OOP Theory Assignmnent 2

23K0703

BCS-2D

Question 1

Code:

```
#include <iostream>

using namespace std;

class SecurityTool
{
protected:
string securityLevel;
int numOfDevices;
float cost;

public:
SecurityTool(
string securityLevel,
int numOfDevices,
float cost)
{
if (securityLevel == "Low" || securityLevel == "Medium" || securityLevel == "High")
{
this->securityLevel = securityLevel;
}

if (cost <= 0)
cost = 1;

this->cost = cost;
}

bool performScan()
{
return false;
}
};

class FirewallTool : public SecurityTool
{
int ports[23];
string protocols[6];

public:
FirewallTool(
string securityLevel,
float cost,
int numOfDevices)
: SecurityTool(
securityLevel,
numOfDevices,
cost)
{
```

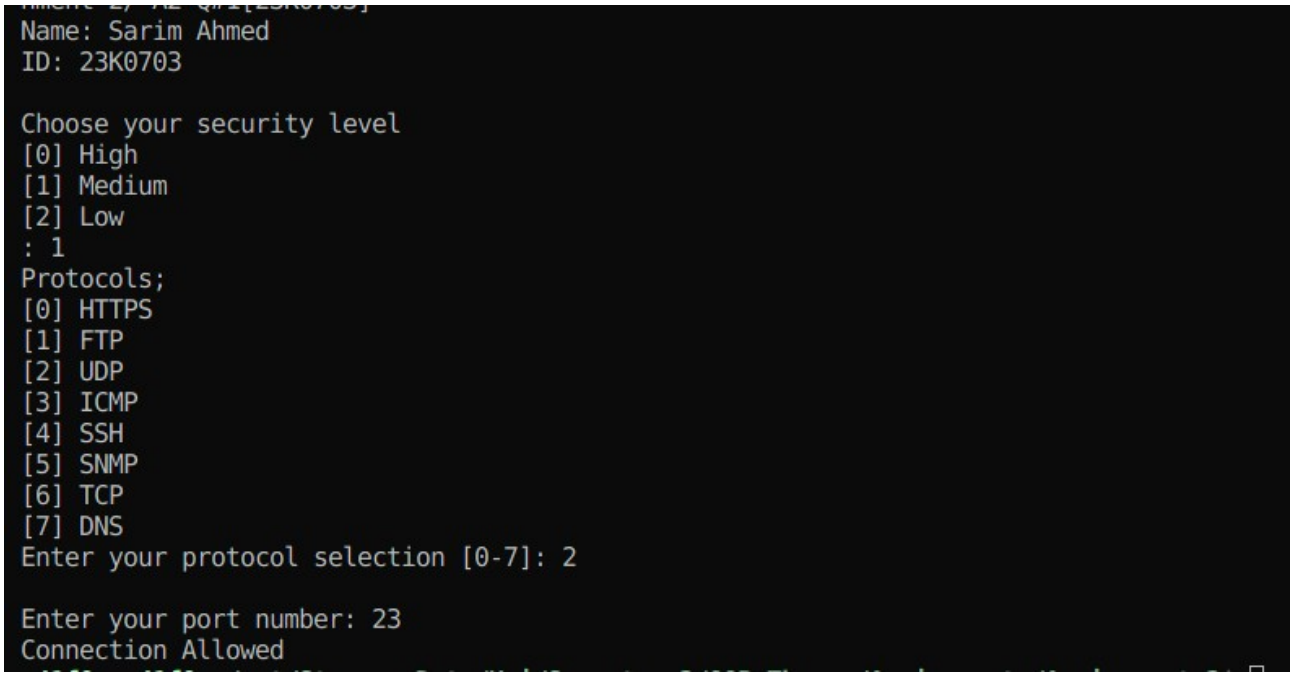
```
generateList();
}

void generateList()
{
for (int i = 0; i < 23; i++)
{
ports[i] = i + 7 + 1;
}

protocols[0] = "HTTPS";
protocols[1] = "FTP";
protocols[2] = "UDP";
protocols[3] = "ICMP";
protocols[4] = "SSH";
protocols[5] = "SNMP";
}

bool performScan(int trafficPort, string trafficProtocol)
{
bool validPort = false, validProtocol = false;

if (securityLevel == "High")
{
// Checking if port is valid
for (int i = 0; i < 23; i++)
{
if (ports[i] == trafficPort)
{
validPort = true;
break;
}
}

// Checking if protocol is valid
for (int i = 0; i < 6; i++)
{
if (protocols[i] == trafficProtocol)
{
validProtocol = true;
break;
}
}
}
else if (securityLevel == "Medium")
{

// Checking for listed ports
for (int i = 0; i < 23; i++)
{
if (ports[i] == trafficPort)
{
validPort = true;
break;
}
}
if (!validPort)
```

```
{
// Checking for 2 extra ports
for (int i = 1; i <= 2; i++)
{
if ((ports[19] + i) == trafficPort)
{
validPort = true;
break;
}
}
}
// Checking if protocol is valid
for (int i = 0; i < 6; i++)
