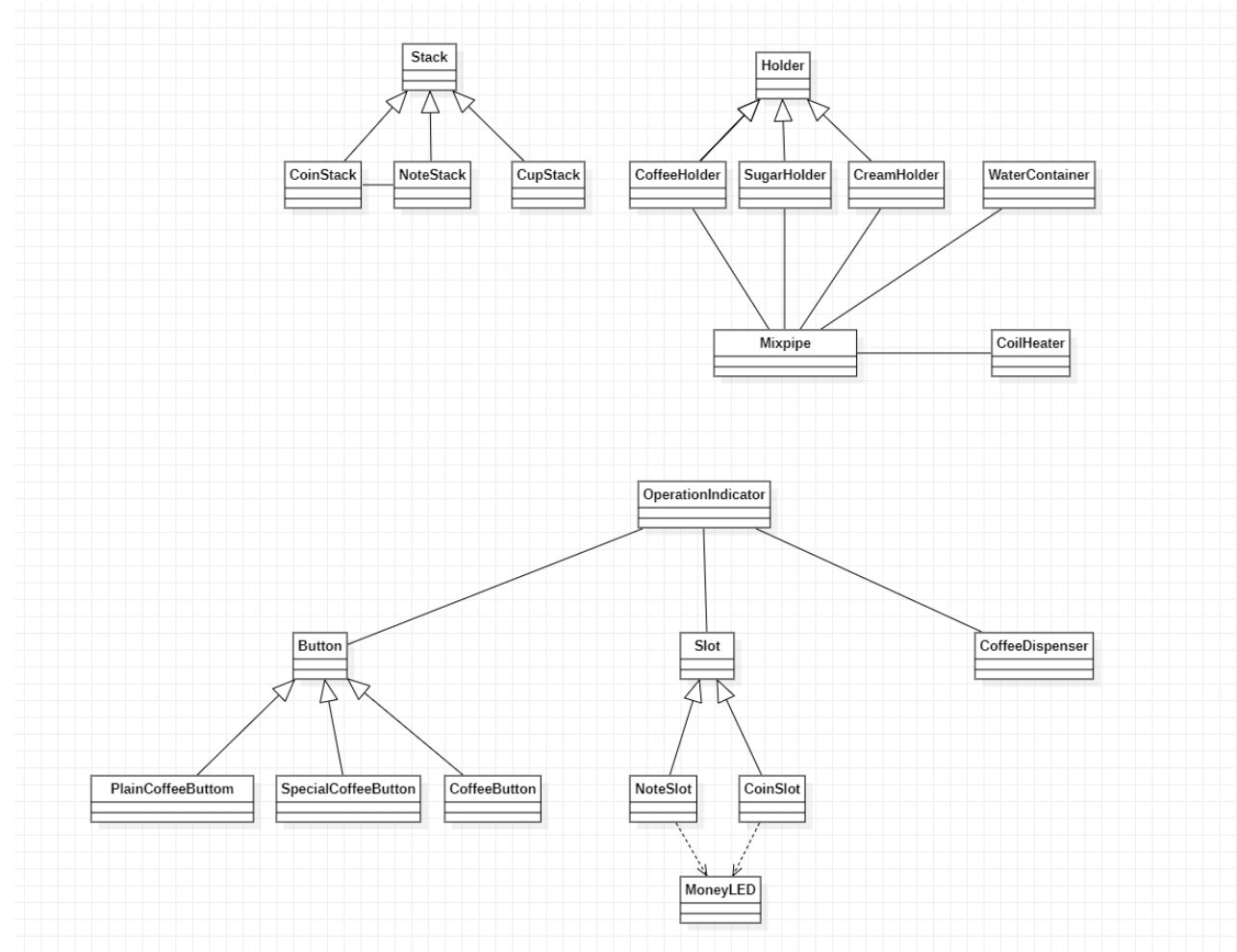


소프트웨어 분석 및 설계 자판기 클래스 모델 구현

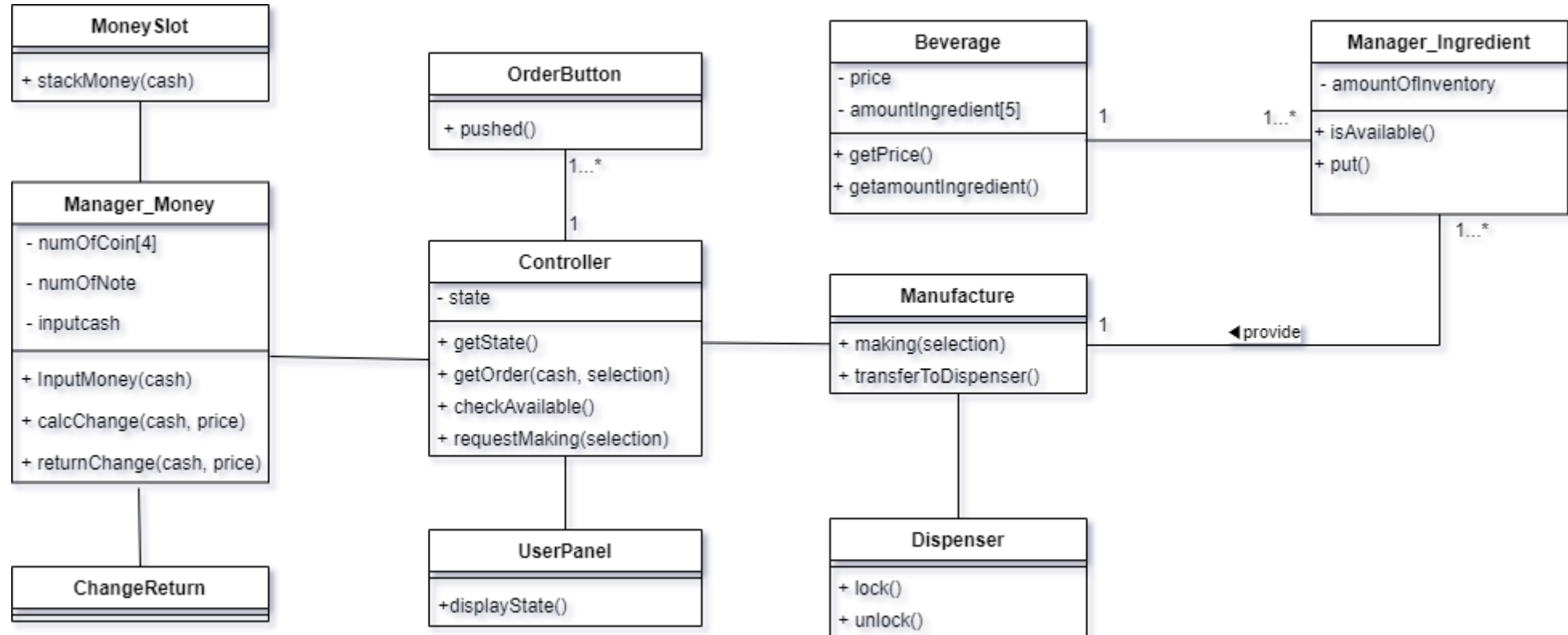
