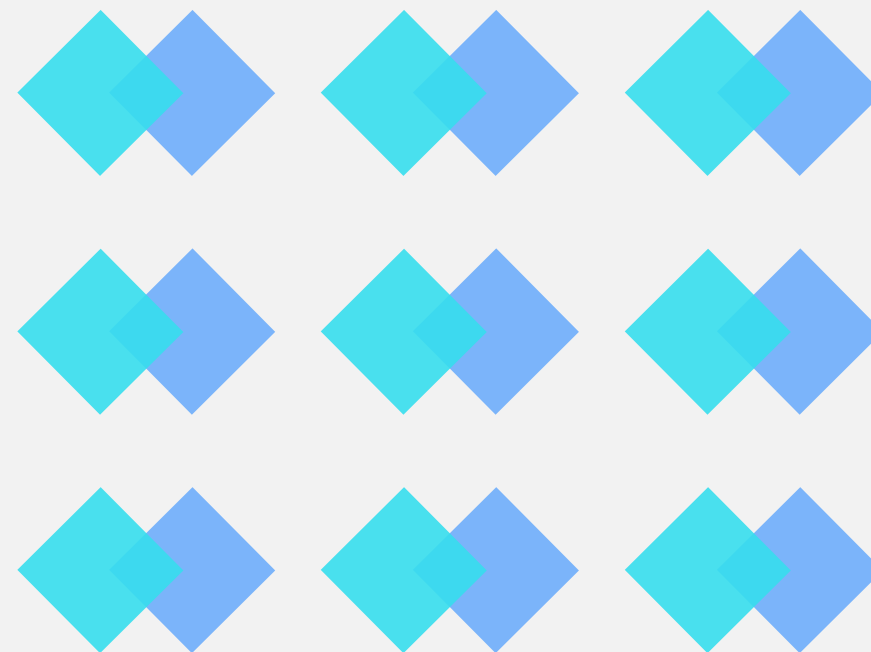


Progress

4

블록에 주문이 다 찰 때까지 넣습니다.

BLOCK

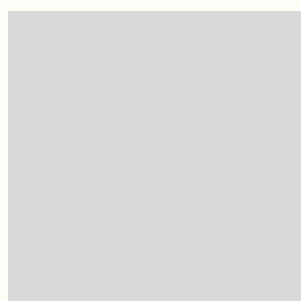
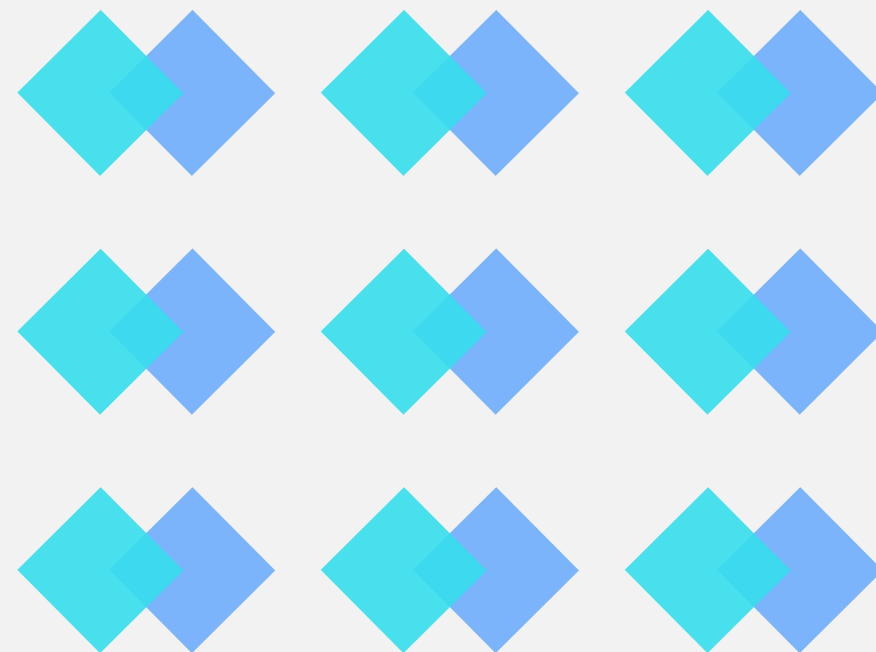


Progress

5

블록이 다 차면 블록을 채굴해 블록해시를 구합니다.