{
if (protocols[i] == trafficProtocol)
{
validProtocol = true;
break;
}
}
}
else if (securityLevel == "Low")
{
// Checking for listed ports
for (int i = 0; i < 23; i++)
{
if (ports[i] == trafficPort)
{
validPort = true;
break;
}
}

if (!validPort)
{
// Checking for 5 extra ports
for (int i = 1; i <= 5; i++)
{
if ((ports[19] + i) == trafficPort)
{
validPort = true;
break;
}
}
}

// Checking if protocol is valid
for (int i = 0; i < 6; i++)
{
if (protocols[i] == trafficProtocol)
{
validProtocol = true;
break;
}
}

if (!validProtocol)
{
```

```
validProtocol = trafficProtocol == "TCP" || trafficProtocol == "DNS";
}
}

return validPort && validProtocol;
}
};

int main()
{

// Solution Header
cout << "Name: Sarim Ahmed" << endl;
cout << "ID: 23K0703" << endl
<< endl;

string securityLevels[3] = {"High", "Medium", "Low"};
int securityLevelChoice;

cout << "Choose your security level" << endl;
for (int i = 0; i < 3; i++)
{
cout << "[" << i << "] " << securityLevels[i] << endl;
}
cout << ": ";
cin >> securityLevelChoice;

FirewallTool firewallTool(securityLevels[securityLevelChoice], 13.0, 5);

string protocols[8] = {
"HTTPS",
"FTP",
"UDP",
"ICMP",
"SSH",
"SNMP",
"TCP",
"DNS",
};

string trafficProtocol;
int trafficPort, protocolChoice;

// Show all protocol options
cout << "Protocols;" << endl;
for (int i = 0; i < 8; i++)
{
cout << "[" << i << "] " << protocols[i] << endl;
}

cout << "Enter your protocol selection [0-7]: ";
cin >> protocolChoice;

cout << endl
<< "Enter your port number: ";
cin >> trafficPort;
```

```
bool allowed = firewallTool.performScan(trafficPort, protocols[protocolChoice]);

if (allowed)
{

cout << "Connection Allowed" << endl;
}
else
{
cout << "Connection Blocked" << endl;
}
}
```

