

CSED232 Object-Oriented Programming

Spring 2019

Programming Assignment #3

Problem Solving

무은재 새내기학부

20180038

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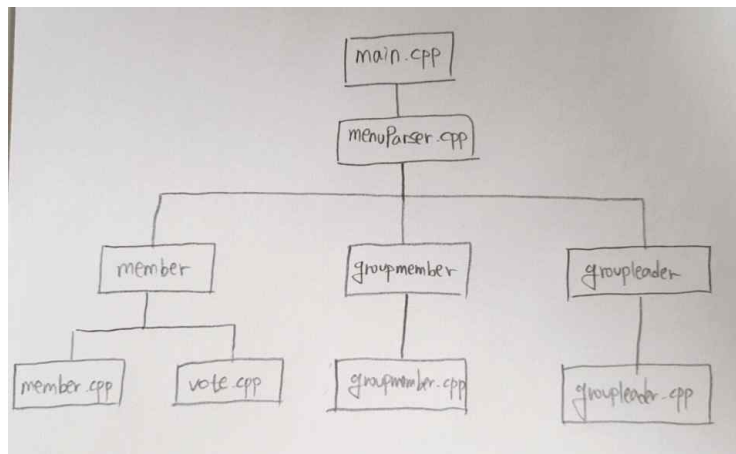
POVIS ID : hyeongkyu

Honor Code : 나는 이 프로그래밍 과제를 다른 사람의 부적절한 도움 없이 완수하였습니다.

## 1. 프로그램 개요

이번 과제에서는 Assn2에서 구현한 것과 마찬가지로 회원들의 의견을 반영하여 의사결정을 내릴 수 있는 투표시스템을 구현한다. 시스템 내에는 일반회원, 그룹회원, 그룹리더가 존재하며 이를 구현하는 과정에서 Class의 개념과 Polymorphism, Inheritance의 개념을 익히고 Design하는 방법을 익힌다. 시스템 상에서 선택할 수 있는 메뉴는 신분에 따라 다르며 어떤 신분인지에 따라 메뉴명이 같을지라도 수행하는 기능이 달라진다. 또한 로그 파일이 존재하여 처음에 로그파일을 로드하기를 원한다면 기존에 수행했던 작업들이 불러와지게 되며, 로그파일을 로드하기를 원하지 않는다면 새롭게 작업들을 수행할 수 있게 된다.

## 2. 전체 구조



이 프로그램은 크게 member, groupmember, groupleader의 세부분으로 나누어져 있다. main함수에서 menuParser.cpp에 포함되어있는 doTask함수를 호출하여 본격적인 작업을 시작하게 된다. doTask함수에서는 printMenu1 함수를 통하여 로그파일을 로드 할 것인지 여부를 결정하고 현재 로그인 여부에 따라 nonmember일 경우 출력되는 메뉴인 printMenu2를 출력할 것인지, 혹은 member, groupmember, groupleader일 경우일 때 다형성을 통한 plugin->printmenu() 함수를 호출할 것인지를 결정하게 된다. 로그파일의 로드 여부와 실행할 함수의 종류를 결정하게 되면 현재 상태에 따라 다형성을 통하여 switch-case문을 실행하게 된다. 이 switch-case문을 통하여 사용자가 원하는 함수를 실행하게 된다. 사용자가 Program Exit이라는 메뉴를 선택하기 전까지는 이 과정을 계속 반복하며 원하는 기능을 수행할 수 있다. Inheritance의 개념은 member.h 8번째 줄에 정의된 class Member를 97번째 줄에서 class groupmember가 public하게 Member를 상속받았으며 115번째 줄에서 class groupleader가 public하게 groupmember를 상속받았다.

member.h 헤더파일 안의 Member class 36번째 줄에서 virtual void printmenu()가 선언되었고, 37번째 줄에서 virtual void printpos()가 선언되었으며 38번째 줄에서 virtual void doswitchcase()가 선언되었다. 이는 member.h 헤더파일에 포함된 groupmember class 안의 101번째 줄에 선언된 virtual void printmenu(), 102번째 줄에 선언된 virtual void printpos(), 103번째 줄에 선언된 virtual void doswitchcase()함수와 polymorphism 관계를 가지게 된다. 또한 member.h 헤더파일에 포함된 groupleader class 안의 119번째 줄에 선언된 virtual void printmenu(), 120번째 줄에 선언된 virtual void printpos(), 121번째 줄에 선언된 virtual void doswitchcase()와도 polymorphism의 관계를 가지게 된다. 이 polymorphism 관계가 직접 사용되는 곳은 menuParser.cpp에서 160번째 줄에 plogin->printmenu()와 161번째 줄에 plogin->printpos(plogin)으로 사용된다. 이는 plogin이 Member 포인터이지만 실제로 어떤 객체를 가리키도록 할당되었는지에 따라 polymorphism을 활용하여 다른 함수를 실행시킬 수 있다는 점을 보인다. 또한 267번째 줄에서도 plogin->doswitchcase()를 이용하여 plogin이 실제 가리키는 class에 따른 함수가 실행되게 된다.

