

Course: 남범석 교수님 Database

Theme: Online Auction Database

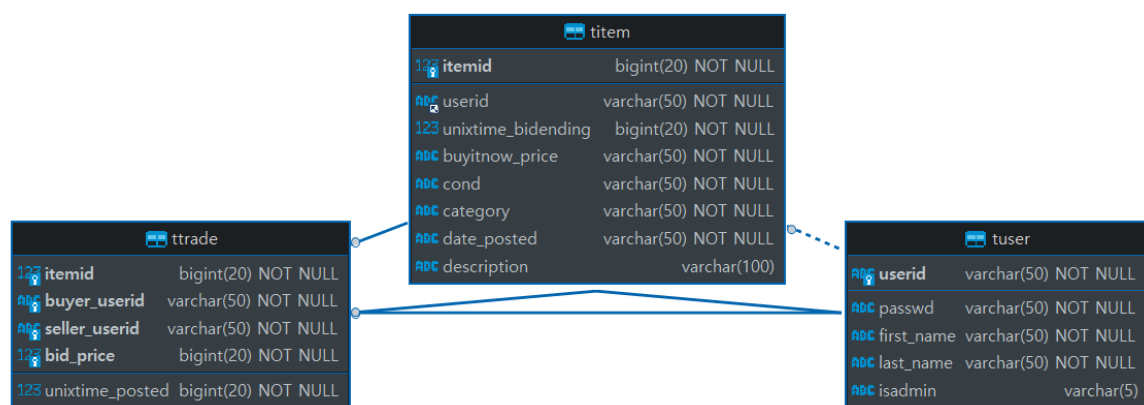
ID/Name: 2017312605/김요셉

Date: 2022-12-2

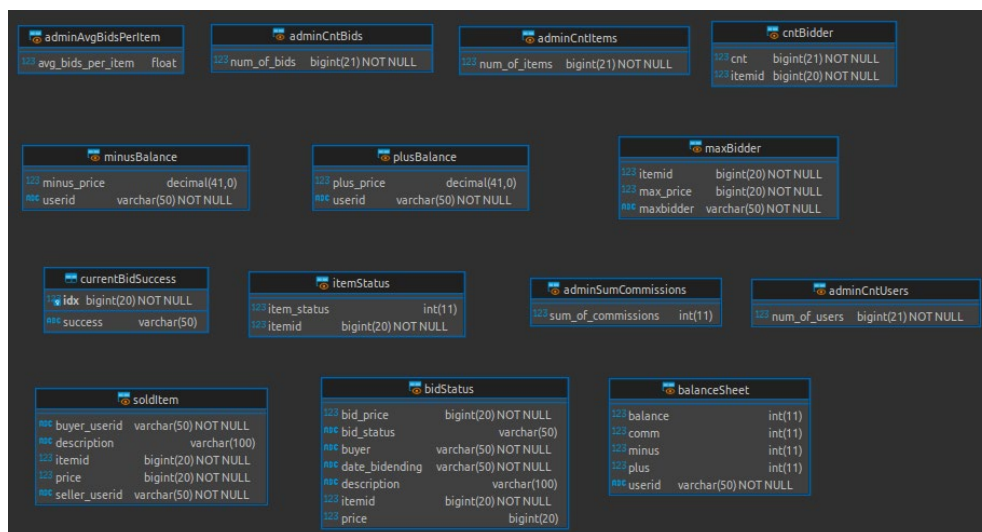
1 Schema

1.1 ER Diagram

1.1.1 Relations



1.1.2 Views et cetera



* *currentBidSuccess* 는 trade가 끝나는 시점에 성공여부를 남기고 시작할 때 초기화되는 1 column 1 row의 단일 값입니다.