사용언어: C++

20190415 황혜령

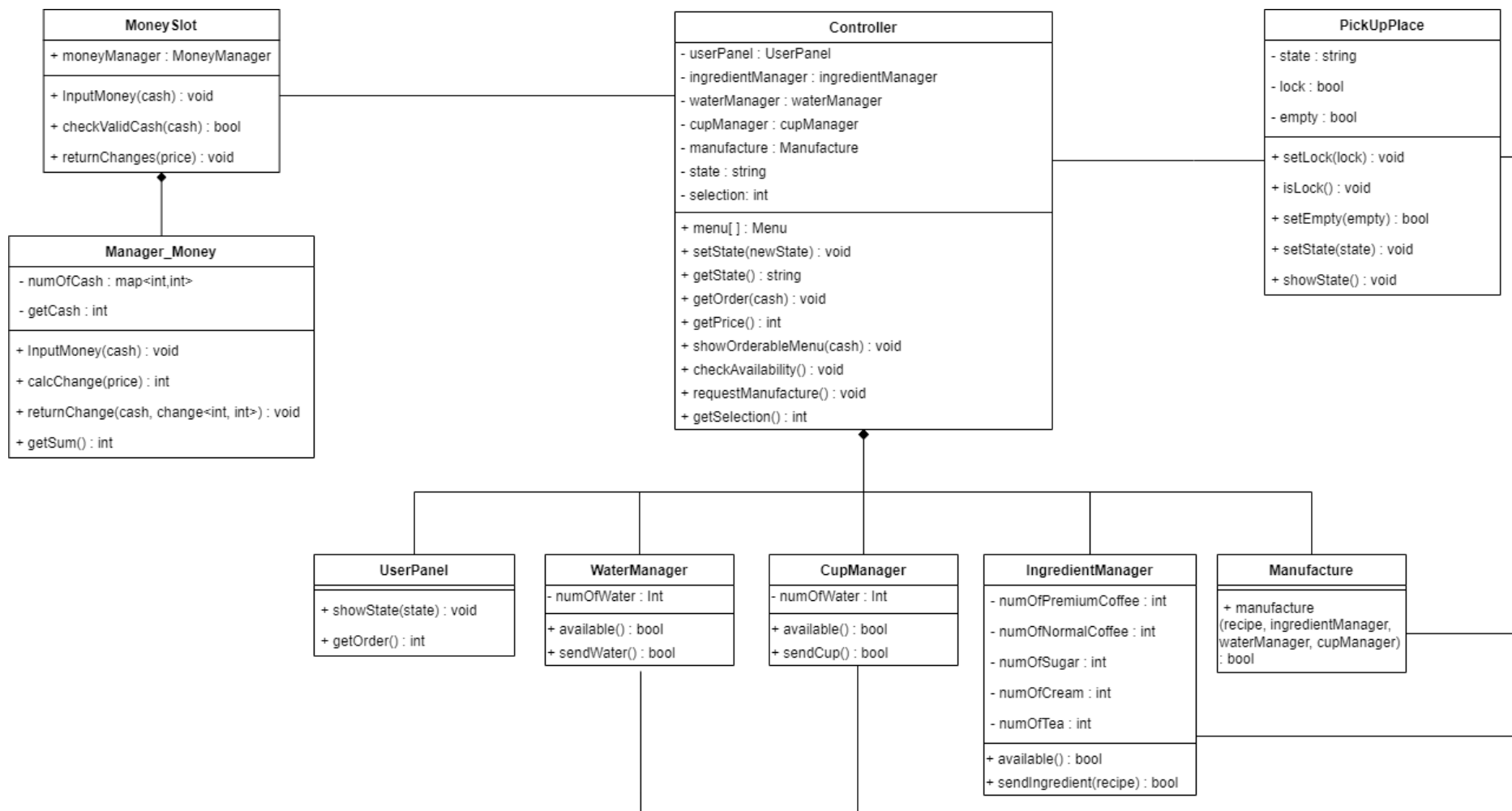
1. 클래스 모델 _수정단계(4주차)