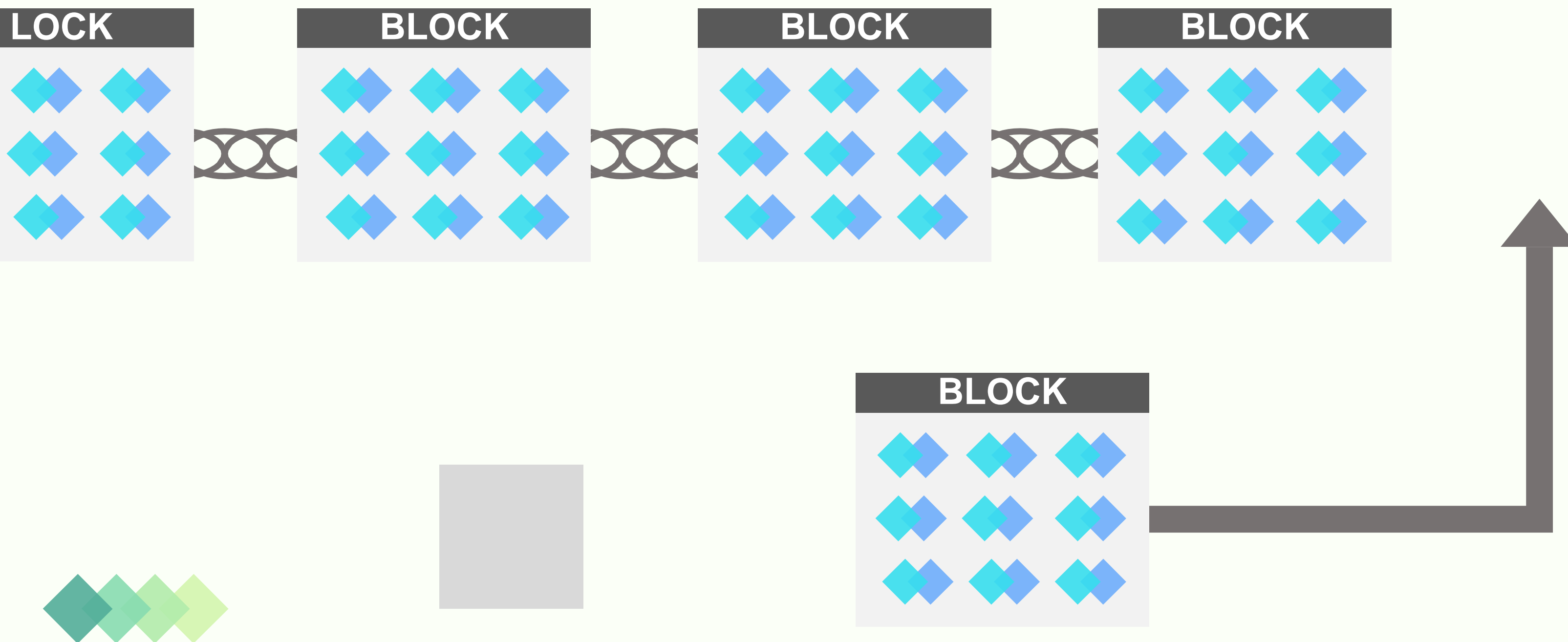
BLOCK



Progress

6

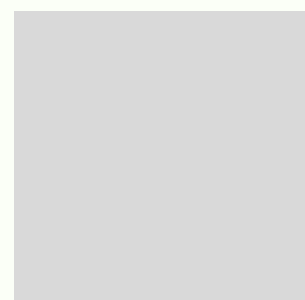
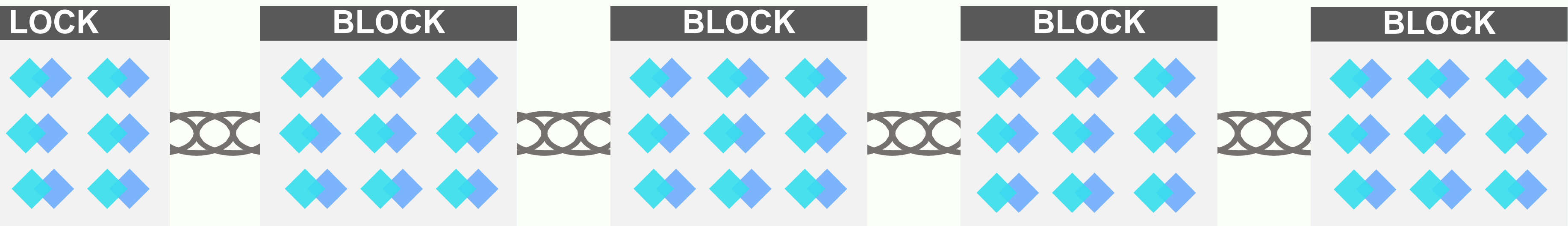
채굴이 끝나면 블록을 블록체인에 연결합니다.



Progress

7

블록이 블록체인에 연결되었습니다.