1.2 Relations

1.2.1 *tUser*

1.2.1.1 Schema

```
4 create table tUser(  
5   -- userid is user's email address  
6   userid varchar(50) not null,  
7   passwd varchar(50) not null,  
8   first_name varchar(50) not null,  
9   last_name varchar(50) not null,  
10  isadmin varchar(5) default "user", -- cf. "admin"  
11  primary key pk (userid)  
12 );
```

1.2.1.2 Functional Dependency

$F1 = \text{userid} \rightarrow \{\text{passwd}, \text{first_name}, \text{last_name}, \text{isadmin}\}$

$F2 = \text{userid} \rightarrow tUser$

1.2.1.3 1NF

모든 attribute는 tuple마다 단 하나의 값을 가져야 합니다. 따라서 name의 first와 last를 각각 하나의 속성에 나눠서 배치시켰습니다.

1.2.1.4 2NF

Primary key 중에 특정 attribute에 종속된 것이 없어야 합니다. 우리는 *userid* 라는 attribute을 도입합니다. 이 값은 각 유저의 이메일에 해당되며, 특정 도메인에 대한 email은 사람 한 명에 일대일 대응이 가능하기 때문에 전체 user중 단 하나를 특정할 수 있고, 따라서 이는 나머지 attribute에 종속되지 않음을 의미합니다. 어떤 *userid* 하나만으로도 tuple 하나를 특정할 수 있습니다.

1.2.1.5 3NF

함수 종속 F 를 확인해보면 $\{\text{passwd}, \text{first_name}, \text{last_name}, \text{isadmin}\}$ 는 *userid*의 부분집합이 아니므로 non trivial합니다. 또한 *userid*는 릴레이션 *tUser*의 Primary Key이므로 Candidate Key 중 하나입니다. 그런데 Candidate Keys는 Super Key 중 최소의 키 개수를 가진 것 이므로 Super Key입니다. 따라서 BCNF를 만족합니다. 한편, BCNF를 만족하면 3NF를 만족합니다.

1.2.2 *tItem*

1.2.3.1 Schema

```

15 create table tItem (
16     -- item 일련번호
17     itemid bigint auto_increment primary key,
18     userid varchar(50) not null,
19     unixtime_bidding bigint not null,
20     buyitnow_price varchar(50) not null,
21     -- 구매 가능?
22     -- unavailable: date_bidding < local time
23     -- available: date_bidding > local time
24     -- 아이템 컨디션
25     cond varchar(50) not null,
26     category varchar(50) not null,
27     date_posted varchar(50) not null,
28     description varchar(100),
29     foreign key tItem(userid) references tUser(userid) on delete cascade
30 );

```

1.2.1.2 Functional Dependency

F1: $itemid \rightarrow \{userid, unixtime_bidding, buyitnow_price, cond, category, date_posted, description\}$

F2: $itemid \rightarrow tItem$

1.2.1.5 3NF

*Itemid*를 제외한 어떠한 것도 튜플을 지칭할 수 없습니다. 예를 들어 *userid*는 다수의 item을 팔 수 있고, *biddingd*이나 가격, 상태, 카테고리, 등록 날짜, 설명 등 어떠한 것도 서로 독립이며 종속되지 않기 때문에 BCNF를 만족하고, 따라서 3NF도 만족합니다.

1.2.3 tTrade

1.2.3.1 Schema

```

36 create table tTrade (
37     itemid bigint not null,
38     buyer_userid varchar(50) not null,
39     seller_userid varchar(50) not null,
40     bid_price bigint not null,
41     unixtime_posted bigint not null,
42     foreign key fk1 (buyer_userid) references tUser(userid),
43     foreign key fk2 (seller_userid) references tUser(userid),
44     foreign key fk3 (itemid) references tItem(itemid) on delete cascade,
45     primary key pk (itemid, buyer_userid, seller_userid, bid_price)
46 );

```

1.2.3.2 Functional Dependency

F1 = $\{itemid, buyer_userid, seller_userid, bid_price\} \rightarrow \{unixtime_posted\}$