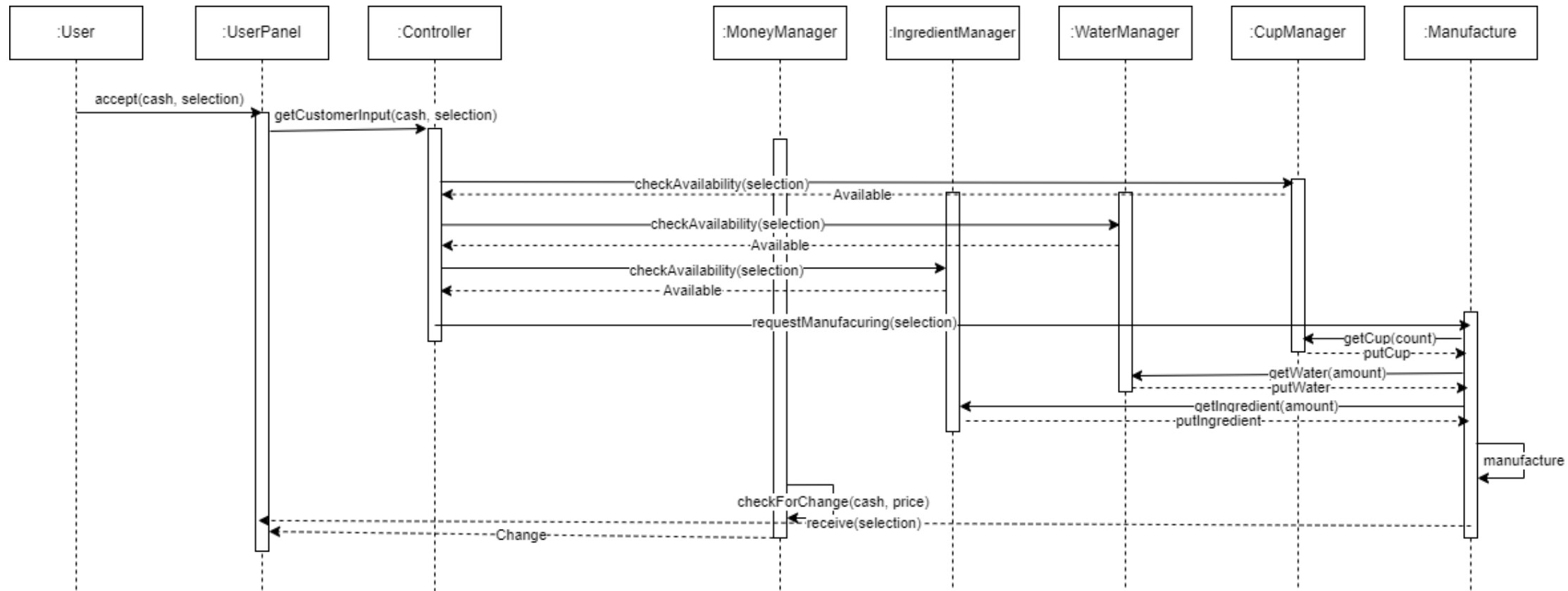
1. 클래스 모델 _수정단계(10주차)