Output:



Question 2

Code:

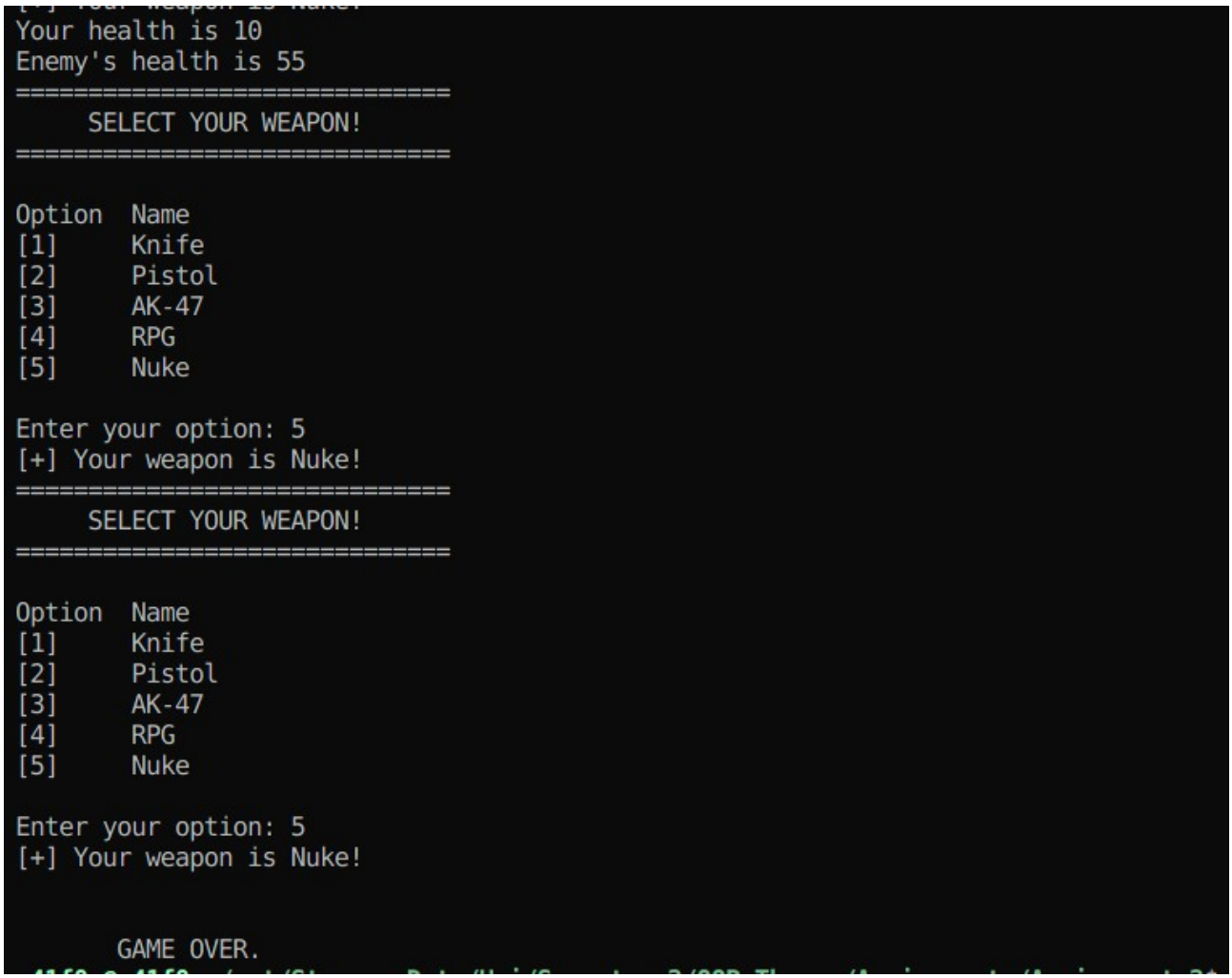
```
#include <iostream>

using namespace std;

class Enemy;
class Player
{
protected:
int playerID, health;
string playerName;

public:
Player(
int playerID,
string playerName)
: playerID(playerID),
```

```
playerName(playerName),
health(100) {}

void takeDamage(int damage)
{
health -= damage;
}

int getHealth()
{
return this->health;
}
};

class Weapon
{
string weaponsList[5];

public:
Weapon()
{
weaponsList[0] = "Knife";
weaponsList[1] = "Pistol";
weaponsList[2] = "AK-47";
weaponsList[3] = "RPG";
weaponsList[4] = "Nuke";
}

void use()
{
int option;

// Print all weapons
cout << "================================\n";
cout << " SELECT YOUR WEAPON!\n";
cout << "================================\n\n";
cout << "Option\tName\n";

for (int i = 0; i < 5; i++)
{
cout << "[" << i + 1 << "]\t" << weaponsList[i] << endl;
}

// Selecting a weapon
cout << "\nEnter your option: ";
cin >> option;

// Using the weapon
cout << "[+] Your weapon is " << weaponsList[option - 1] << "!" << endl;
}
};

class Character : public Player
{
int level, points;
string experience;
```

```
public:
Character(
int playerID,
string playerName)
: level(0),
points(0),
experience("Beginner"),
Player(playerID, playerName) {}

void levelUp()
{
if (experience == "Beginner")
{
experience = "Intermidiate";
}
else if (experience == "Intermidiate")
{
experience = "Advanced";
}
else if (experience == "Advanced")
{
experience = "Expert";
}
}

void playGame(Enemy *enemy);
};

class Enemy : public Player
{
int damage;

public:
Enemy(int playerID,
string playerName,
int damage)
: Player(playerID, playerName)
{
if (damage > 10)
{
this->damage = 10;
}
else if (damage < 1)
{
this->damage = 1;
}
else
{
this->damage = damage;
}
}

void attack(Character *character)
{
// Select weapon
Weapon weapons;
```

```
weapons.use();
character->takeDamage(this->damage);
}
};
void Character::playGame(Enemy *enemy)
{
Weapon weapons;

weapons.use();

enemy->takeDamage(5);
this->points += 10;
levelUp();
}

int main()
{
// Solution Header
cout << "Name: Sarim Ahmed" << endl;
cout << "ID: 23K0703" << endl
<< endl;

Enemy enemy(12345, "Baba Bandook", 10);
Character character(12342, "Burqa Avenger");

Enemy *e = &enemy;
Character *c = &character;

while (e->getHealth() > 0 && c->getHealth() > 0)
{
cout << "Your health is " << c->getHealth() << endl;
cout << "Enemy's health is " << e->getHealth() << endl;

c->playGame(e);
e->attack(c);
}

if (e->getHealth() <= 0 && c->getHealth() <= 0)
{
cout << "\n\n THE GAME WAS A DRAW." << endl;
}
else if (e->getHealth() <= 0)
{
cout << "\n\n THE CHARACTER WON." << endl;
}
else
{
cout << "\n\n GAME OVER." << endl;
}
}
```