### 3. Class 설명

group.h 헤더파일에는 group class가 포함되어 있다. group class의 private member에는 그룹 이름을 나타내는 name, 그룹에 속한 멤버리스트를 저장하는 groupmember 배열, 그룹 리더를 저장하는 leader, 그룹 멤버 수를 저장하는 num, 그룹 멤버리스트에 저장되어있는 마지막 index에 1을 더한 값, 즉 다음에 저장될 위치(index)를 가리키는 gloc, 그룹내 투표리스트인 gvc가 있다. public method에는 default constructor, destructor이 존재하며 그룹 멤버를 추가해주는 함수인 plusgroupmember, 그룹멤버를 삭제해주는 함수인 deletegroupmember도 존재한다. 또한 private에 저장되어있는 member variable을 얻어오고 설정할 수 있는 여러 함수들도 존재한다.

group.h 헤더파일에는 group들을 관리하는 groupcollection class도 존재한다. groupcollection class의 private member에는 모든 그룹을 담고있는 배열인 grouplist 배열, 그룹의 개수를 나타내는 num이 있다. public method에는 default constructor, destructor, 그룹을 추가해주는 makegroup 함수가 존재하며 이외에도 private member를 얻어오거나 설정할 수 있는 다양한 함수들이 존재한다.

vote.h 헤더파일에는 vote class가 포함되어 있다. vote class의 private member에는 투표 주제를 저장하는 subject, 투표 항목 수를 저장하는 itemnum, 투표 항목의 투표수를 저장하는 item배열, 중복 투표 여부를 검사하기 위한 RRNlist배열이 있다. public method에는 constructor이 존재하며 이외에 private에 저장되어있는 member를 얻어오고 설정할 수 있는 여러 함수들이 존재한다.

vote.h 헤더파일에는 vote들을 관리하는 voteCollection class도 존재한다. voteCollection class의 private member에는 전체 투표 리스트를 저장하는 votelist 배열, 전체 투표의 개수를 저장하는 nsubject, 전체 투표리스트에 저장되어있는 마지막 index에 1을 더한 값, 즉 다음에 저장될 위치(index)를 가르키는 loc이 있다. public method에는 default constructor, destructor이 존재하며 votelist에 새로운 vote를 동적할당해주는 함수인 makevote, vote를 삭제해주는 deletevoteitem, 새로운 vote를 추가하는 addvoteitem, 투표 항목을 나열해주는 listallvote, 투표를 진행하게 해주는 castvote method가 존재하며 이외에도 private에 저장되어있는 member를 얻어오고 설정할 수 있는 method들이 존재한다.

member.h 헤더파일에는 member class가 존재한다. member class의 private member에는 주민번호를 저장하는 RRN, ID를 저장하는 ID, 비밀번호를 저장하는 password, 속해있는 그룹 이름을 저장하는 groupname, 그룹에 속해있는지의 여부를 저장하는 isgroup, 그룹 리더 여부를 저장하는 isgroupleader, 투표 여부를 저장하는 votefor배열이 있다. public method에는 default constructor, copy constructor, 메뉴를 출력해주는 printmenu, 현재 상황을 출력해주는 printpos, switch-case문을 나타내는 doswitchcase함수가 존재하며 이외에도 private에 저장되어있는 member를 얻어오고 설정할 수 있는 method들이 존재한다.

member.h 헤더파일에는 Member class를 상속받은 groupmember class가 있다. groupmember class의 public method로는 default constructor, copy constructor, 메뉴를 출력해주는 printmenu, 현재 상황을 출력해주는 printpos, switch-case문을 나타내는 doswitchcase, 회원 탈퇴를 진행하는 unsubscribe, 로그아웃을 진행하는 Logout, 투표를 삭제하는 deletevoteitem, 투표를 추가하는 addvoteitem, 투표리스트를 출력하는 listallvote, 투표를 진행하는 castvote, 그룹탈퇴를 진행하는 unsubscribegroup method가 존재한다.

member.h 헤더파일에는 groupmember class를 상속받은 groupleader class가 있다. groupleader class의 public method로는 default constructor, copy constructor, 메뉴를 출력해주는 printmenu, 현재 상황을 출력해주는 printpos, switch-case문을 나타내는 doswitchcase, 로그아웃을 진행하는 Logout, 투표를 삭제하는 deletevoteitem, 투표를 추가하는 addvoteitem, 투표리스트를 출력하는 listallvote, 투표를 진행하는 castvote, 멤버를 추방시키는 banmember, 그룹 멤버를 출력하는 listgroupmember method가 존재한다. 또한 private에 using문을 이용하여 base class인 groupmember class에서 unsubscribegroup기능은 사용하지 못하게 하였다.