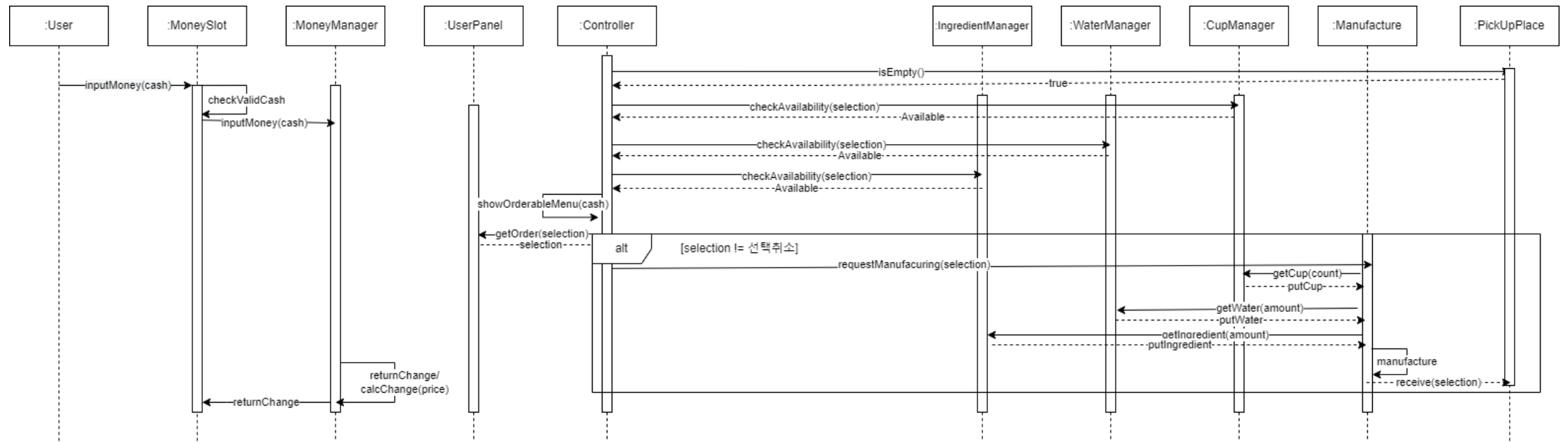
1. 클래스 모델 _최종 버전



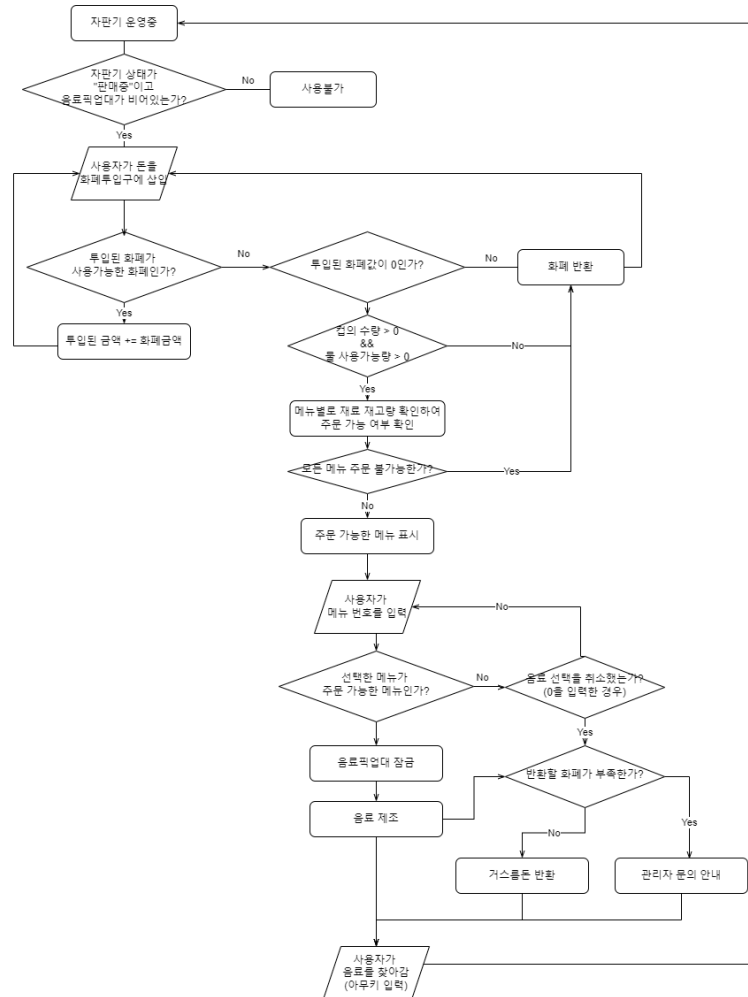
2. 시퀀스 모델_수정단계(9주차)



2. 시퀀스 모델 _최종 버전



3. 구현 코드 흐름도



4. 실행화면

```
=====자판기 사용 매뉴얼=====
= 1. 동전 또는 1천원 화폐를 화폐 투입구에 넣어주세요. =
= 2. 화폐 삽입을 그만하려면 '0'을 입력하여 주세요. =
= 3. 주문 가능한 메뉴의 번호를 입력하여 주세요. =
= 4. "제조 완료" 표시가 나타나면 음료를 찾아가세요. =
= 5. 거스름돈을 화폐 투입구에서 찾아가세요. =
=====

[ 판매중 ]

=====화폐 투입구=====
500
=====
[ 투입된 금액: 500 ]

=====화폐 투입구=====
100
=====
[ 투입된 금액: 600 ]

=====화폐 투입구=====
50
=====
[ 투입된 금액: 650 ]

=====화폐 투입구=====
10
=====
[ 투입된 금액: 660 ]

=====화폐 투입구=====
0
=====

*****MENU*****
(1) 고급커피 700 ○
(2) 고급커피 700 ○
(3) 고급커피 700 ○
(4) 특수커피 600 ●
(5) 특수커피 600 ●
(6) 특수커피 600 ●
(7) 일반커피 500 ●
(8) 일반커피 500 ●
(9) 일반커피 500 ●
(10) 우리차 500 ●
(11) 우리차 500 ●
(12) 우리차 500 ●
*****

[ 메뉴 선택 ]

3
9
PickUpPlace: <lock>

[ 일반커피 제조 중 ]

PickUpPlace [ _|_| ]
PickUpPlace [ _|~|_| ]
PickUpPlace [ _|☆|_| ]
PickUpPlace [ _|§|_| ]

[ 제조 완료. 음료를 찾아가세요. ]

PickUpPlace: <unlock>
PickUpPlace [ _|_|_| ]

=====화폐 투입구=====
100 50 10
=====
PickUpPlace [ _|_|_|_| ]
```

정상적으로 buy coffee 유스케이스가 작동되는 경우의 실행 화면입니다.