Output:



Question 3:

Code:

```
#include <iostream>

using namespace std;

class DarazPersonalData
{
string firstName;
string lastName;
string address;
string city;
string state;
string zip;
string phone;

public:
DarazPersonalData(
string firstName,
string lastName,
string address,
string city,
string state,
string zip,
```

```
string phone)
: firstName(firstName),
lastName(lastName),
address(address),
city(city),
state(state),
zip(zip),
phone(phone)
{
}

string getFirstName()
{
return this->firstName;
}

void setFirstName(string firstName)
{
this->firstName = firstName;
}

string getLastName()
{
return this->lastName;
}

void setLastName(string lastName)
{
this->lastName = lastName;
}

string getAddress()
{
return this->address;
}

void setAddress(string address)
{
this->address = address;
}

string getCity()
{
return this->city;
}

void setCity(string city)
{
this->city = city;
}

string getState()
{
return this->state;
}

void setState(string state)
```

```
{
this->state = state;
}

string getZip()
{
return this->zip;
}

void setZip(string zip)
{
this->zip = zip;
}

string getPhone()
{
return this->phone;
}

void setPhone(string phone)
{
this->phone = phone;
}
};

class DarazCustomerData : public DarazPersonalData
{
int customerNumber, loyaltyPoints;

public:
DarazCustomerData(
string firstName,
string lastName,
string address,
string city,
string state,
string zip,
string phone,
int customerNumber,
int loyaltyPoints)
: DarazPersonalData(
firstName,
lastName,
address,
city,
state,
zip,
phone)
{
this->customerNumber = customerNumber;
setLoyaltyPoints(loyaltyPoints);
}

int getCustomerNumber()
{
return this->customerNumber;
}
```

```
void setCustomerNumber(int customerNumber)
{
this->customerNumber = customerNumber;
}

int getLoyaltyPoints()
{
return this->loyaltyPoints;
}

void setLoyaltyPoints(int loyaltyPoints)
{
if (loyaltyPoints < 0)
{
this->loyaltyPoints = 0;
}
else
{
this->loyaltyPoints = loyaltyPoints;
}
}
};

class DarazLoyaltyProgram
{
public:
void addLoyaltyPoints(DarazCustomerData &customer, int points)
{
int currentPoints = customer.getLoyaltyPoints();
customer.setLoyaltyPoints(currentPoints + points);
}

float redeemLoyaltyPointsForDiscounts(DarazCustomerData &customer, int points)
{
int currentPoints = customer.getLoyaltyPoints();
float discount = 0, discountRate = 3;

if (currentPoints >= points)
{
customer.setLoyaltyPoints(currentPoints - points);
discount = points * discountRate;
}

cout << "Discount Availed is " << discount << endl;

return discount;
}

void displayTotalLoyaltyPoints(DarazCustomerData &customer)
{
cout << "Loyalty points for " << customer.getFirstName() << " are: " << customer.getLoyaltyPoints()
<< endl;
}
};

int main()
```

```
{

// Solution Header
cout << "Name: Sarim Ahmed" << endl;
cout << "ID: 23K0703" << endl
<< endl;
DarazLoyaltyProgram loyaltyProgram;

DarazCustomerData customerData("Sarim", "Ahmed", "A-214", "Karachi", "Sindh", "101",
"03121234567", 1234, 220);

loyaltyProgram.displayTotalLoyaltyPoints(customerData);

loyaltyProgram.redeemLoyaltyPointsForDiscounts(customerData, 200);
loyaltyProgram.displayTotalLoyaltyPoints(customerData);

loyaltyProgram.addLoyaltyPoints(customerData, 100);
loyaltyProgram.displayTotalLoyaltyPoints(customerData);
}
```