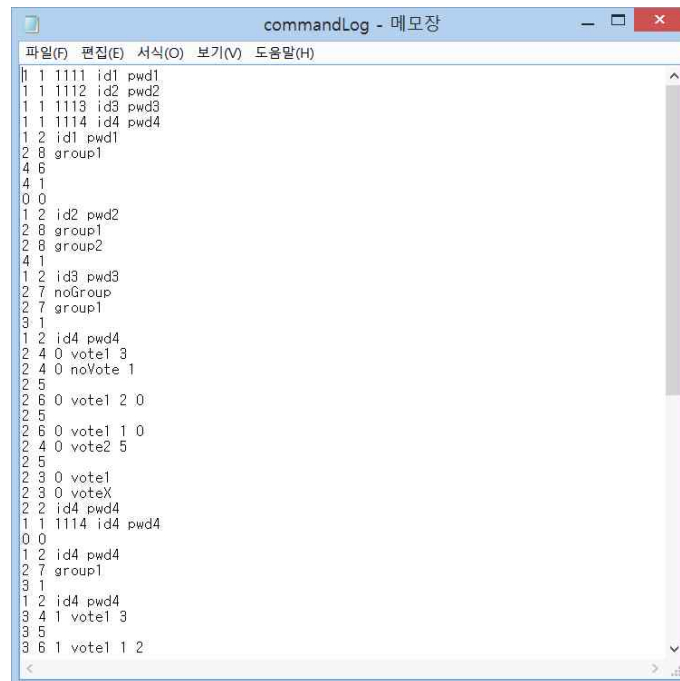
member.h 헤더파일에는 전체 member를 관리하는 MemberCollection class가 있다. MemberCollection class의 private member로는 모든 멤버의 정보를 저장하는 포인터 배열인 memberlist, 전체 멤버 수를 나타내는 membernum, memberlist 배열 중 가장 마지막 배열의 index에 1을 더한 값, 즉 다음 member가 추가될 index를 나타내는 mloc이 존재한다. public method로는 constructor, destructor, 멤버를

memberlist에 동적할당 시켜주는 setmember, member를 memberlist에서 할당 해제해주는 deletemember, 회원가입을 시켜주는 join, 멤버의 중복 여부를 검사하는 searchMember, 회원 탈퇴를 시켜주는 unsubscribe, 로그인을 진행시켜주는 Login, 로그아웃을 진행하는 Logout, 그룹에 참여 시켜주는 joingroup, 그룹을 만들어주는 creategroup이 있으며 이외에도 private member를 얻어오고 설정할 수 있는 여러 method들이 존재한다.

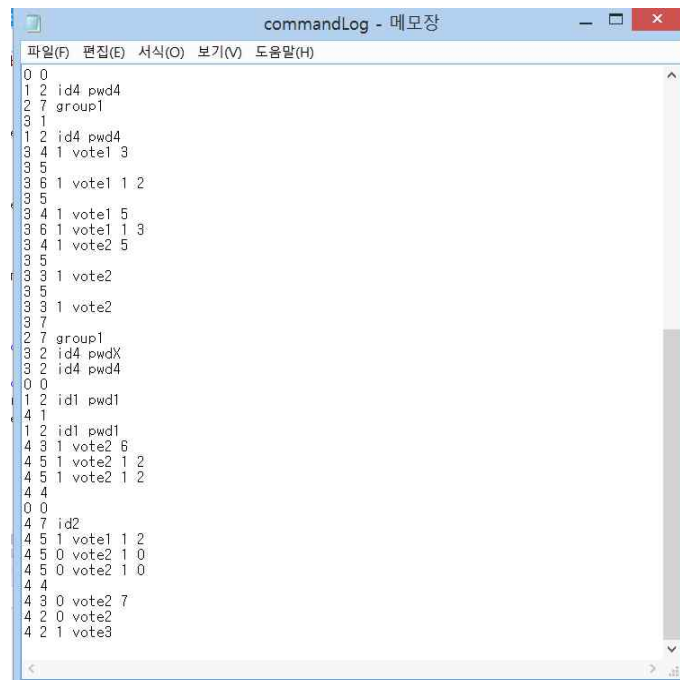
#### 4. 프로그램 실행 방법

프로그램을 처음 실행하면 로그 파일을 로드 할 것인지 여부를 묻는 창이 나온다. 여기서 1을 입력하면 로그 파일을 로드해서 저번에 실행했던 작업들에 이어서 작업할 수 있고, 0을 입력하면 로그 파일을 로드하지 않고 새롭게 작업을 시작할 수 있다. 그 뒤에는 현재 사용자의 상태에 따른 메뉴가 출력된다. Non Member 상태일 때는 회원가입, 로그인, 프로그램 종료의 기능을 수행할 수 있으며, Member 상태일 때는 로그아웃, 회원탈퇴, 투표삭제, 투표추가, 투표리스트 조회, 투표, 그룹 참여, 그룹 생성, 프로그램 종료의 기능을 수행할 수 있다. Group Member 상태일 때는 로그아웃, 회원 탈퇴, 투표 삭제, 투표 추가, 투표리스트 조회, 투표, 그룹 탈퇴, 프로그램 종료의 기능을 수행할 수 있으며 Group Leader 상태일 때는 로그아웃, 투표 삭제, 투표 추가, 투표리스트 조회, 투표, 모든 그룹 멤버 조회, 그룹 멤버 추방, 프로그램 종료의 기능을 사용할 수 있다. 또한 어떠한 신분이던 간에 0 0을 입력하면 현재 존재하는 모든 멤버, 일반투표, 그룹, 그룹투표에 대한 정보를 확인 할 수 있도록 하였다.