Analysis

Development Environment

C++11

Visual Studio 2017

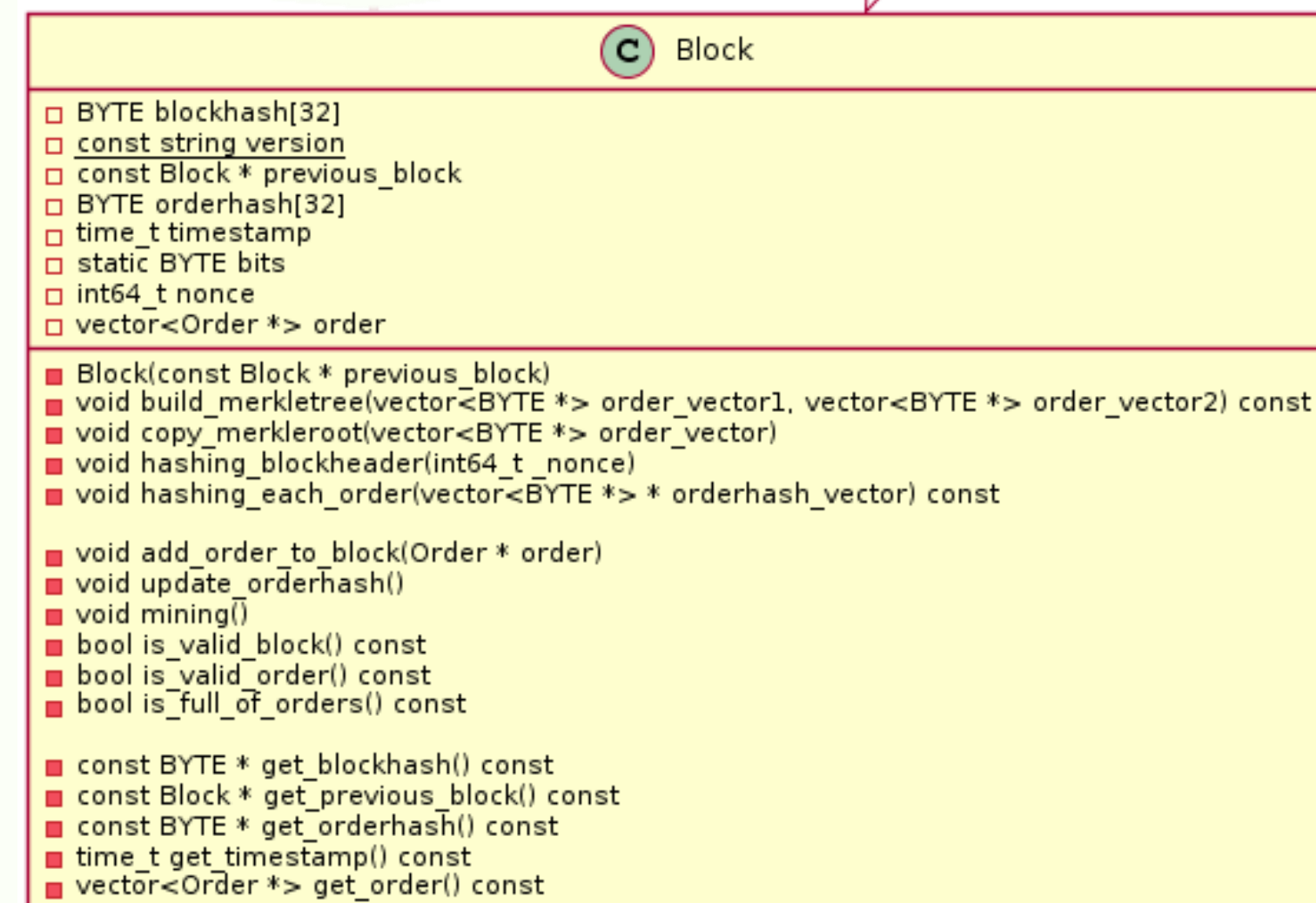
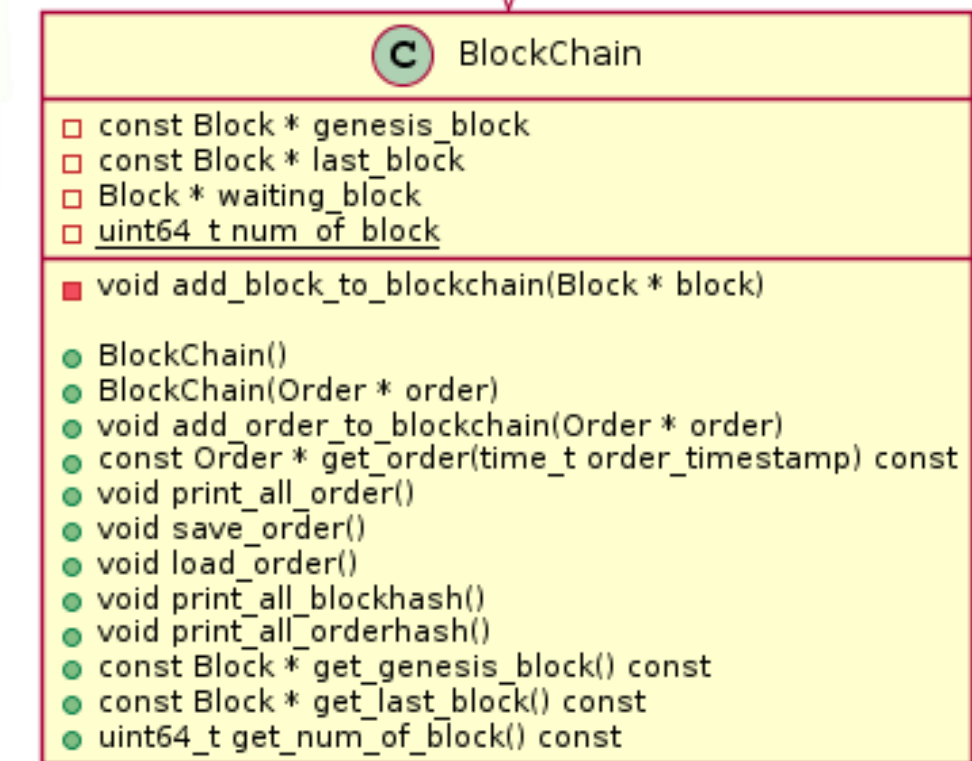
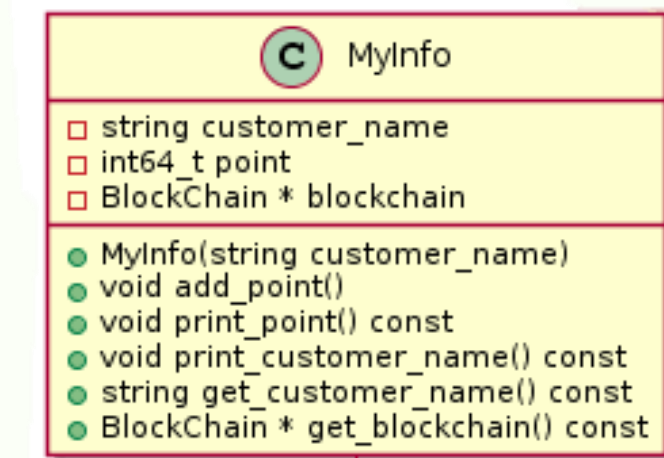
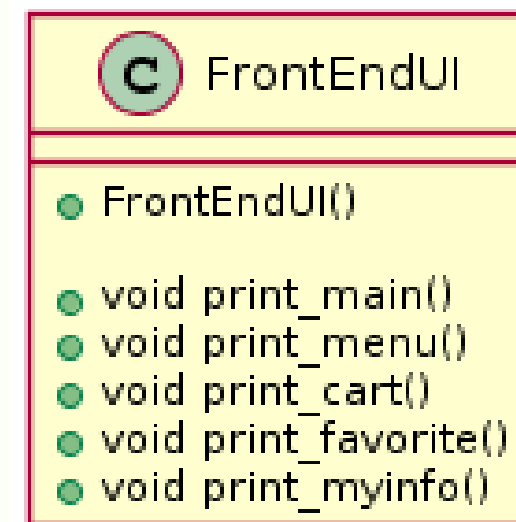
Windows 10 Edu 64bit