F2 = $\{itemid, buyer_userid, seller_userid, bid_price\} \rightarrow tTrade$

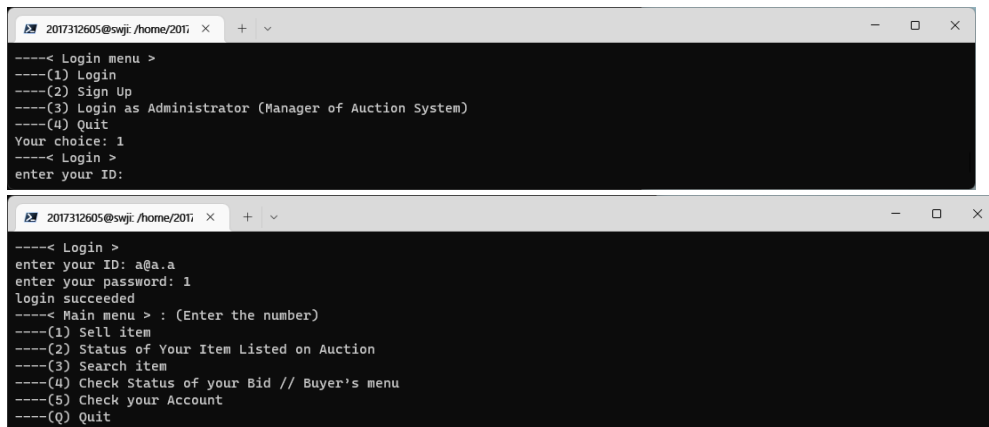
1.2.3.3 3NF

*tTrade*에서 *unixtime_posted*는 절대 튜플 하나를 특정할 수 없습니다. 그 이유는 동시에 다른 거래가 이뤄질 수 있기 때문입니다. 1분 내에서 동일한 시간으로 간주하기 때문에 실질적으로는 동일한 item에 대해 거래를 다른 가격으로 할 수 없습니다(이미 가격이 결정될 경우 procedure 선에서 거부됨). 그러나, $\{itemid, buyer_userid, seller_userid, bid_price\}$ 는 primary key로서 super key이므로 BCNF의 조건을 F1과 F2 모두 만족합니다. 따라서 우리는 이 릴레이션이 3NF를 만족한다는 점을 알 수 있습니다.

2 Interface

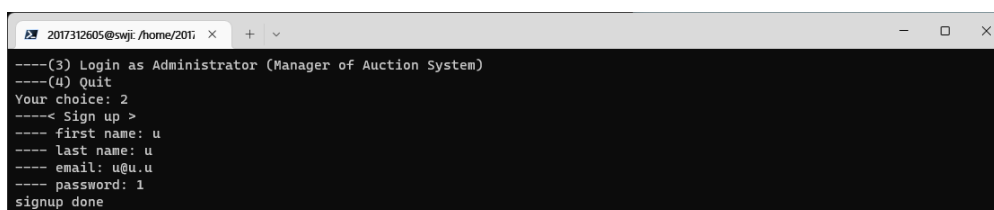
2.1 Login & Signup Menu

2.1.1 Login



```
2017312605@swji: /home/2017/ $  
----< Login menu >  
----(1) Login  
----(2) Sign Up  
----(3) Login as Administrator (Manager of Auction System)  
----(4) Quit  
Your choice: 1  
----< Login >  
enter your ID:  
  
2017312605@swji: /home/2017/ $  
----< Login >  
enter your ID: a@a.a  
enter your password: 1  
login succeeded  
----< Main menu > : (Enter the number)  
----(1) Sell item  
----(2) Status of Your Item Listed on Auction  
----(3) Search item  
----(4) Check Status of your Bid // Buyer's menu  
----(5) Check your Account  
----(Q) Quit
```