#### 5. 프로그램 실행 예제



```
commandLog - 메모장
파일(F) 편집(E) 서식(O) 보기(V) 도움말(H)
1 1 1111 id1 pwd1
1 1 1112 id2 pwd2
1 1 1113 id3 pwd3
1 1 1114 id4 pwd4
1 2 id1 pwd1
2 8 group1
4 6
4 1
0 0
1 2 id2 pwd2
2 8 group1
2 8 group2
4 1
1 2 id3 pwd3
2 7 noGroup
2 7 group1
3 1
1 2 id4 pwd4
2 4 0 vote1 3
2 4 0 noVote 1
2 5
2 6 0 vote1 2 0
2 5
2 6 0 vote1 1 0
2 4 0 vote2 5
2 5
2 3 0 vote1
2 3 0 voteX
2 2 id4 pwd4
1 1 1114 id4 pwd4
0 0
1 2 id4 pwd4
2 7 group1
3 1
1 2 id4 pwd4
3 4 1 vote1 3
3 5
3 6 1 vote1 1 2
```



```
commandLog - 메모장
파일(F) 편집(E) 서식(O) 보기(V) 도움말(H)
0 0
1 2 id4 pwd4
2 7 group1
3 1
1 2 id4 pwd4
3 4 1 vote1 3
3 5
3 6 1 vote1 1 2
3 5
3 4 1 vote1 5
3 6 1 vote1 1 3
3 4 1 vote2 5
3 5
3 3 1 vote2
3 5
3 3 1 vote2
3 7
2 7 group1
3 2 id4 pwdX
3 2 id4 pwd4
0 0
1 2 id1 pwd1
4 1
1 2 id1 pwd1
4 3 1 vote2 6
4 5 1 vote2 1 2
4 5 1 vote2 1 2
4 4
0 0
4 7 id2
4 5 1 vote1 1 2
4 5 0 vote2 1 0
4 5 0 vote2 1 0
4 4
4 3 0 vote2 7
4 2 0 vote2
4 2 1 vote3
```