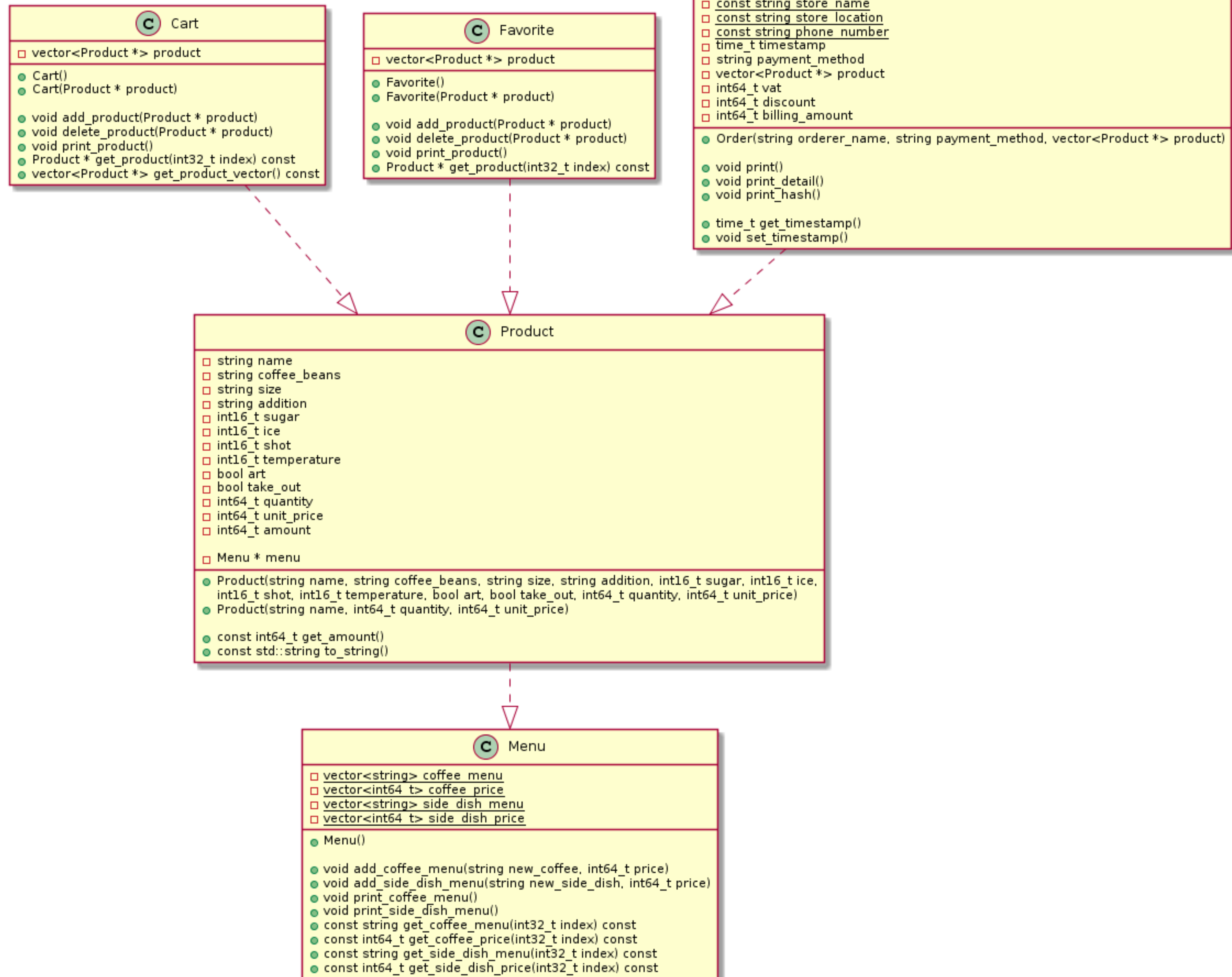
Intel i5



Class Diagram

18.11.14 기준





C FAQ

□ vector<string> question
□ vector<string> answer

- FAQ()
- void print_question() const
- void print_answer(int32_t index) const

E _Main

exit, menu, cart,
favorite, FAQ, myinfo

E _Menu

back, coffee, side_dish

E _Cart

back, order, add_to_favorite,
delete_from_cart, go_to_favorite

E _Favorite

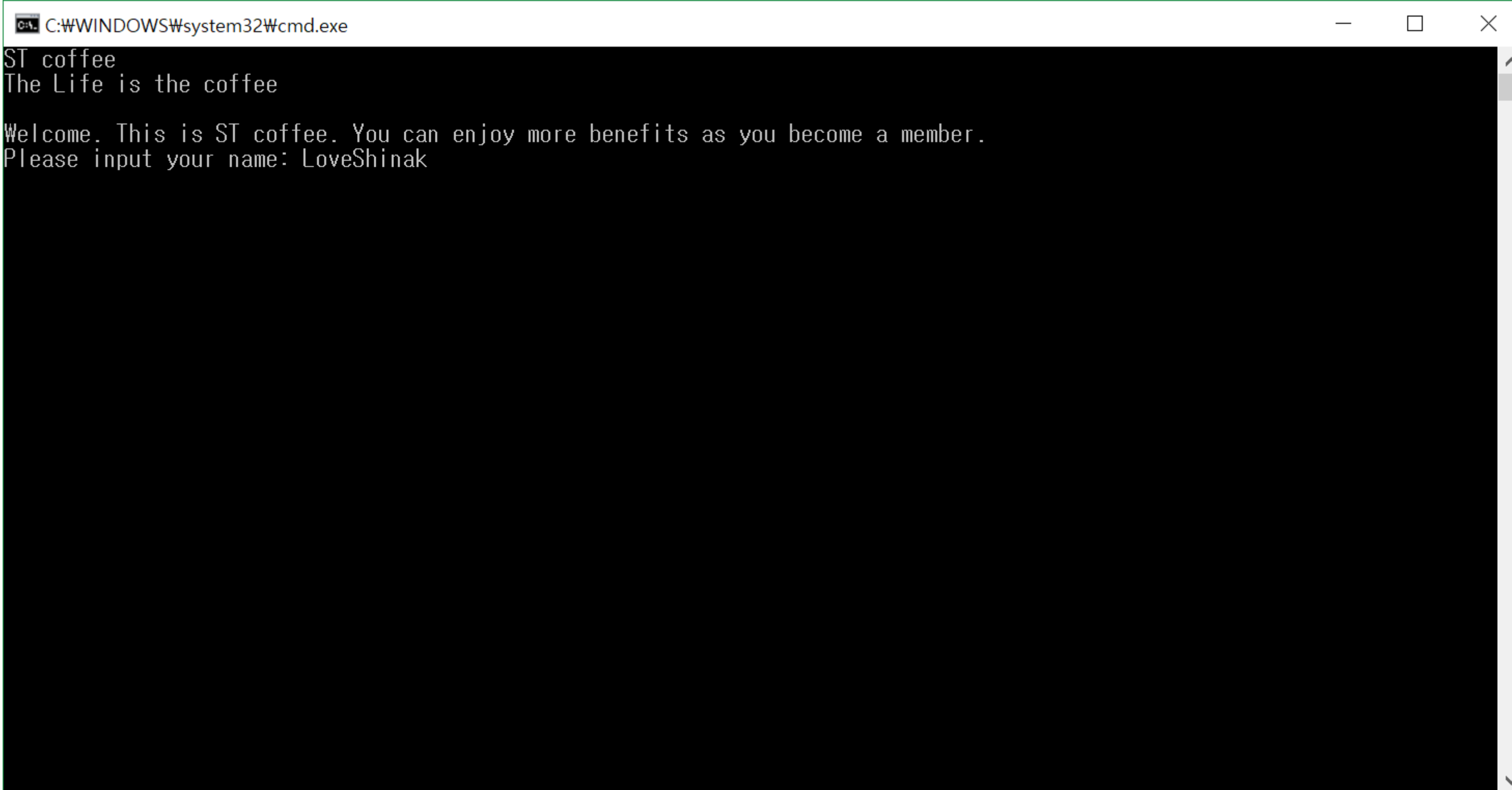
back, add_to_cart, delete_from_favorite,
go_to_cart