2.1.2 Signup



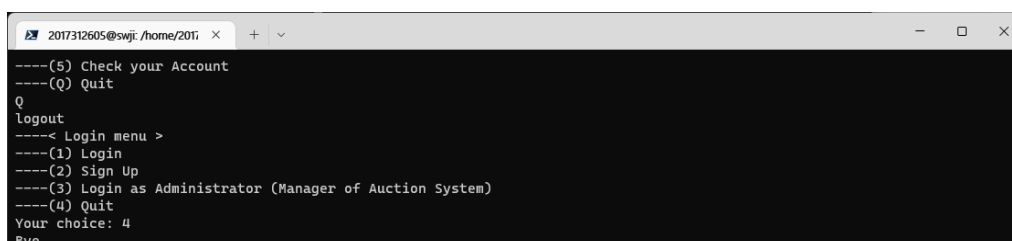
```
2017312605@swji: /home/2017/ $  
----(3) Login as Administrator (Manager of Auction System)  
----(4) Quit  
Your choice: 2  
----< Sign up >  
---- first name: u  
---- last name: u  
---- email: u@u.u  
---- password: 1  
signup done
```

2.1.3 Login as admin



```
2017312605@swji: /home/2017/ $  
Your choice: 3  
----< Login as Administrator >  
enter your ID: a@a.a  
enter your password: 1  
login succeeded  
----< Admin Main menu > : (Enter the number)  
----(0) Reset Balance Monthly  
----(1) Number of Users  
----(2) Number of Items  
----(3) Number of Trades  
----(4) Average Trades per Item(#Trades/#Items)  
----(5) Sum of Commissions  
----(Q) Quit
```

2.1.4 Quit (System Exit)



```
2017312605@swji: /home/2017/ $  
----(5) Check your Account  
----(Q) Quit  
Q  
logout  
----< Login menu >  
----(1) Login  
----(2) Sign Up  
----(3) Login as Administrator (Manager of Auction System)  
----(4) Quit  
Your choice: 4  
Bye
```

2.2 User Main Menu

```
2017312605@swj: /home/2017312605$ ./2017312605
enter your password: 1
login succeeded
----< Main menu > : (Enter the number)
----(1) Sell item
----(2) Status of Your Item Listed on Auction
----(3) Search item
----(4) Check Status of your Bid // Buyer's menu
----(5) Check your Account
----(Q) Quit
```

2.2.1 Sell Item (시간 값은 yyyy-mm-dd,hh:mm 형태입니다.)

```
2017312605@swj: /home/2017312605$ ./2017312605
enter your password: 1
login succeeded
----< Main menu > : (Enter the number)
----(1) Sell item
----(2) Status of Your Item Listed on Auction
----(3) Search item
----(4) Check Status of your Bid // Buyer's menu
----(5) Check your Account
----(Q) Quit
1
----< Sell item >
---- select from the following category : (Enter the number)
(1) Electronics
(2) Books
(3) Home
(4) clothing
(5) Sporting Goods
1
---- condition: (Enter the number)
(1) New
(2) Like-New
(3) Used (Good)
(4) Used (Acceptable)
1
---- description: description for test (manual)
---- buy-it-now price: 2500
---- bid ending date: 2022-11-29,07:05
success!
----< Main menu > : (Enter the number)
```