로그파일이 위 그림과 같을 경우에 처음에 로그 파일 로드를 하게 되면 아래 그림들과 같이 실행된다. 위의 로그 파일은 LMS에 공지된 assn3\_example에 적혀 있는 Log file의 형태와 같다.

```
C:\Users\박형규-PC\source\repos\Wassn3W\Debug\Wassn3.exe
Load log file?(1:yes, 0:no (log will be deleted)):1

=====
Num:1
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 1 1
Selected Menu: 1.1 Register as a Member
1.1 Resident Registration Number: 1111
ID: id1
Password:pwd1
Registration Done!

=====
Num:2
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 1 1
Selected Menu: 1.1 Register as a Member
1.1 Resident Registration Number: 1112
ID: id2
Password:pwd2
Registration Done!

=====
Num:3
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 1 1
Selected Menu: 1.1 Register as a Member
1.1 Resident Registration Number: 1113
ID: id3
Password:pwd3
Registration Done!
```

```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe
=====
Num:4
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 1 1
Selected Menu: 1.1 Register as a Member
1.1 Resident Registration Number: 1114
ID: id4
Password:pwd4
Registration Done!

=====
Num:5
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 1 2
Selected Menu: 1.2 Login
ID: id1
Password:pwd1
Login Success!

=====
Num:6
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id1, [Current Position]: Member
Select Menu: 2 8
Selected Menu: 2.8 Create Group
<Group List>
None
```



```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe
=====
Num:7
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Vote Item
4.4 List All Vote Items
4.5 Cast a Vote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 6
Selected Menu: 4.6 List All Group Members
<Group Members>
id1

=====
Num:8
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Vote Item
4.4 List All Vote Items
4.5 Cast a Vote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 1
Selected Menu: 4.1 Logout
Logout Success

=====
Num:9
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 0 0
<Member List>
[ID]: id1, [Joined Group]: group1, [Position]: Group Leader
[ID]: id2, [Joined Group]: None, [Position]: Member
[ID]: id3, [Joined Group]: None, [Position]: Member
```

```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe
[ID]: id4, [Joined Group]: None, [Position]: Member
<Group List>
group1
<General Votes>
None
<Group Votes>
group1: None

=====
Num:10
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 1 2
Selected Menu: 1.2 Login
ID: id2
Password:pwd2
Login Success!

=====
Num:11
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id2, [Current Position]: Member
Select Menu: 2 8
Selected Menu: 2.8 Create Group
<Group List>
group1
Group Name to Create: group1
Group create Failed

=====
Num:12
```

```
C:\Users\박형규-PC\source\repos\Wassn3\Debug\Wassn3.exe
=====
Num:12
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id2, [Current Position]: Member
Select Menu: 2 8
Selected Menu: 2.8 Create Group
<Group List>
group1
Group Name to Create: group2
Group Created Success

=====
Num:13
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Vote Item
4.4 List All Vote Items
4.5 Cast a Vote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id2, [Current Position]: Group Leader, [Joined Group]: group2
Select Menu: 4 1
Selected Menu: 4.1 Logout
Logout Success

=====
Num:14
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 1 2
```

```
C:\Users\박형규-PC\source\repos\Wassn3\Debug\Wassn3.exe
Selected Menu: 1.2 Login
ID: id3
Password:pwd3
Login Success!

=====
Num:15
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id3, [Current Position]: Member
Select Menu: 2 7
Selected Menu: 2.7 Join Group
<Group List>
group1 group2
Group Name to Join: noGroup
Group Join Failed

=====
Num:16
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id3, [Current Position]: Member
Select Menu: 2 7
Selected Menu: 2.7 Join Group
<Group List>
group1 group2
Group Name to Join: group1
Group Join Success
```

```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe
=====
Num:17
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id3, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 1
Selected Menu: 3.1 Logout
Logout Success

=====
Num:18
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 1 2
Selected Menu: 1.2 Login
ID: id4
Password:pwd4
Login Success!

=====
Num:19
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id4, [Current Position]: Member
Select Menu: 2 4
Selected Menu: 2.4 Add a New Vote Item
```

```
C:\Users\박형규-PC\source\repos\Wassn3\Debug\Wassn3.exe
<General Votes>
None
Vote Subject: vote1
Number of Vote Items: 3
Vote Added!

=====
Num:20
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id4, [Current Position]: Member
Select Menu: 2 4
Selected Menu: 2.4 Add a New Vote Item
<General Votes>
Vote1
Vote Subject: noVote
Number of Vote Items: 1
Vote Added Failed

=====
Num:21
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id4, [Current Position]: Member
Select Menu: 2 5
Selected Menu: 2.5 List All Vote Items
<General Vote>
Vote Subject: vote1, Vote Counts per Item - item1: 0 item2: 0 item3: 0
```

```
C:\Users\박형규-PC\source\repos\Wassn3\Debug\Wassn3.exe
=====
Num:22
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id4, [Current Position]: Member
Select Menu: 2 6
Selected Menu: 2.6 Cast a Vote
<General Votes>
vote1
Vote Subject: vote1
Vote for(select 1 item): 2
Request processed successfully!

=====
Num:23
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id4, [Current Position]: Member
Select Menu: 2 5
Selected Menu: 2.5 List All Vote Items
<General Vote>
Vote Subject: vote1, Vote Counts per Item - item1: 0 item2: 1 item3: 0

=====
Num:24
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
```

```
C:\Users\박형규-PC\source\repos\Wassn3\Debug\Wassn3.exe
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id4, [Current Position]: Member
Select Menu: 2 6
Selected Menu: 2.6 Cast a Vote
<General Votes>
vote1
Vote Subject: vote1
Vote for(select 1 item): 1
Request processed failed

=====
Num:25
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id4, [Current Position]: Member
Select Menu: 2 4
Selected Menu: 2.4 Add a New Vote Item
<General Votes>
vote1
Vote Subject: vote2
Number of Vote Items: 5
Vote Added!

=====
Num:26
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
```



```
C:\Users\박형규-PC\source\repos\Wassn3\Debug\Wassn3.exe
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id4, [Current Position]: Member
Select Menu: 2 5
Selected Menu: 2.5 List All Vote Items
<General Vote>
Vote Subject: vote1, Vote Counts per Item - item1: 0 item2: 1 item3: 0
Vote Subject: vote2, Vote Counts per Item - item1: 0 item2: 0 item3: 0 item4: 0
item5: 0

=====
Num:27
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id4, [Current Position]: Member
Select Menu: 2 3
Selected Menu: 2.3 Delete Existing Vote
<General Votes>
vote1 vote2