E _MyInfo

back, order_history, point,
your_name



Application Preview

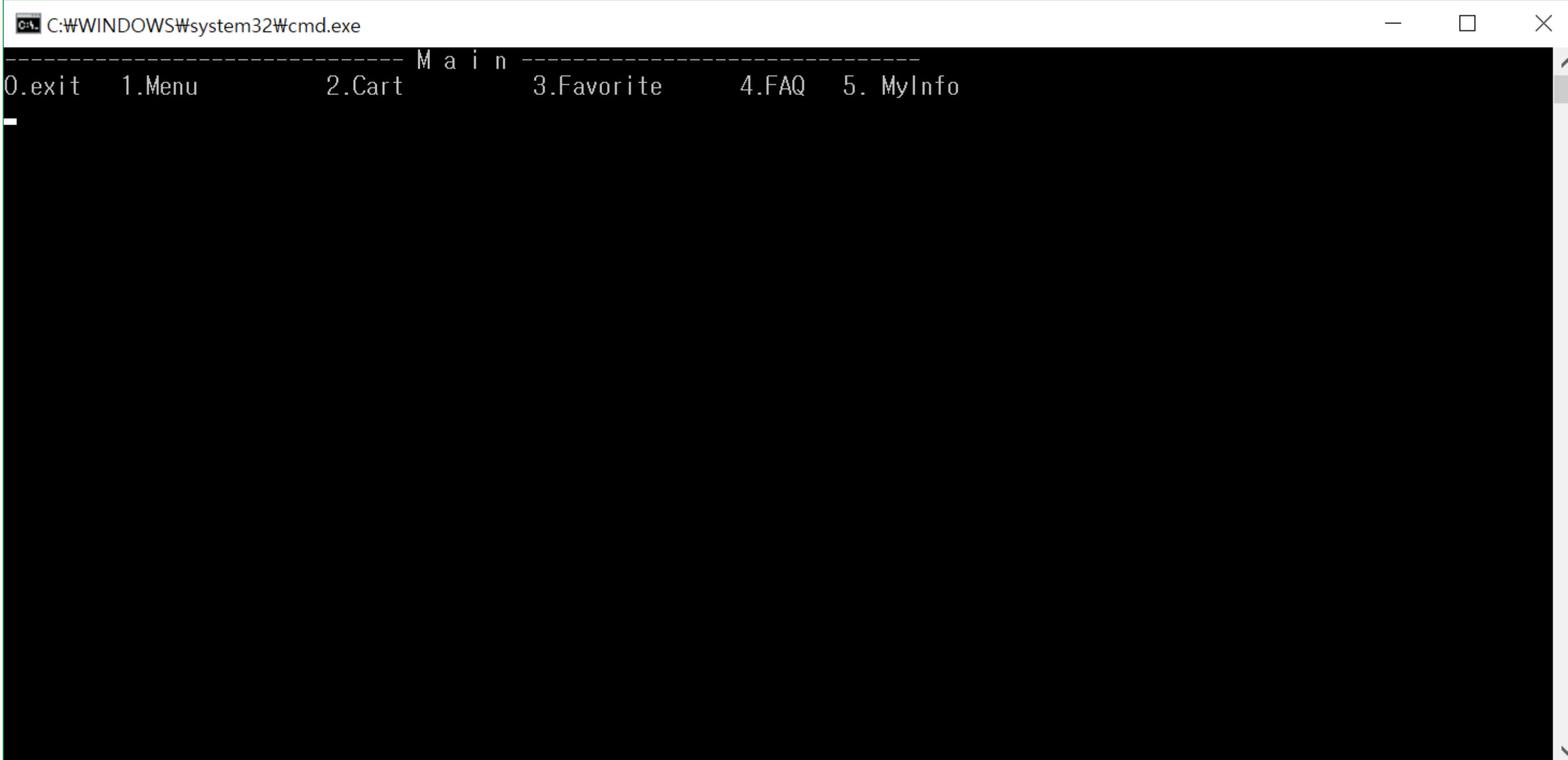


```
C:\WINDOWS\system32\cmd.exe
ST coffee
The Life is the coffee
Welcome. This is ST coffee. You can enjoy more benefits as you become a member.
Please input your name: LoveShinak
```

A screenshot of a Windows command prompt window. The title bar shows the path 'C:\WINDOWS\system32\cmd.exe'. The command prompt displays the output of a program: 'ST coffee', 'The Life is the coffee', 'Welcome. This is ST coffee. You can enjoy more benefits as you become a member.', and 'Please input your name: LoveShinak'. The text is white on a black background. A vertical scrollbar is visible on the right side of the window.



Application Preview



A screenshot of a Windows command prompt window titled "C:\WINDOWS\system32\cmd.exe". The window displays a menu application with the following text:

```
----- M a i n -----  
0.exit   1.Menu   2.Cart   3.Favorite   4.FAQ   5. MyInfo  
_
```

The application is running in a black terminal window with white text. The menu options are listed on a single line, and a cursor is positioned at the end of the first line. The window has a standard Windows title bar with minimize, maximize, and close buttons.



Application Preview

```
C:\WINDOWS\system32\cmd.exe
----- C o f f e e -----
0.back
1.Americano          2000원
2.Espresso           1000원
3.Cafe Latte         2500원
4.Cafe Mocha         3000원

4
Size(string): L
Coffee beans(string): Brazil_Santos
Topping, whipping cream, syrup(string): Caramel_syrup
Sugar(0 ~ 100): 100
Ice(0 ~ 100): 10
Shot(int): 1
Temperature(int): 70
Cafe Art or not(1/0): 1
Take out(1/0): 1
Quantity(int): 2

Coffee Menu: Cafe Mocha
Size: L
Coffee beans(string): Brazil_Santos
Addition: Caramel_syrup
Sugar: 100%
Ice: 10%
Shot: 1
Temperature: 70`c
Cafe art : Art
Take out : Take out
Quantity: 2
Total price: 6000
Confirm order?(1/0)
```



Application Preview

```
C:\WINDOWS\system32\cmd.exe
----- C a r t -----
0.back
1.Cafe Mocha
Size: L
Quantity: 2
Unit price: 3000
Total amount: 6000
```