Output:

```
Name: Sarim Ahmed
ID: 23K0703

Loyalty points for Sarim are: 220
Discount Availed is 600
Loyalty points for Sarim are: 20
Loyalty points for Sarim are: 120
```

Question 4:

Code:

```
#include <iostream>
#include <functional>

using namespace std;

class User
{
string username, email;
size_t password;

public:
User(string username, string password, string email)
{
this->username = username;
this->email = email;

this->password = hash(password);
}

bool verifyUser(string email, string password)
```

```
{
return this->email == email && this->password == hash(password);
}

size_t hash(string password)
{
return std::hash<string>{}(password);
}
};

class Post
{
string postId, content, comments[10];
int numComments, likes, views;

public:
Post(string postId, string content) : postId(postId), content(content)
{
numComments = 0;
for (int i = 0; i < 10; i++)
comments[i] = "";
likes = 0;
views = 0;
}

int getViews()
{
return this->views;
}

void promoteViews()
{
this->views *= 3;
}

int getNumComments()
{
return this->numComments;
}

int getLikes()
{
return this->likes;
}

void promoteLikes()
{
this->likes *= 2;
}

void comment(string comment)
{
comments[numComments] = comment;
numComments++;
}

void like()
```

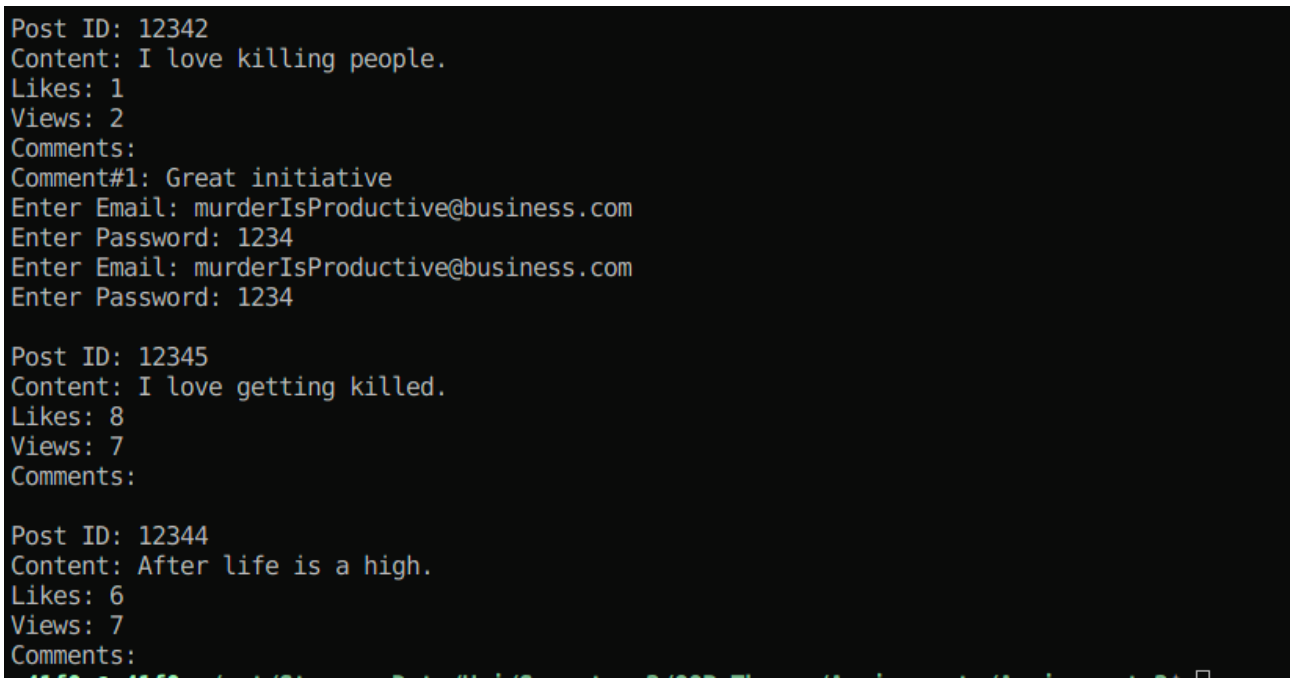
```
{
likes++;
}

void display()
{
// Add view
views++;

cout << "\nPost ID: " << postId << endl;
cout << "Content: " << content << endl;
cout << "Likes: " << likes << endl;
cout << "Views: " << views << endl;
cout << "Comments:" << endl;
for (int i = 0; i < numComments; i++)
{
cout << "Comment#" << i + 1 << ": " << comments[i] << endl;
}
}
};

class RegularUser : public User
{
int numPostsPosted;
static const int MAX_FEED_SIZE = 10;
Post *feed[MAX_FEED_SIZE];

public:
RegularUser(
string username,
string password,
string email)
: User(
username,
password,
email)
{
numPostsPosted = 0;
}

void addToFeed(Post *post)
{
if (numPostsPosted < 5)
{
numPostsPosted++;
feed[numPostsPosted - 1] = post;
}
}

void viewFeed()
{
for (int i = 0; i < numPostsPosted; i++)
{
feed[i]->display();
}
}
};
```

```
class BusinessUser : public User
{
int numPostsPromoted;
Post *promotedPosts[10];

public:
BusinessUser(
string username,
string password,
string email)