Vote Subject to Delete: vote1
Vote Deleted!

=====
Num:28
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
```

```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe
2.9 Program Exit
=====
[ID]: id4, [Current Position]: Member
Select Menu: 2 3
Selected Menu: 2.3 Delete Existing Vote
<General Votes>
vote2
Vote Subject to Delete: voteX
Vote Deleted Failed

=====
Num:29
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id4, [Current Position]: Member
Select Menu: 2 2
Selected Menu: 2.2 Unsubscribe from System
ID: id4
Password:pwd4
Unsubscribe Success

=====
Num:30
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 1 1
Selected Menu: 1.1 Register as a Member
1.1 Resident Registration Number: 1114
ID: id4
Password:pwd4
Registration Done!

=====
```

```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe
Num:31
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 0 0
<Member List>
[ID]: id1, [Joined Group]: group1, [Position]: Group Leader
[ID]: id2, [Joined Group]: group2, [Position]: Group Leader
[ID]: id3, [Joined Group]: group1, [Position]: Group Member
[ID]: id4, [Joined Group]: None, [Position]: Member
<Group List>
group1 group2
<General Votes>
vote2
<Group Votes>
group1: None
group2: None

=====
Num:32
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 1 2
Selected Menu: 1.2 Login
ID: id4
Password:pwd4
Login Success!

=====
Num:33
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
```

```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id4, [Current Position]: Member
Select Menu: 2 7
Selected Menu: 2.7 Join Group
<Group List>
group1 group2
Group Name to Join: group1
Group Join Success

=====
Num:34
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 1
Selected Menu: 3.1 Logout
Logout Success

=====
Num:35
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 1 2
Selected Menu: 1.2 Login
ID: id4
Password:pwd4
Login Success!

=====
Num:36
=====
```

```
C:\Users\박형규-PC\source\repos\Wassn3\Debug\Wassn3.exe
=====
Num:36
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 4
Selected Menu: 3.4 Add a New Vote Item
<General Votes>
vote2
<Group Votes>
None
Select Vote Type(0: general, 1: group): 1
Vote Subject: vote1
Number of Vote Items: 3
Vote Added!

=====
Num:37
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 5
Selected Menu: 3.5 List All Vote Items
<General Vote List>
Vote Subject: vote2, Vote Counts per Item - item1: 0 item2: 0 item3: 0 item4: 0
item5: 0
<Group Vote List>
Vote Subject: vote1, Vote Counts per Item - item1: 0 item2: 0 item3: 0

=====
Num:38
```

```
C:\Users\박형규-PC\source\repos\Wassn3W\Debug\Wassn3.exe
=====
Num:38
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 6
Selected Menu: 3.6 Cast a Vote
<General Votes>
vote2
<Group Votes>
vote1
Select Vote Type(0: general, 1: group): 1
Vote Subject: vote1
Vote for(select 2 items): 1 2
Request processed successfully!

=====
Num:39
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 5
Selected Menu: 3.5 List All Vote Items
<General Vote List>
Vote Subject: vote2, Vote Counts per Item - item1: 0 item2: 0 item3: 0 item4: 0
item5: 0
<Group Vote List>
Vote Subject: vote1, Vote Counts per Item - item1: 1 item2: 1 item3: 0

=====
Num:40
```

```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe
=====
Num:40
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 4
Selected Menu: 3.4 Add a New Vote Item
<General Votes>
vote2
<Group Votes>
vote1
Select Vote Type(0: general, 1: group): 1
Vote Subject: vote1
Number of Vote Items: 5
Vote added fail

=====
Num:41
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 6
Selected Menu: 3.6 Cast a Vote
<General Votes>
vote2
<Group Votes>
vote1
Select Vote Type(0: general, 1: group): 1
Vote Subject: vote1
Vote for(select 2 items): 1 3
Request processed failed
```

```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe
=====
Num:42
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 4
Selected Menu: 3.4 Add a New Vote Item
<General Votes>
vote2
<Group Votes>
vote1
Select Vote Type(0: general, 1: group): 1
Vote Subject: vote2
Number of Vote Items: 5
Vote Added!

=====
Num:43
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 5
Selected Menu: 3.5 List All Vote Items
<General Vote List>
Vote Subject: vote2, Vote Counts per Item - item1: 0 item2: 0 item3: 0 item4: 0
item5: 0
<Group Vote List>
Vote Subject: vote1, Vote Counts per Item - item1: 1 item2: 1 item3: 0
Vote Subject: vote2, Vote Counts per Item - item1: 0 item2: 0 item3: 0 item4: 0
item5: 0
```



```
C:\Users\박형규-PC\source\repos\Wassn3\Debug\Wassn3.exe
=====
Num:44
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 3
Selected Menu: 3.3 Delete Existing Vote
<General Votes>
vote2
<Group Votes>
vote1 vote2
Select Vote Type(0: general, 1: group): 1
Vote Subject to Delete: vote2
Vote Deleted!

=====
Num:45
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 5
Selected Menu: 3.5 List All Vote Items
<General Vote List>
Vote Subject: vote2, Vote Counts per Item - item1: 0 item2: 0 item3: 0 item4: 0
item5: 0
<Group Vote List>
Vote Subject: vote1, Vote Counts per Item - item1: 1 item2: 1 item3: 0

=====
Num:46
=====
```

```
C:\Users\박형규-PC\source\repos\Wassn3\Debug\Wassn3.exe
=====
Num:46
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 3
Selected Menu: 3.3 Delete Existing Vote
<General Votes>
vote2
<Group Votes>
vote1
Select Vote Type(0: general, 1: group): 1
Vote Subject to Delete: vote2
Vote Deleted Failed

=====
Num:47
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 7
Selected Menu: 3.7 Unregister from a Group
Unsubscribe Group Success

=====
Num:48
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
```

```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe
Num:48
=====
2.1 Logout
2.2 Unsubscribe from System
2.3 Delete Existing Vote Item
2.4 Add a Vote Item
2.5 List All Vote Items
2.6 Cast a Vote
2.7 Join Group
2.8 Create a Group
2.9 Program Exit
=====
[ID]: id4, [Current Position]: Member
Select Menu: 2 7
Selected Menu: 2.7 Join Group
<Group List>
group1 group2
Group Name to Join: group1
Group Join Success

=====
Num:49
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 2
Selected Menu: 3.2 Unregister from System
ID: id4
Password:pwdX
Unsubscribe Failed

=====
Num:50
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
```

```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe

=====
Num:50
=====
3.1 Logout
3.2 Unsubscribe from System
3.3 Delete Existing Vote Item
3.4 Add a Vote Item
3.5 List All Vote Items
3.6 Cast a Vote
3.7 Unsubscribe from Group
3.8 Program Exit
=====
[ID]: id4, [Current Position]: Group Member, [Joined Group]: group1
Select Menu: 3 2
Selected Menu: 3.2 Unregister from System
ID: id4
Password:pwd4
Unsubscribe Success

=====
Num:51
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 0 0
<Member List>
[ID]: id1, [Joined Group]: group1, [Position]: Group Leader
[ID]: id2, [Joined Group]: group2, [Position]: Group Leader
[ID]: id3, [Joined Group]: group1, [Position]: Group Member
<Group List>
group1 group2
<General Votes>
vote2
<Group Votes>
group1: vote1
group2: None

=====
Num:52
=====
1.1 Register as a Member
1.2 Login
```

```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe

=====
Num:52
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 1 2
Selected Menu: 1.2 Login
ID: id1
Password:pwd1
Login Success!

=====
Num:53
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Vote Item
4.4 List All Vote Items
4.5 Cast a Vote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 1
Selected Menu: 4.1 Logout
Logout Success

=====
Num:54
=====
1.1 Register as a Member
1.2 Login
1.3 Program Exit
=====
[Current Position]: Non Member
Select Menu: 1 2
Selected Menu: 1.2 Login
ID: id1
Password:pwd1
Login Success!
```

```
C:\Users\박형규-PC\source\repos\Wassn3\Debug\Wassn3.exe
=====
Num:55
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Vote Item
4.4 List All Vote Items
4.5 Cast a Vote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 3
Selected Menu: 4.3 Add a New Vote Item
<General Votes>
vote2
<Group Votes>
vote1
Select Vote Type(0: general, 1: group): 1
Vote Subject: vote2
Number of Vote Items: 6
Vote Added!

=====
Num:56
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Vote Item
4.4 List All Vote Items
4.5 Cast a Vote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 5
Selected Menu: 4.5 Cast a Vote
<General Votes>
vote2
<Group Votes>
vote1 vote2
Select Vote Type(0: general, 1: group): 1
Vote Subject: vote2
Vote for(select 2 items): 1 2
Request processed successfully!
```

```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe

=====
Num:57
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Vote Item
4.4 List All Vote Items
4.5 Cast a Vote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 5
Selected Menu: 4.5 Cast a Vote
<General Votes>
vote2
<Group Votes>
vote1 vote2
Select Vote Type(0: general, 1: group): 1
Vote Subject: vote2
Vote for(select 2 items): 1 2
Request processed failed

=====
Num:58
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Vote Item
4.4 List All Vote Items
4.5 Cast a Vote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 4
Selected Menu: 4.4 List All Vote Items
<General Vote List>
Vote Subject: vote2, Vote Counts per Item - item1: 0 item2: 0 item3: 0 item4: 0
item5: 0
<Group Vote List>
Vote Subject: vote1, Vote Counts per Item - item1: 1 item2: 1 item3: 0
Vote Subject: vote2, Vote Counts per Item - item1: 1 item2: 1 item3: 0 item4: 0
item5: 0 item6: 0
```

```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe
Num:59
=====
4.1 Logout
4.2 Delete Existing Uote Item
4.3 Add a Uote Item
4.4 List All Uote Items
4.5 Cast a Uote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 0 0
<Member List>
[ID]: id1, [Joined Group]: group1, [Position]: Group Leader
[ID]: id2, [Joined Group]: group2, [Position]: Group Leader
[ID]: id3, [Joined Group]: group1, [Position]: Group Member
<Group List>
group1 group2
<General Votes>
vote2
<Group Votes>
group1: vote1 vote2
group2: None

=====
Num:60
=====
4.1 Logout
4.2 Delete Existing Uote Item
4.3 Add a Uote Item
4.4 List All Uote Items
4.5 Cast a Uote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 7
Selected Menu: 4.7 Ban a Group Member
Group Member's ID to Ban: id2
Ban Failed

=====
Num:61
=====
```



```
C:\Users\박형규-PC\source\repos\Wassn3W\Debug\Wassn3.exe
=====
Num:61
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Vote Item
4.4 List All Vote Items
4.5 Cast a Vote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 5
Selected Menu: 4.5 Cast a Vote
<General Votes>
vote2
<Group Votes>
vote1 vote2
Select Vote Type(0: general, 1: group): 1
Vote Subject: vote1
Vote for(select 2 items): 1 2
Request processed successfully!

=====
Num:62
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Vote Item
4.4 List All Vote Items
4.5 Cast a Vote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 5
Selected Menu: 4.5 Cast a Vote
<General Votes>
vote2
<Group Votes>
vote1 vote2
Select Vote Type(0: general, 1: group): 0
Vote Subject: vote2
Vote for(select 2 items): 1 0
Request processed successfully!
```

```
C:\Users\박형규-PC\source\repos\Wassn3\Debug\Wassn3.exe
=====
Num:63
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Vote Item
4.4 List All Vote Items
4.5 Cast a Vote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 5
Selected Menu: 4.5 Cast a Vote
<General Votes>
vote2
<Group Votes>
vote1 vote2
Select Vote Type(0: general, 1: group): 0
Vote Subject: vote2
Vote for(select 2 items): 1 0
Request processed failed

=====
Num:64
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Vote Item
4.4 List All Vote Items
4.5 Cast a Vote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 4
Selected Menu: 4.4 List All Vote Items
<General Vote List>
Vote Subject: vote2, Vote Counts per Item - item1: 1 item2: 0 item3: 0 item4: 0
item5: 0
<Group Vote List>
Vote Subject: vote1, Vote Counts per Item - item1: 2 item2: 2 item3: 0
Vote Subject: vote2, Vote Counts per Item - item1: 1 item2: 1 item3: 0 item4: 0
item5: 0 item6: 0
```

```
C:\Users\박형규-PC\source\repos\Wassn3\Debug\Wassn3.exe
=====
Num:65
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Vote Item
4.4 List All Vote Items
4.5 Cast a Vote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 3
Selected Menu: 4.3 Add a New Vote Item
<General Votes>
vote2
<Group Votes>
vote1 vote2
Select Vote Type(0: general, 1: group): 0
Vote Subject: vote2
Number of Vote Items: 7
Vote added fail

=====
Num:66
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Vote Item
4.4 List All Vote Items
4.5 Cast a Vote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 2
Selected Menu: 4.2 Delete Existing Vote
<General Votes>
vote2
<Group Votes>
vote1 vote2
Select Vote Type(0: general, 1: group): 0
Vote Subject to Delete: vote2
Vote Deleted!
```

```
C:\Users\박형규-PC\source\repos\Wassn3\WDebug\Wassn3.exe
vote2
<Group Votes>
vote1 vote2
Select Vote Type(0: general, 1: group): 0
Vote Subject to Delete: vote2
Vote Deleted!

=====
Num:67
=====
4.1 Logout
4.2 Delete Existing Uote Item
4.3 Add a Uote Item
4.4 List All Uote Items
4.5 Cast a Uote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu: 4 2
Selected Menu: 4.2 Delete Existing Vote
<General Votes>
None
<Group Votes>
vote1 vote2
Select Vote Type(0: general, 1: group): 1
Vote Subject to Delete: vote3
Vote Deleted Failed

=====
Num:68
=====
4.1 Logout
4.2 Delete Existing Vote Item
4.3 Add a Uote Item
4.4 List All Uote Items
4.5 Cast a Uote
4.6 List All Group Members
4.7 Ban a Member from Group
4.8 Program Exit
=====
[ID]: id1, [Current Position]: Group Leader, [Joined Group]: group1
Select Menu:
```