5. 소스코드_Controller Class

```
(SWAD) 자판기 - Controller - getOrder(int cash)
9 #include "UserPanel.h"
10 #include "PickUpPlace.h"
11 using namespace std;
12
13 const int NUMOFMENU = 13;
14
15 typedef struct Menu {
16     const int menuID;
17     const string menuName;
18     const int price;
19     const bool ingredient[5]; //프리미엄커피, 일반커피, 설탕, 크림
20     bool available;
21 }Menu;
22
23 class Controller{
24 private:
25     UserPanel userPanel;
26     IngredientManager ingredientManager;
27     WaterManager waterManager;
28     CupManager cupManager;
29     Manufacture manufacture;
30     string state;
31     int selection = 100;
32
33 public:
34     Menu menu[NUMOFMENU] = {
35         {0, "", 0},
36         {1, "고급커피", 700, {true, false, true, true, false}},
37         {2, "고급커피", 700, {true, false, true, true, false}},
38         {3, "고급커피", 700, {true, false, true, true, false}},
39         {4, "특수커피", 600, {false, true, true, true, false}},
40         {5, "특수커피", 600, {false, true, true, true, false}},
41         {6, "특수커피", 600, {false, true, true, true, false}},
42         {7, "일반커피", 500, {false, true, false, false, false}},
43         {8, "일반커피", 500, {false, true, false, false, false}},
44         {9, "일반커피", 500, {false, true, false, false, false}},
45         {10, "우리차", 500, {false, false, true, false, true}},
46         {11, "우리차", 500, {false, false, true, false, true}},
47         {12, "우리차", 500, {false, false, true, false, true}}
48     };
49     void showOrderableMenu(int cash);
50     void setState(string state) {
51         this->state = state;
52         userPanel.showState(this->state);
53     }
54     int getPrice() { return menu[this->selection].price; }
55     int getSelection() { return selection; }
56     string getState() { return this->state; }
57     void checkAvailability();
58     void getOrder(int cash);
59     void requestManufacture(PickUpPlace* pickupPlace);
60 };
61
(SWAD) 자판기 - Controller - showOrderableMenu(int cash)
10 void Controller::showOrderableMenu(int cash) {
11     bool isOrderable = false; //주문 가능한 상태인지 체크
12
13     cout << "*****MENU*****\n";
14
15     // 물 또는 컵이 없는 경우 모든 메뉴 주문 불가능
16     if(waterManager.available() && cupManager.available()){
17         checkAvailability(); // 재료 있는지 확인
18         for (int i = 1; i < NUMOFMENU; i++) {
19             // 주문 가능한 메뉴: ●, 불가능한 메뉴: ○ 로 표시
20             if ((menu[i].price <= cash) && (menu[i].available)) {
21                 cout << "(" << menu[i].menuID << ") " << menu[i].menuName << " " << menu[i].price << " ● " << endl;
22                 isOrderable = true;
23             }
24             else {
25                 cout << "(" << menu[i].menuID << ") " << menu[i].menuName << " " << menu[i].price << " ○ " << endl;
26             }
27         }
28     }
29     else {
30         for (int i = 1; i < NUMOFMENU; i++){
31             cout << "(" << menu[i].menuID << ") " << menu[i].menuName << " " << menu[i].price << " ○ " << endl;
32             this->selection = 0; // 메뉴 선택하지 않고 거스를돈 반환하기 위해 0으로 설정
33         }
34     }
35     cout << "*****\n";
36
37     selection = (isOrderable) ? selection : 0; // 모든 메뉴 주문 불가능하다면 메뉴를 선택하지 않은 상태로 설정
38 }
39
40 void Controller::getOrder(int cash) {
41     setState("메뉴 선택");
42
43     // 모든 메뉴 불가능할 경우 selection은 이미 0이므로 선택하지 않음
44     while (selection) {
45         selection = userPanel.getOrder();
46
47         // 삽입된 금액보다 선택한 메뉴의 가격이 높거나 비활성화된 버튼을 누른 경우 다시 선택하도록 함
48         if (menu[selection].price <= cash || (selection >= NUMOFMENU))
49             break;
50     }
51 }
52
53 void Controller::requestManufacture(PickUpPlace* pickupPlace) {
54     setState(menu[this->selection].menuName + " 제조 중");
55     pickupPlace->setEmpty(false);
56
57     if (manufacture.manufacture(pickupPlace, menu[this->selection].ingredient, &ingredientManager, &cupManager, &waterManager))
58         setState("제조 완료, 음료를 찾아가세요.");
59     pickupPlace->setLock(false);
60     pickupPlace->setState("_I_I_");
61 }
```

5. 소스코드_MoneySlot Class

```
(SWAD) 자판기 (전역 범위) MoneySlot inputMoney()

1 #ifndef MONEYSLOT_H
2 #define MONEYSLOT_H
3 #include <string>
4 #include "MoneyManager.h"
5
6 class MoneySlot{
7 public:
8     MoneyManager moneyManager;
9     bool checkValidCash(int cash); // 사용가능한 화폐인지 검사
10    void inputMoney(); // 사용자가 삽입한 화폐
11    void returnChanges(int price); // 거스름돈 반환
12 };
13
14 #endif

6 bool MoneySlot::checkValidCash(int cash) {
7     if (cash == 10 || cash == 50 || cash == 100 || cash == 500 || cash == 1000)
8         return true;
9     else
10        return false;
11 }
12
13 void MoneySlot::inputMoney() {
14     int cash = 0;
15
16     //사용자가 자판기에 화폐 투입
17     while (true) {
18         cout << "=====화폐 투입구=====\\n"; cin >> cash; cout << "----- " << endl;
19
20         // 사용가능한 화폐이면 moneyManager가 관리하도록 함
21         if (checkValidCash(cash)) {
22             moneyManager.inputMoney(cash);
23         }
24         // 사용 불가능한 화폐이면 반환
25         else {
26             if (cash == 5000 || cash == 10000 || cash == 50000){
27                 cout << "반환: " << cash << endl;
28                 cash = 0;
29             }
30             // 0을 입력했을시 화폐 삽입 멈춤
31             else if (cash == 0)
32                 return;
33         }
34         cout << "[ 투입된 금액: " << moneyManager.getSum() << " ]" << endl;
35     }
36 }
37
38 void MoneySlot::returnChanges(int price) {
39     //화폐별 거스름돈 개수 저장 공간
40     map<int, int> change = {
41         {10, 0}, {50, 0}, {100, 0}, {500, 0}, {1000, 0}
42     };
43     moneyManager.returnChange(price, change);
44
45     //moneySlot에 거스름돈 반환
46     cout << "=====화폐 투입구=====\\n";
47     while (change[1000]) {
48         cout << 1000 << " ";
49         change[1000]--;
50     }
51     while (change[500]) {
52         cout << 500 << " ";
53         change[500]--;
54     }
55     while (change[100]) {
56         cout << 100 << " ";
57         change[100]--;
```

5. 소스코드_MoneyManager Class

```
1 #ifndef MONEYMANAGER_H
2 #define MONEYMANAGER_H
3 #include <string>
4 #include <map>
5 using namespace std;
6
7 class MoneyManager{
8 private:
9     map<int, int> numOfCash = {
10         {10, 500}, {50, 500}, {100, 500}, {500, 500}, {1000, 500}
11     };
12     int getCash = 0;
13 public:
14     void inputMoney(int cash);
15     int calcChange(int price);
16     void returnChange(int price, map<int, int>& change);
17     int getSum() { return this->getCash; }
18 };
19
20 #endif
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5. 소스코드_IngredientManager Class

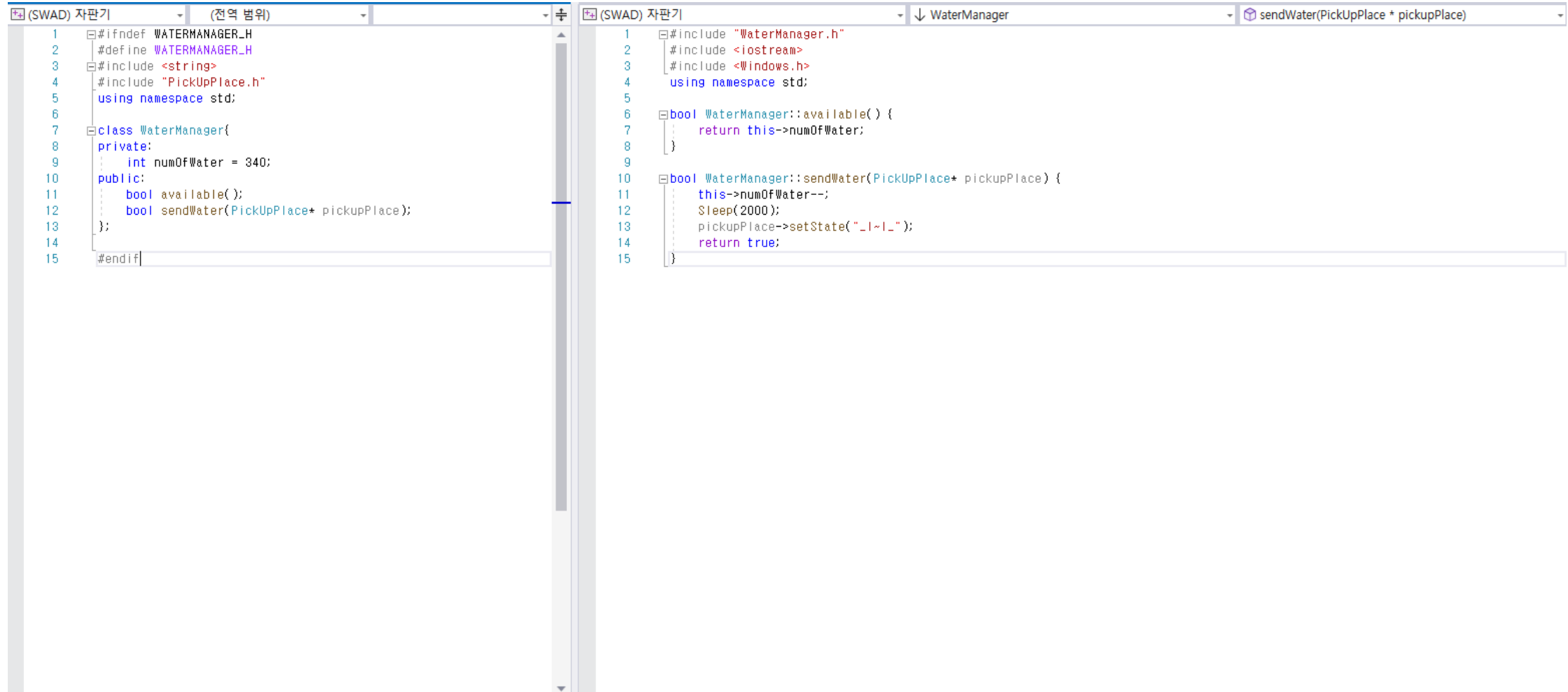
```
(SWAD) 자판기 (전역 범위) (SWAD) 자판기 IngredientManager available(const bool ingredient[5])
1 #ifndef INGREDIENTMANAGER_H
2 #define INGREDIENTMANAGER_H
3 #include <string>
4 #include "PickUpPlace.h"
5 using namespace std;
6
7 class IngredientManager{
8 private:
9     int numOfPremiumCoffee = 565;
10    int numOfNormalCoffee = 600;
11    int numOfSugar = 618;
12    int numOfCream = 350;
13    int numOfTea = 175;
14
15 public:
16    bool available(const bool ingredient[5]);
17    bool sendIngredient(const bool ingredient[5], PickUpPlace* pi);
18 };
19
20 #endif
6 bool IngredientManager::available(const bool ingredient[5]) {
7     bool isAvailable = false;
8
9     if (ingredient[0]){
10         if (numOfPremiumCoffee > 0)
11             isAvailable = true;
12         else
13             return false;
14     }
15     if (ingredient[1]){
16         if (numOfNormalCoffee > 0)
17             isAvailable = true;
18         else
19             return false;
20     }
21     if (ingredient[2]){
22         if (numOfSugar > 0)
23             isAvailable = true;
24         else
25             return false;
26     }
27     if (ingredient[3]){
28         if (numOfCream > 0)
29             isAvailable = true;
30         else
31             return false;
32     }
33     if (ingredient[4]){
34         if (numOfTea > 0)
35             isAvailable = true;
36         else
37             return false;
38     }
39     return isAvailable;
40 }
41 bool IngredientManager::sendIngredient(const bool ingredient[5], PickUpPlace* pickupPlace) {
42     if (ingredient[0]){
43         numOfPremiumCoffee--;
44         Sleep(1000);
45         pickupPlace->setState("-I★I-");
46     }
47     if (ingredient[1]){
```

5. 소스코드_CupManager Class

