U1764486 - Israr Hussain
Programming - Software design and development

Week 1

Git Commands

1. **Git init -** This creates a new local repository
Git add <filename> **Git add*** - This will Add files to staging (index)
Git status - This will list all files that have been changed and also those files that need to adding.
Git clone /path/to/repository - this creates a working copy or a local directory
Git checkout -b <branchname> - This will create a new branch and switch to it
Git pull - This will fetch and merge the remote server to the working directory
Git grep "foo()" - this will search for the working directory called "foo()"
Git commit -m "Commit message" - this will commit changes to head however it will not make any changes to the remote repository

Hello World program

```
print ('hello, world')
```

Israr Hussain

Week 2

Teams and Pupils work Python.

A school decides to run a five-a-side football competition. There are 172 pupils in the school. Write out expressions that will determine how many teams of five there will be, and how many pupils will not be able to play. Test these at the Python console, and take a screenshot for your logbook

Write a program that creates a variable like so (as the first line): number_of_pupils = 172 and then prints out the number of teams of five, and the number left out. Include the program in your logbook (as a screenshot, showing the output).

```
1  number_of_pupils = 172
2  total_teams = 172 // 5
3  pupils_selected = total_teams * 5
4  pupils_remaining = number_of_pupils - pupils_selected
5  print (number_of_pupils)
6  print (pupils_remaining)
7
8
```

Summary of code

The number_of_pupils is a variable with the value of 172
The total_teams a variable with the sum of 172 / 5
Pupils_selected is a variable with the sum of total_teams * 5
Pupils_remaining will equal

Israr Hussain

Week 3

TABLE with Teams and Pupils work Python.

```
'''number_of_pupils / total_teams / pupils_remaining'''
'''     166                40              0           '''
'''     187                77              2           '''
'''     199                40              4            '''

number_of_pupils = int( input ("Please enter the number of students in the school") )
total_teams = number_of_pupils// 5
pupils_selected = total_teams * 5
pupils_remaining = number_of_pupils - pupils_selected
print (total_teams)
print (pupils_remaining)
```

Summary.

Above i have created a table of values with the number of pupils, total teams and pupils remaining, the program will first ask the user to enter the number of students in the school which will then be the divided by 5 to represent the total number of teams,

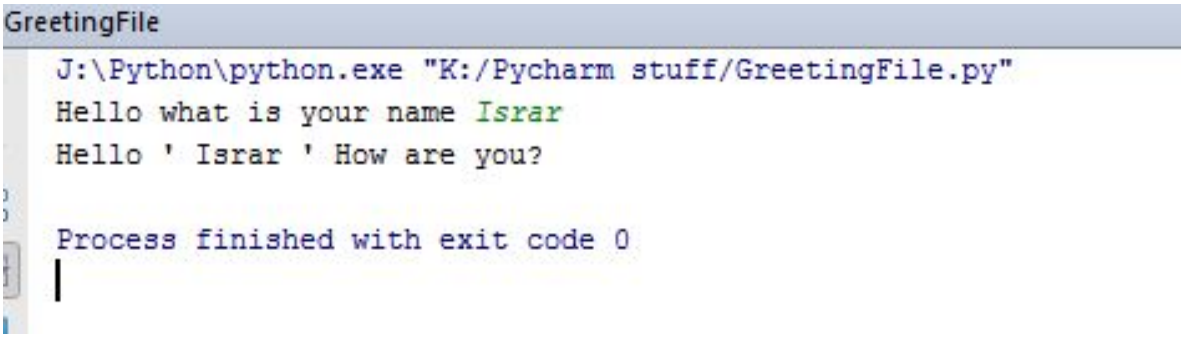
The pupils selected variable will portray the sum of total_tems * 5
Which will then be required for the sum of pupils remaining.
The sum of pupils remaining will be he number_of_pupils - pupils_selected.

The code will then print the number of teams and the number of pupils remaining without a team.

Week 4

Greetings.

```
name = ascii(input ("Hello what is your name"))

print ("Hello", name, "How are you?")
```




```
Python 2.7.14 (v2.7.14:84471935ed, Sep 16 2017, 20:19:30) [MSC v.1500 32 bit (Intel)] on win32
>>> str = raw_input ("Hello, what's your name?")
... print ("Good to meet you " + str.capitalize())
Hello, what's your name?>? israr
Good to meet you Israr

>>>
```

PEP 8: no newline at end of file

The above code works by asking the user their name and then showing the name back in Capital Letters along with a sentence.

Celsius to Fahrenheit

```
celsius_str = int (input('Enter the temperature in celsius'))
fahrenheit = celsius_str * 9 / 5 + 32
print ('Temperature in fahrenheit is ' + str(fahrenheit))
```

Celsius to Fahrenheit

Working code

```
Enter the temperature in celsius 34
Temperature in fahrenheit is 93.2

Process finished with exit code 0
```

The above code converts Celsius to Fahrenheit

WEEK 5

If statements implemented into Celsius and Fahrenheit program

```
celsius_str = (input('Enter the temperature in celsius'))
if celsius_str [-1].upper() == 'c':
    celsius = float (celsius_str [:-1])
else:
    celsius = float (celsius_str)

    if celsius < -273.14:
        raise ValueError ('error.')
else:
fahrenheit = celsius * 9 / 5 + 32
print ('Temp in Fahrenheit is ' + str (fahrenheit) + 'F.')
```

```
Enter the temperature in celsius 47
Temperature in fahrenheit is 116.6

Process finished with exit code 0
```

Israr Hussain

Repetition

Q2. Add table that calculates generates a table of temperature

Listing - Celsius to Fahrenheit Table Generator

```
for CelsiusTemp in range (-10,33):
   FahrenheitTemp = CelsiusTemp * 9 / 5 + 32

   print ( CelsiusTemp,"\t\t\t\t",format( FahrenheitTemp, "" ) )
```

Multiplication Generator - Exercise 5

```
import random

for number in range(0,5):
    # randomly generates2 numbers from variables number1 and number2
    number1 = random.randint(1,12)
    number2 = random.randint(1,12)
    # variable answer is the sum of the two random numbers.
    answer = number1 * number2
# guess equals 0 for now
    guess = 0
    # asks user the question
    print "What is", number1, "X", number2, "?"

    while guess != answer:

    #User input is guess
        guess = input("Answer: ")
        if guess != answer:
            print "Incorrect Answer, try again"
    print "Well Done!"
print "That's it, good work!"
```

Multiplication Generator - Exercise 8 Extended - Average of attempts

```
import random

attempt = 0
attempts = 0
number_of_attempts = 0
for number in range(0,5):
    # randomly generates2 numbers from variables number1 and number2
    number1 = random.randint(1,12)
    number2 = random.randint(1,12)
    # variable answer is the sum of the two random numbers.
    answer = number1 * number2
# guess equals 0 for now
    attempt = 0
    # asks user the question
    print "What is", number1, "X", number2, "?"

    while attempt != answer:
    #User input is guess

        attempt = input("Enter Your Answer: ")

        if attempt != answer:
            attempts = attempts + 1
            print "Incorrect, try again"

    attempts = attempts + 1
    print "Well Done!"

attempts = attempts / 5
print("Average is", attempts)
```

-

```
/usr/bin/python2.7 "/Users/israrhussain/PycharmProjects/PythonProject_UniYr1/Generate
What is 9 X 6 ?
Enter Your Answer: 6
Incorrect, try again
Enter Your Answer: 6
Incorrect, try again
Enter Your Answer: 6
Incorrect, try again
Enter Your Answer: 6
Incorrect, try again
Enter Your Answer: 6
Incorrect, try again
Enter Your Answer: 54
Well Done!
What is 6 X 4 ?
Enter Your Answer: 24
Well Done!
What is 7 X 4 ?
Enter Your Answer: 28
Well Done!
What is 11 X 1 ?
Enter Your Answer: 11
Well Done!
What is 9 X 12 ?
Enter Your Answer: 108
Well Done!
('Average is', 2)

Process finished with exit code 0
```


```
import random

attempt = 0
attempts = 0
number_of_attempts = 0
for number in range(0,5):
    # randomly generates 2 numbers from variables number1 and number2
    number1 = random.randint(1,12)
    number2 = random.randint(1,12)
    # variable answer is the sum of the two random numbers.
    answer = number1 * number2
# guess equals 0 for now
    attempt = 0
```

```
    # asks user the question
    print "What is", number1, "X", number2, "?"

    while attempt != answer:
    #User input is guess

        attempt = input("Enter Your Answer: ")

        if attempt != answer:
            attempts = attempts + 1
            print "Incorrect, try again"

    attempts = attempts + 1
    print "Well Done!"

attempts = attempts / 5
print  ("Average is", attempts)
```