: User(
username,
password,
email)
{
numPostsPromoted = 0;
}

void promotePost(Post *post)
{
if (numPostsPromoted < 10)
{
string inputEmail, inputPassword;

cout << "Enter Email: ";
cin >> inputEmail;

cout << "Enter Password: ";
cin >> inputPassword;

if (verifyUser(inputEmail, inputPassword))
{
post->promoteLikes();
post->promoteViews();

promotedPosts[numPostsPromoted] = post;
numPostsPromoted++;
}
}
}

void viewPromotedPosts()
{
for (int i = 0; i < numPostsPromoted; i++)
{
promotedPosts[i]->display();
}
}
};

int main()
{
// Solution Header
cout << "Name: Sarim Ahmed" << endl;
cout << "ID: 23K0703" << endl
<< endl;
```

```
Post *post1 = new Post("12345", "I love getting killed.");
Post *post2 = new Post("12344", "After life is a high.");
Post *post3 = new Post("12342", "I love killing people.");

RegularUser user1("uwuMurderer", "12398ru23", "murder@hehe.com");
RegularUser user2("waitingToBeMurdered", "3r4t34t43t", "murdered@haha.com");
BusinessUser user3("murderPromoter786", "1234", "murderIsProductive@business.com");

post1->like();
post1->like();
post1->like();
post1->like();

post2->like();
post2->like();
post2->like();

post3->like();

post3->comment("Great initiative");

user2.addToFeed(post1);
user2.addToFeed(post2);
user2.addToFeed(post3);

user2.viewFeed();
user2.viewFeed();

user3.promotePost(post1);
user3.promotePost(post2);

user3.viewPromotedPosts();
}
```

Output:

```
Name: Sarim Ahmed
ID: 23K0703


Post ID: 12345
Content: I love getting killed.
Likes: 4
Views: 1
Comments:

Post ID: 12344
Content: After life is a high.
Likes: 3
Views: 1
Comments:

Post ID: 12342
Content: I love killing people.
Likes: 1
Views: 1
Comments:
Comment#1: Great initiative

Post ID: 12345
Content: I love getting killed.
Likes: 4
Views: 2
Comments:

Post ID: 12344
Content: After life is a high.
Likes: 3
Views: 2
Comments:
```


Post ID: 12342
Content: I love killing people.
Likes: 1
Views: 2
Comments:
Comment#1: Great initiative
Enter Email: murderIsProductive@business.com
Enter Password: 1234
Enter Email: murderIsProductive@business.com
Enter Password: 1234
Post ID: 12345
Content: I love getting killed.
Likes: 8
Views: 7
Comments:
Post ID: 12344
Content: After life is a high.
Likes: 6
Views: 7
Comments: