**BIL105E**

Introduction to Scientific and Engineering Computing

2014 Spring

# Report of HW2

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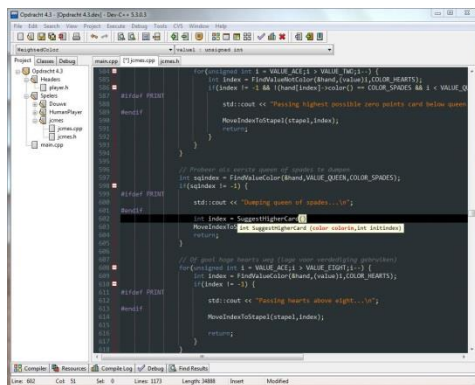
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# 1- Introduction

A vending machine program which displays avaible options, takes coin inputs and calculates remaining change, is programmed in this homework.

# 2- Development and Operating Environments

### MS Windows

Orwell Dev-C++ (version 5.5.3) environment has been used to write the source code, compile and run the program.



### Unix

The source code has been also copied to Unix, then compiled and tested with the

GNU C Compiler. The following is the commands used:

To compile : **gcc hw2.c –o hw2**

To run : **./hw2**

# 3- Data Structures and Variables

```
char *items[ LENGTH]={"Water","Cola","Fanta","Chocolate","Biscuit","Gum","Candy"};
int prices[ LENGTH]={ 55,80,100,120,95,40,60};
int i; //for loops
int select; //for user input

int deposit =0, coin, inv_count=0; //for total coins, current coin, invalid input
char ch; //to detect enter key

int remaining = ( deposit-prices[ select-1]); //for remaining coins
```

No data structures were used in this program.

## 4- Program Flow

Start

items[7]=Water,Cola,Fanta,Chocolate,Biscuit,Gum,Candy
prices[7]=55,80,100,120,95,40,60

AVAILABLE ITEMS
(Item# ItemName
ItemPrice)
1. Water 0.55 TL
2. Cola 0.80 TL
3. Fanta 1.00 TL
4. Chocolate 1.20 TL
5. Biscuit 0.95 TL
6. Gum 0.40 TL
7. Candy 0.60 TL

Input
select

select<=0 or >7?

T

Wrong selection

F

```
                                    │
                                    ▼
                        ┌───────────────────────┐
                        │      deposit=0        │
                        │   coin,inv_count=0    │
                        └───────────────────────┘
                                    │
                                    │
                                    ▼
                               ◇─────────◇
                              ╱   while    ╲
                             ◇  input coin  ◇
                              ╲             ╱
                               ◇─────────◇
                                    │ T
                                    │
                                    ▼
                          ◇───────────────────◇
                         ╱                      ╲              F      ┌──────────────┐
                        ◇ coin= 1 || 5 || 10 || 25 || 50? ◇─────────▶│  inv_count++ │
                         ╲                      ╱                     └──────────────┘
                          ◇───────────────────◇
                                    │ T
                                    │
                                    ▼
                              ◇─────────◇       T      ┌──────────────────────┐
                             ◇  coin=1?  ◇────────────▶│  deposit += coin*100 │
                              ◇─────────◇              └──────────────────────┘
                                    │ F
                                    │
                                    ▼
                        ┌───────────────────────┐
                        │    deposit += coin    │
                        └───────────────────────┘
                                    │
                                    ▼
```

```
                           │
                           ▼
              ┌──────────────────────┐
         F    │        Enter          │
  ◄──────────◄│      pressed?         │
              └──────────────────────┘
                           │ T
                           ▼
              ┌──────────────────────┐    T    ┌──────────────────┐
              │   inv_count !=0?      │────────►│ invalid coin(s)  │
              └──────────────────────┘         └──────────────────┘
                           │                             │
                           ▼◄────────────────────────────┘
              ┌──────────────────────┐
              │    output deposit     │
              └──────────────────────┘
                           │
                           ▼
        ┌──────────────────────────────────┐
        │ remaining=deposit-prices[select-1]│
        └──────────────────────────────────┘
                           │
                           ▼
              ┌──────────────────┐   F    ┌──────────────┐   F    ┌──────────────┐
              │  remaining>0?    │───────►│ remaining=0? │───────►│ Insufficient │
              └──────────────────┘        └──────────────┘        │   deposit    │
                        │ T                      │                 └──────────────┘
                        ▼                        ▼                        │
        ┌──────────────────────┐      ┌──────────────────┐                ▼
        │ accepted_coins[5]=   │      │  No remaining    │──────►(       End       )
        │   100,50,25,10,5     │      └──────────────────┘
        └──────────────────────┘
                        │
                        ▼
```

```
                              for
                           i=0;i<5;i++

                      while
               remaining>accepted_coins[i]
    F                                              T

               remaining = remaining - accepted_coins[i]

                          i !=0?              F        output 1 TL
                    T

                                              output
                                          accepted_coins[
                                                i]

               remaining=accepted_coins[i]?          F

                              T
```

i !=0?

**T** **F**

output 1 TL

output
accepted_coins[
i]

**End**