2.2.2 Status of Your Item Listed on Auction

```
2017312605@swj: /home/2017312605$ ./2017312605
bid ending date: 2022-11-29,19:10
--- Which item do you want to bid? (Enter the number or 'B' to go back to the previous menu): 26
--- Bidding price? (Enter the price or 'buy' to pay for the buy-it-now price) :1500
success
----< Main menu > : (Enter the number)
----(1) Sell item
----(2) Status of Your Item Listed on Auction
----(3) Search item
----(4) Check Status of your Bid // Buyer's menu
----(5) Check your Account
----(Q) Quit
2
----< Status of Your Item Listed on Auction >
Item [7]
description: desc desc test
status: 3 bids
current bidding price: 300
current highest bidder: c@c.c
date posted: 2022-11-21,22:24
bid ending date: 2022-12-01,12:00
Item [8]
description: basket ball
status: sold
current bidding price: 1000
current highest bidder: c@c.c
date posted: 2022-11-21,22:25
bid ending date: 2022-11-21,23:00
Item [19]
description: book for developer
status: sold
current bidding price: 20000
current highest bidder: h@h.h
date posted: 2022-11-21,23:5
bid ending date: 2022-11-21,23:10
Item [21]
description: ubuntu
status: 1 bids
current bidding price: 99999
current highest bidder: f@f.f
date posted: 2022-11-21,23:8
bid ending date: 2022-12-31,12:31
----< Main menu > : (Enter the number)
----(1) Sell item
----(2) Status of Your Item Listed on Auction
----(3) Search item
----(4) Check Status of your Bid // Buyer's menu
----(5) Check your Account
----(Q) Quit
```

2.2.3 Search Item

```
2017312605@swji:/home/201: x + v
3
----< Search item >
----(1) Search items by category
----(2) Search items by description keyword
----(3) Search items by seller
----(4) Search items by date posted
----(5) Go Back
----(6) Quit
(Enter the number): 2
---- description keyword: test
----< Search results: test>
Item [5]
description: desc 5 !!test test test test
status: sold
current bidding price: 200000
current highest bidder: c@c.c
date posted: 2022-11-21,22:22
bid ending date: 2022-11-21,22:22
Item [7]
description: desc desc test
status: 3 bids
current bidding price: 300
current highest bidder: c@c.c
date posted: 2022-11-21,22:24
bid ending date: 2022-12-01,12:00
Item [25]
description: description for test (manual)
status: unsold
current bidding price: 0
current highest bidder:
date posted: 2022-11-29,19:3
bid ending date: 2022-11-29,07:05
Item [26]
description: test for manual 2
status: 0 bids
current bidding price: 0
current highest bidder:
date posted: 2022-11-29,19:5
bid ending date: 2022-11-29,19:10

--- Which item do you want to bid? (Enter the number or 'B' to go back to the previous menu): 26
--- Bidding price? (Enter the price or 'buy' to pay for the buy-it-now price) :1500
success
----< Main menu > : (Enter the number)
----(1) Sell item
----(2) Status of Your Item Listed on Auction
----(3) Search item
----(4) Check Status of your Bid // Buyer's menu
----(5) Check your Account
----(Q) Quit
```

2.2.4 Bid Status

```
2017312605@swji:/home/201: x + v
bid ending date: 2022-11-21,23:10
Item [21]
description: ubuntu
status: 1 bids
current bidding price: 99999
current highest bidder: f@f.f
date posted: 2022-11-21,23:8
bid ending date: 2022-12-31,12:31

----< Main menu > : (Enter the number)
----(1) Sell item
----(2) Status of Your Item Listed on Auction
----(3) Search item
----(4) Check Status of your Bid // Buyer's menu
----(5) Check your Account
----(Q) Quit
4
----< Check Status of your Bid >
Item [6]
description: desc 6 home home
status: You won the item
your bidding price: 10000
current highest bidder: 10000
bid ending date: 2022-11-21,22:26
Item [10]
description: linux server
status: You won the item
your bidding price: 200000
current highest bidder: 200000
bid ending date: 2022-11-21,22:30
Item [16]
description: hello world
status: You won the item
your bidding price: 99999
current highest bidder: 99999
bid ending date: 2022-11-21,22:48
Item [26]
description: test for manual 2
status: You are the highest bidder.
your bidding price: 1500
current highest bidder: 1500
bid ending date: 2022-11-29,19:10

----< Main menu > : (Enter the number)
----(1) Sell item
----(2) Status of Your Item Listed on Auction
----(3) Search item
----(4) Check Status of your Bid // Buyer's menu
----(5) Check your Account
----(Q) Quit
```