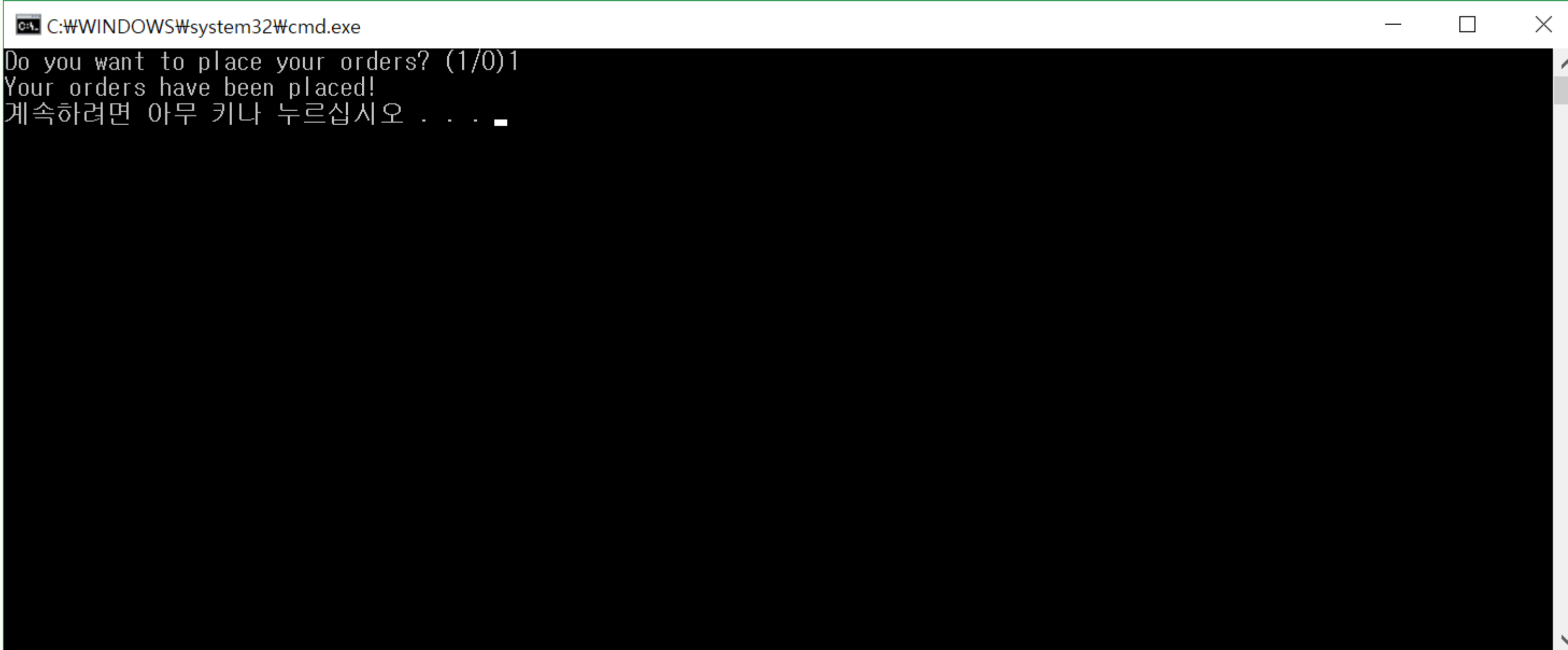


Application Preview

```
C:\WINDOWS\system32\cmd.exe
Selected: Cafe Mocha
Size: L
Quantity: 2
Unit price: 3000
Total amount: 6000
----- O p t i o n -----
0.back    1.Order    2.Add to favorite    3.Delete from cart    4.Go to favorite
_
```



Application Preview



A screenshot of a Windows command prompt window. The title bar shows the path "C:\WINDOWS\system32\cmd.exe". The command prompt displays the following text: "Do you want to place your orders? (1/0)1", "Your orders have been placed!", and "계속하려면 아무 키나 누르십시오 . . .". The text is white on a black background. The window has standard Windows window controls (minimize, maximize, close) in the top right corner.

```
C:\WINDOWS\system32\cmd.exe
Do you want to place your orders? (1/0)1
Your orders have been placed!
계속하려면 아무 키나 누르십시오 . . .
```



Application Preview

```
C:\WINDOWS\system32\cmd.exe
----- M y I n f o -----
0.back  1.Order history  2.Point  3.Your name
1

Blockhash: 008aa2e875e497c525175d88d8bab43236337925dc4f6b9797dd8a6d43b594
Orderhash: 5f3848a59048ccbc0c7a2237cef1e531284fc0b8a6b52bdd5f47e1cee96f57

Store name: ST coffee
Store location: Chung-Ang Univ main store
Customer's name: LoveShinak

Product: Cafe Mocha
Size: L
Quantity: 2
Unit price: 3000
Total amount: 6000

Payment method: Cash
Total billing amount : 6000

계속하려면 아무 키나 누르십시오 . . .
```



Application Preview

```
C:\WINDOWS\system32\cmd.exe

----- M y I n f o -----
0.back  1.Order history  2.Point  3.Your name
1

Blockhash: 008aa2e875e497c525175d88d8bab43236337925dc4f6b9797dd8a6d43b594
Orderhash: 5f3848a59048ccbc0c7a2237cef1e531284fc0b8a6b52bdd5f47e1cee96f57

Store name: ST coffee
Store location: Chung-Ang Univ main store
Customer's name: LoveShinak

Product: Cafe Mocha
Size: L
Quantity: 2
Unit price: 3000
Total amount: 6000

Payment method: Cash
Total billing amount : 6000

계속하려면 아무 키나 누르십시오 . . .
```



Application Preview

```
C:\WINDOWS\system32\cmd.exe
----- S i d e D i s h -----
0.back
1.Honey Bread      3000원
2.Sandwitch        2000원
3.Brownie          4000원
4.Macaroon         2000원
5.Mango Mousse Cake 4000원

4
Size(string): L
Take out(1/0): 1
Quantity(int): 2

Side dish: Macaroon
Size: L
Take out : Take out
Quantity: 2
Total price: 4000
Confirm order?(1/0)
```



Application Preview



A screenshot of a Windows command prompt window. The title bar shows the path `C:\WINDOWS\system32\cmd.exe`. The command prompt displays the following text:

```
Move your order to?    1.Cart    2.Favorite    3.Order now
3
Payment method(string): Card
```

The window has a black background and a white border. The text is white. The window title bar is white with standard Windows window controls (minimize, maximize, close) on the right.