```
(SWAD) 자판기 (전역 범위)
1 #ifndef CUPMANAGER_H
2 #define CUPMANAGER_H
3 #include <string>
4 #include "PickUpPlace.h"
5 using namespace std;
6
7 class CupManager{
8 private:
9     int numOfCup = 350;
10 public:
11     bool available();
12     bool sendCup(PickUpPlace*);
13 };
14
15 #endif

(SWAD) 자판기 ↓ CupManager sendCup(PickUpPlace * pickupPlace)
1 #include "CupManager.h"
2 #include <iostream>
3 #include <Windows.h>
4 using namespace std;
5
6 bool CupManager::available() {
7     return numOfCup;
8 }
9
10 bool CupManager::sendCup(PickUpPlace* pickupPlace) {
11     this->numOfCup--;
12     Sleep(1000);
13     pickupPlace->setState("_I_I_");
14     return true;
15 }
```

5. 소스코드_WaterManager Class

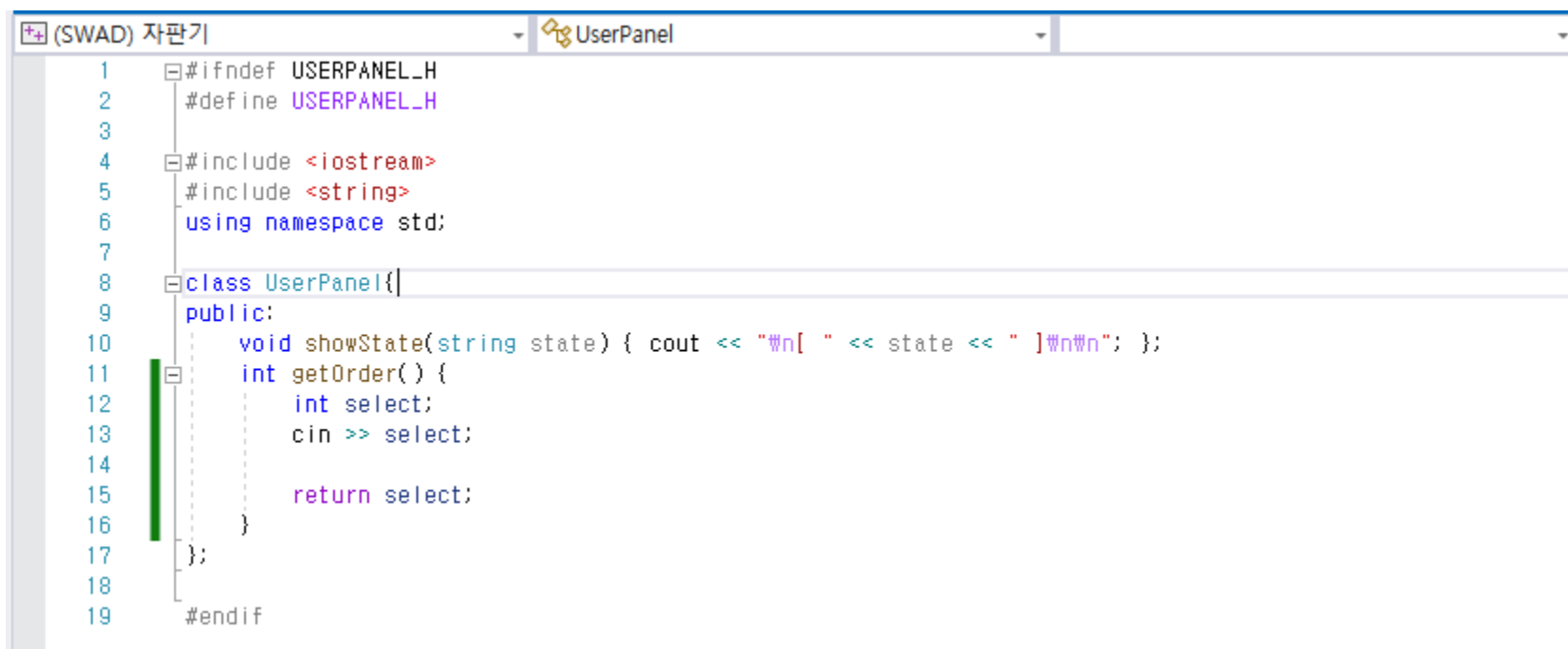


The image shows two side-by-side code editors. The left editor displays the header file `WaterManager.h`, and the right editor displays the implementation file `WaterManager.cpp`.