2.2.5 Account Status

```
2017312605@swji: /home/2017312605$ python3 auction.py
your bidding price: 1500
current highest bidder: 1500
bid ending date: 2022-11-29,19:10

----< Main menu > : (Enter the number)
----(1) Sell item
----(2) Status of Your Item Listed on Auction
----(3) Search item
----(4) Check Status of your Bid // Buyer's menu
----(5) Check your Account
----(Q) Quit
5
----< Check your Account >
[Sold Item 8]
  description: basket ball
  sold price: 1000
[Sold Item 19]
  description: book for developer
  sold price: 20000
[Purchased Item 6]
  description: desc 6 home home
  purchased price: 10000
[Purchased Item 10]
  description: linux server
  purchased price: 200000
[Purchased Item 16]
  description: hello world
  purchased price: 99999
[Your Balance Summary]
  sold: 21000 won
  commission: 420 won
  purchased: 309999 won
  total balance: -289419 won

----< Main menu > : (Enter the number)
----(1) Sell item
----(2) Status of Your Item Listed on Auction
----(3) Search item
----(4) Check Status of your Bid // Buyer's menu
```

2.2.6 User Logout

```
2017312605@swji: /home/2017312605$ python3 auction.py
----< Main menu > : (Enter the number)
----(1) Sell item
----(2) Status of Your Item Listed on Auction
----(3) Search item
----(4) Check Status of your Bid // Buyer's menu
----(5) Check your Account
----(Q) Quit
Q
logout
----< Login menu >
----(1) Login
----(2) Sign Up
```

3 Administrator Menu

3.1 Admin Main Menu

```
2017312605@swji: /home/2017312605$ ./dbpa2
Your choice: 3
----< Login as Administrator >
enter your ID: a@a.a
enter your password: 1
login succeeded
----< Admin Main menu > : (Enter the number)
----(0) Reset Balance Monthly
----(1) Number of Users
----(2) Number of Items
----(3) Number of Trades
----(4) Average Trades per Item(#Trades/#Items)
----(5) Sum of Commissions
----(Q) Quit
```

3.2 Reset Balance Monthly

이 기능은 트리거 대신 넣었습니다. 어느 시점에 발동하더라도 해당 월 1일을 기준으로 그 이전에 종료된 거래 기록이 모두 사라집니다. 따라서 이후로 사용자는 해당월 1일부터의 정산표를 확인할 수 있습니다.

```
2017312605@swji: /home/2017312605/work/db/dbpa2$ ls2
clean.sh include README.md sql
compile.sh myauction run.sh src
2017312605@swji: /home/2017312605/work/db/dbpa2$ clear
2017312605@swji: /home/2017312605/work/db/dbpa2$ sh run.sh
----< Login menu >
----(1) Login
----(2) Sign Up
----(3) Login as Administrator (Manager of Auction System)
----(4) Quit
Your choice: 3
----< Login as Administrator >
enter your ID: a@a.a
enter your password: 1
login succeeded
----< Admin Main menu > : (Enter the number)
----(0) Reset Balance Monthly
----(1) Number of Users
----(2) Number of Items
----(3) Number of Trades
----(4) Average Trades per Item(#Trades/#Items)
----(5) Sum of Commissions
----(Q) Quit
0
Reset Balance This Month: 2022-12-1,00:00
----< Admin Main menu > : (Enter the number)
----(0) Reset Balance Monthly
----(1) Number of Users
----(2) Number of Items
----(3) Number of Trades
----(4) Average Trades per Item(#Trades/#Items)
----(5) Sum of Commissions
----(Q) Quit

mysql> select * from Item;
+-----+-----+-----+-----+-----+-----+
| itemid | userid | date_posted | description | unixtime_bidding | buyinnow_price | cond | category |
+-----+-----+-----+-----+-----+-----+
| 3 | a@a.a | 2022-11-21,22:28 | desc 3 | 1669065460 | 30000 | Like-New | Home |
| 4 | a@a.a | 2022-11-21,22:21 | desc4 | 1669064200 | 120000 | New | Books |
| 7 | d@d.d | 2022-12-01,12:00 | desc desc fast | 1669063600 | 2000 | Like-New | Electronics |
| 11 | h@h.h | 2022-12-31,12:31 | desc desc test | 1672457460 | 122121 | New | Electronics |
| 21 | d@d.d | 2022-11-21,22:32 | new new buy it | 1672457460 | 77777 | New | Electronics |
| 26 | b@b.b | 2022-11-29,19:10 | ubuntu | 1669716600 | 2900 | Like-New | Home |
+-----+-----+-----+-----+-----+-----+
5 rows in set (0.00 sec)

mysql>
```