Application Preview

```
C:\WINDOWS\system32\cmd.exe
----- M y I n f o -----
0.back    1.Order history    2.Point    3.Your name
1

Blockhash: 008e94bc1e12822dac90659396e3e3bdfa1472ec48a35d2347f36dbea75e2
Orderhash: 5c4c93f499baaf066f0107c2238d95d106825ca3342f2929a6d7a8579a036cf

Store name: ST coffee
Store location: Chung-Ang Univ main store
Customer's name: LoveShinak

Product: Macaroon
Size: L
Quantity: 2
Unit price: 2000
Total amount: 4000

Payment method: Card
Total billing amount : 4000

Blockhash: 008aa2e875e497c525175d88d8bab43236337925dc4f6b9797dd8a6d43b594
Orderhash: 5f3848a59048ccbc0c7a2237cef1e531284fc0b8a6b52bdd5f47e1cee96f57

Store name: ST coffee
Store location: Chung-Ang Univ main store
Customer's name: LoveShinak

Product: Cafe Mocha
Size: L
Quantity: 2
Unit price: 3000
Total amount: 6000

Payment method: Cash
Total billing amount : 6000

계속하려면 아무 키나 누르십시오 . . .
```



Application Preview

```
C:\WINDOWS\system32\cmd.exe

----- M y I n f o -----
0.back    1.Order history    2.Point    3.Your name
1

Blockhash: 008e94bc1e12822dac90659396e3e3bdfa1472ec48a35d2347f36dbea75e2
Orderhash: 5c4c93f499baaf066f0107c2238d95d106825ca3342f2929a6d7a8579a036cf

Store name: ST coffee
Store location: Chung-Ang Univ main store
Customer's name: LoveShinak

Product: Macaroon
Size: L
Quantity: 2
Unit price: 2000
Total amount: 4000

Payment method: Card
Total billing amount : 4000

Blockhash: 008aa2e875e497c525175d88d8bab43236337925dc4f6b9797dd8a6d43b594
Orderhash: 5f3848a59048ccbc0c7a2237cef1e531284fc0b8a6b52bdd5f47e1cee96f57

Store name: ST coffee
Store location: Chung-Ang Univ main store
Customer's name: LoveShinak

Product: Cafe Mocha
Size: L
Quantity: 2
Unit price: 3000
Total amount: 6000

Payment method: Cash
Total billing amount : 6000

계속하려면 아무 키나 누르십시오 . . .
```



Change & Extension

상품을 구성하는 요소의 변경, 추가, 삭제에 용이하다.
실제로 상품의 닉네임 구현을 까먹어 상품 닉네임을
추가했는데 3분도 걸리지 않았다.

메뉴 내용과 가격은 Menu 클래스의 static 변수에서
언제든 변경할 수 있다.

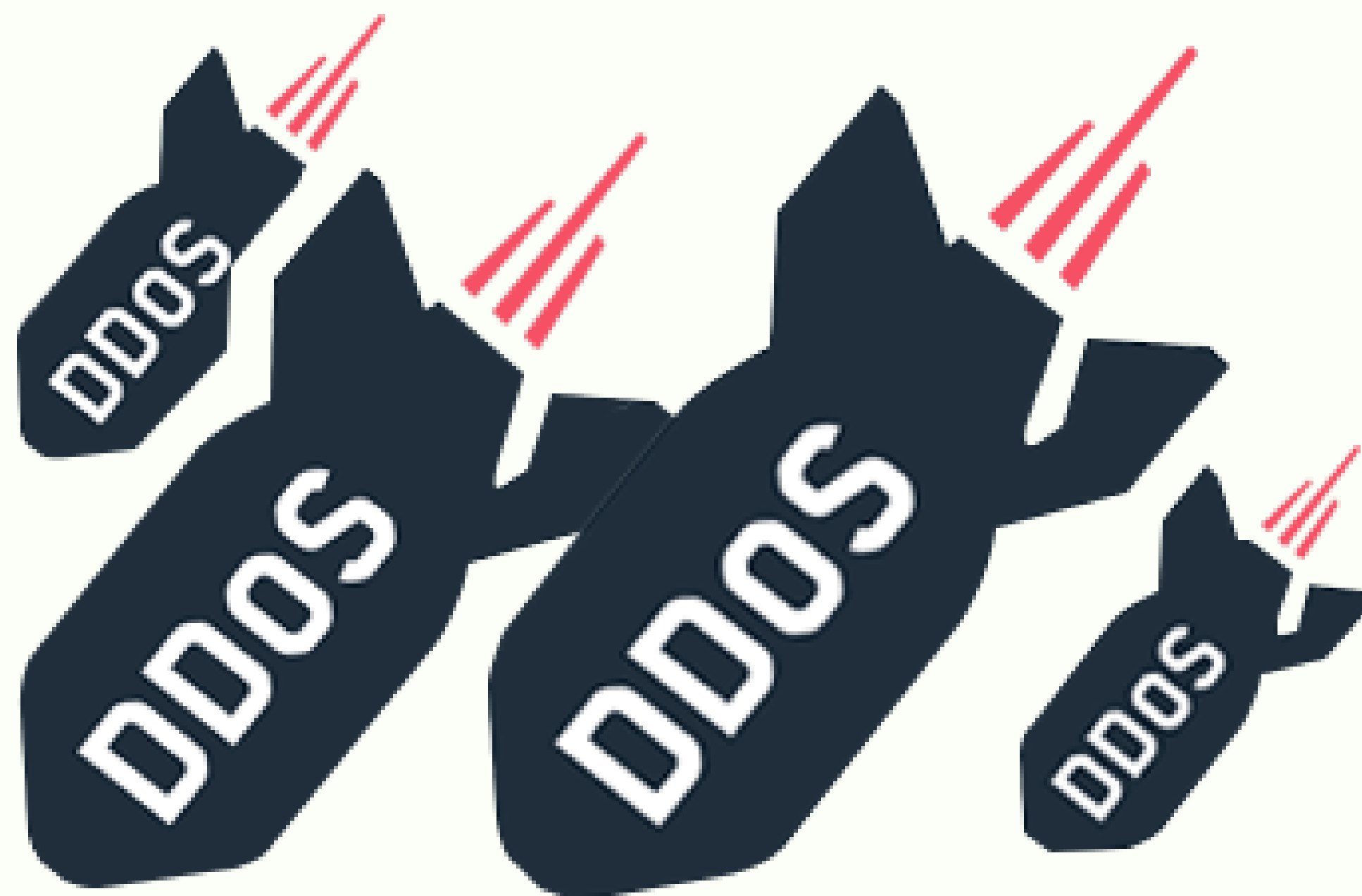
클래스 별로 기능을 나누고, 기능을 여러 메소드로 나
누었기 때문에 오류가 발생했을 때 쉽게 디버깅이 가
능하다.