```
1  #ifndef WATERMANAGER_H
2  #define WATERMANAGER_H
3  #include <string>
4  #include "PickUpPlace.h"
5  using namespace std;
6
7  class WaterManager{
8  private:
9      int numOfWater = 340;
10 public:
11     bool available();
12     bool sendWater(PickUpPlace* pickupPlace);
13 };
14
15 #endif
```

```
1  #include "WaterManager.h"
2  #include <iostream>
3  #include <Windows.h>
4  using namespace std;
5
6  bool WaterManager::available() {
7      return this->numOfWater;
8  }
9
10 bool WaterManager::sendWater(PickUpPlace* pickupPlace) {
11     this->numOfWater--;
12     Sleep(2000);
13     pickupPlace->setState("_I~I_");
14     return true;
15 }
```

5. 소스코드_UserPanel Class



The screenshot shows a C++ code editor window titled "(SWAD) 자판기" (Vending Machine). The code defines a `UserPanel` class with two public methods: `showState` and `getOrder`. The `showState` method prints the current state, and the `getOrder` method prompts the user for an order and returns it. The code is enclosed in a header guard `USERPANEL_H`.

```
1  #ifndef USERPANEL_H
2  #define USERPANEL_H
3
4  #include <iostream>
5  #include <string>
6  using namespace std;
7
8  class UserPanel{
9  public:
10     void showState(string state) { cout << "현재 상태: " << state << "입니다." << endl; }
11     int getOrder() {
12         int select;
13         cin >> select;
14
15         return select;
16     }
17 };
18
19 #endif
```

5. 소스코드_Manufacture Class

```
(SWAD) 자판기 - Manufacture
1  #ifndef MANUFACTURE_H
2  #define MANUFACTURE_H
3  #include <iostream>
4  #include <string>
5  #include <Windows.h>
6  #include "IngredientManager.h"
7  #include "CupManager.h"
8  #include "WaterManager.h"
9  #include "Manufacture.h"
10 #include "pickUpPlace.h"
11 using namespace std;
12
13 class Manufacture{
14 public:
15     bool manufacture(PickUpPlace*, const bool*, IngredientManager*, CupManager*, WaterManager*);
16 };
17
18 bool Manufacture::manufacture(PickUpPlace* pickupPlace, const bool* recipe, IngredientManager* ingrediendtManager, CupManager* cupManager, WaterManager* waterManager) {
19     if (cupManager->sendCup(pickupPlace) && waterManager->sendWater(pickupPlace) && ingrediendtManager->sendIngredient(recipe, pickupPlace)) {
20         pickupPlace->setState("_I$ I_"); //mix
21         Sleep(2000);
22         return true;
23     }
24     else false;
25 }
26
27 #endif
```


5. 소스코드_PickUpPlace Class

```
(SWAD) 자판기 PickupPlace
1  #ifndef PICKUPPLACE_H
2  #define PICKUPPLACE_H
3  #include <iostream>
4  #include <string>
5  using namespace std;
6
7  class PickupPlace{
8  private:
9      string state;
10     bool lock = false;
11     bool empty = true; // 픽업대에 음료 존재 여부
12 public:
13     void setLock(bool lock) {
14         this->lock = lock;
15         if (this->lock)
16             cout << "PickUpPlace: <lock>\n";
17         else
18             cout << "PickUpPlace: <unlock>\n";
19     }
20     bool isLock() {
21         return this->lock;
22     }
23     void setEmpty(bool empty) {
24         this->empty = empty;
25
26         if (empty)
27             setState("-----");
28     }
29     bool isEmpty() {
30         return this->empty;
31     }
32     void setState(string newState) {
33         this->state = newState;
34         showState();
35     }
36     void showState() { cout << "PickUpPlace [" << state << "]\n"; }
37 };
38
39 #endif
```