## 6. 토론, 결론 및 개선방향

이번 프로그램을 구현하며 다형성과 상속의 개념에 대해 다시 한 번 상기하게 되는 시간을 가졌다. 다형성을 적용 할 때는 base class의 포인터 변수와 상속하는 형태인 class, 그리고 같은 signature을 가진 method가 필요하며 base class의 포인터에 derived class를 할당하는 형태는 가능하지만 derived class의 포인터에 base class의 객체를 할당하는 형태는 불가능 하다는 것을 다시 한 번 인식하게 되었다. 또한 상속을 할 때 derived class와 base class의 default, copy constructor의 유무에 따라 constructor가 어떤 때 제대로 작동하고 어떤 때는 의도한대로 작동하지 않는지에 대해서도 다시 한 번 상기하는 시간이 되었다. 이번 프로그램은 Assn2를 구현했던 것을 이용하여 작성할 수 있었기 때문에 프로그램을 구현하는 데에 오랜 시

간이 걸리지 않을 것이라고 구현하기 전에 생각하였으나 다형성과 상속을 이용하여 프로그램을 구현하다 보니 생각보다 오랜 시간이 걸렸다. 또한 다형성과 상속뿐만 아니라 파일 입출력, 생성자, 소멸자 등 다양한 개념을 한 프로그램에 응용하여 구현하려다 보니 생각보다 많은 어려움이 있었던 것 같다. 구현된 이 프로그램에 group leader의 변경을 가능하게 하거나, group leader외에 그룹 매니저라는 새로운 역할의 도입, vote가 존재한 상태에서 vote의 투표 항목 추가 가능 등의 기능을 도입한다면 더 발전된 프로그램이 될 수 있을 것 같다.

## 7. 참고문헌

<https://docs.microsoft.com/ko-kr/cpp/error-messages/compiler-warnings/compiler-warning-level-1-c4154?view=vs-2019>

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