Vision

Current Limitation



Current Limitation

블록에 포인터 값이 저장되기 때문에 프로그램을 종료하면 블록체인이 사라짐.

Product class의 세분화가 필요함.

입력으로 띄어쓰기를 못 입력하고, string, int 등 정해진 양식에 맞춰 입력해야 함.

Cart에 있는 상품을 일괄적으로 구매할 수 없음.



Future Plan

블록체인을 컴퓨터에 저장하는 save/load 기능을 추가

Product class에 팩토리 메소드 디자인을 적용

입력값을 정제하는 메소드와, 여러 선택지를 화면에 출력하는 메소드를 추가

Cart 클래스에 order_all() 메소드를 추가



Team

기획 및 개발, PPT: 곽태욱

UML 제작: 고가해

베타 테스터: 서신악

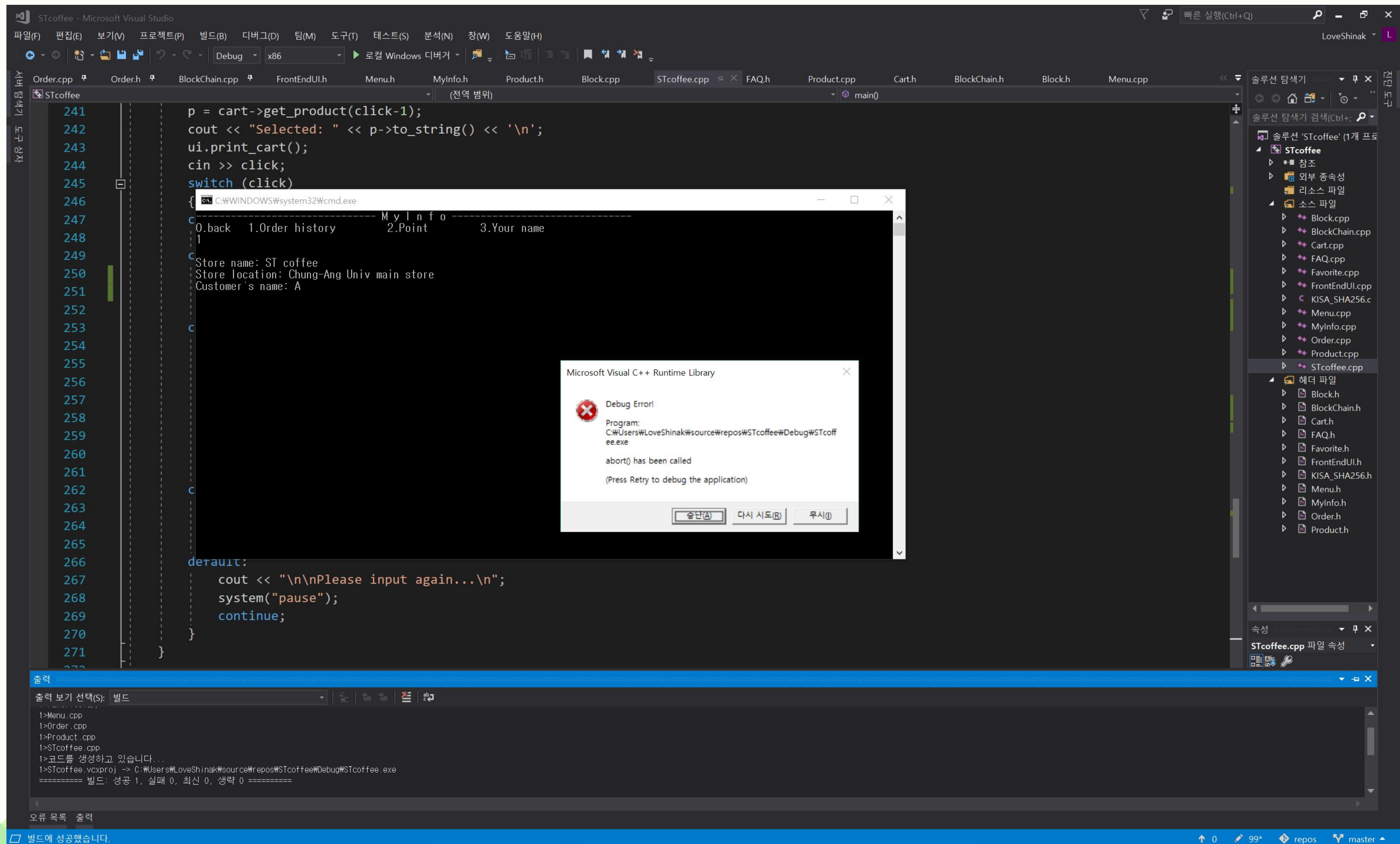


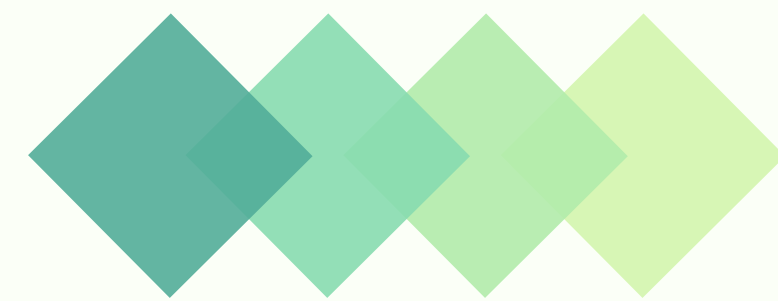
Source Code

Github:
<https://github.com/rmfpdlxmtidl>



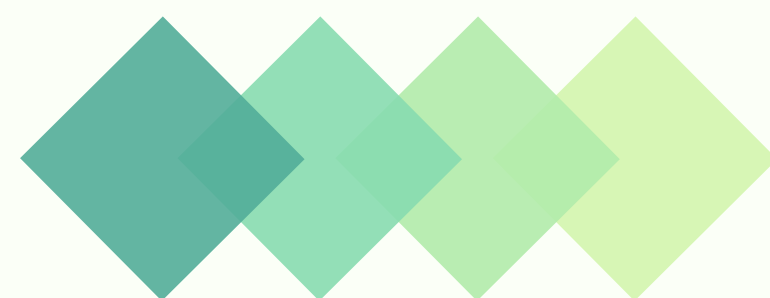
Episode





QnA





감사합니다