3.3 number of Users

```
2017312605@swji: /home/2017312605$ ./dbpa2
----< Admin Main menu > : (Enter the number)
----(0) Reset Balance Monthly
----(1) Number of Users
----(2) Number of Items
----(3) Number of Trades
----(4) Average Trades per Item(#Trades/#Items)
----(5) Sum of Commissions
----(Q) Quit
1
Number of Users: 12
----< Admin Main menu > : (Enter the number)
----(0) Reset Balance Monthly
```

3.4 Number of Items


```
2017312605@swji: /home/2017312605$ ./2017312605
Number of Users: 12
----< Admin Main menu > : (Enter the number)
----(0) Reset Balance Monthly
----(1) Number of Users
----(2) Number of Items
----(3) Number of Trades
----(4) Average Trades per Item(#Trades/#Items)
----(5) Sum of Commissions
----(Q) Quit
2
Number of Items: 26
----< Admin Main menu > : (Enter the number)
```

3.5 Number of Trades

```
2017312605@swji: /home/2017312605$ ./2017312605
----< Admin Main menu > : (Enter the number)
----(0) Reset Balance Monthly
----(1) Number of Users
----(2) Number of Items
----(3) Number of Trades
----(4) Average Trades per Item(#Trades/#Items)
----(5) Sum of Commissions
----(Q) Quit
3
Number of Trades: 24
----< Admin Main menu > : (Enter the number)
----(0) Reset Balance Monthly
```

3.6 Average Trades per Items

경매 시스템의 활성도와 연관성을 보일 수 있습니다.

```
2017312605@swji: /home/2017312605$ ./2017312605
Number of Trades: 24
----< Admin Main menu > : (Enter the number)
----(0) Reset Balance Monthly
----(1) Number of Users
----(2) Number of Items
----(3) Number of Trades
----(4) Average Trades per Item(#Trades/#Items)
----(5) Sum of Commissions
----(Q) Quit
4
Average Trades per Item: 0.923077
----< Admin Main menu > : (Enter the number)
```

3.7 Sum of Commissions

경매 운영자의 입장에서 주 수입원이므로 따로 이 부분을 보이게 했습니다.

```
2017312605@swji: /home/2017312605$ ./2017312605
enter your ID: a@a.a
enter your password: 1
login succeeded
----< Admin Main menu > : (Enter the number)
----(0) Reset Balance Monthly
----(1) Number of Users
----(2) Number of Items
----(3) Number of Trades
----(4) Average Trades per Item(#Trades/#Items)
----(5) Sum of Commissions
----(Q) Quit
5
>> Sum of Commissions: 11788
```

3.8 Quit

```
2017312605@swji: /home/2017312605$ python3 main.py
----< Admin Main menu > : (Enter the number)
----(0) Reset Balance Monthly
----(1) Number of Users
----(2) Number of Items
----(3) Number of Trades
----(4) Average Trades per Item(#Trades/#Items)
----(5) Sum of Commissions
----(Q) Quit
5
>> Sum of Commissions: 11812
----< Admin Main menu > : (Enter the number)
----(0) Reset Balance Monthly
```