Week 6
Reusable code

1. Version 1 - asks for user's name and gives random answers

HotlineSupport.py

```
import random
import sys

goodbye = False
nameasked = False

if nameasked == False:
    name = raw_input("Enter your name to begin ")
print("Hello", name, "Welcome to Technical support")
nameasked = True

while goodbye == False:

        question = raw_input("Ask a question ")

        if question == "goodbye":
            print ("Goodbye", name)
            sys.exit()
        else:
         outcome = ['Yes!', 'No!', 'Maybe!']
        print(random.choice(outcome))
```

```
/usr/bin/python2.7 /Users/israrhussain/PycharmProjects/
Enter your name to begin Israr
('Hello', 'Israr', 'Welcome to Technical support')
Ask a question Does this code work
Maybe
Ask a question Is the sky blue
Yes
Ask a question Is the sky orange
No
Ask a question goodbye
('Goodbye', 'Israr')

Process finished with exit code 0
```

Photos

5: Debug 6: TODO Python Console Terminal

2. Version 2 - 5 question outcomes.

HotlineSupport.py

```
import random
import sys

goodbye = False
nameasked = False

if nameasked == False:
    name = raw_input("Enter your name to begin ")
print("Hello", name, "Welcome to Technical support")
nameasked = True

while goodbye == False:

        question = raw_input("Ask a question ")

        goodbye1 = "goodbye"
        if question.lower() == goodbye1.lower():
            print ("Goodbye", name)
            sys.exit()
        else:
            outcome = ['Have you tried restarting the system?', 'Have you updated the system?',
                    'Have you tried plugging it in?', 'How long has it been since the problem started?', 'Have you backed up your data?']
        print(random.choice(outcome))
```

HotlineSupport

```
/usr/bin/python2.7 /Users/israrhussain/PycharmProjects/Pytho
Enter your name to begin Israr
('Hello', 'Israr', 'Welcome to Technical support')
Ask a question My Phone stopped working
Have you backed up your data?
Ask a question Yes
Have you updated the system?
Ask a question No
Have you backed up your data?
Ask a question goodBYE
('Goodbye', 'Israr')

Process finished with exit code 0
```

The code above will give the user random outcomes from a list of 5 different sentences.

3.Version 3

```
import random
import sys
goodbye = False
nameasked = False

if nameasked == False:
   name = raw_input("Enter your name to begin ")
print("Hello", name, "Welcome to Technical support")
nameasked = True

while goodbye == False:
```

```
   question = raw_input("Ask a question ")
#WORDS TO LOOK FOR
   checks = ['apple', 'windows', 'android', 'xbox', 'phone']
   goodbye1 = "goodbye"
   windows = "windows"
   apple = "apple"
   phone = "phone"
   android = "android"
   xbox = "xbox"


   if question.lower() in (check.lower() for check in checks):
       # If statement checking for words

       if question.lower() == goodbye1.lower():
               print ("Goodbye", name)
               sys.exit()

       if windows.lower() in question.lower():
               print (name, "Try reboot your computer and report back!")

       if apple.lower() in question.lower():
               print (name, "Try updating your iphone to IOS 11 and report
back!")

       if android.lower() in question.lower():
               print (name, "Try restarting your android smartphone!")

       if xbox.lower() in question.lower():
               print (name, "Have you checked your internet connection?")

       if phone.lower() in question.lower():
               print (name, "Try reboot your phone and report back!")

   else:
       outcome = ['Have you tried restarting the system?', 'Have you updated
the system?',
                  'Have you tried plugging it in?', 'How long has it been
since the problem started?',
                  'Have you backed up your data?']
       print(random.choice(outcome))
```

Israr Hussain

AdvancedHotlineSupportV3.py

```
import random
import sys

goodbye = False
nameasked = False

if nameasked == False:
    name = raw_input("Enter your name to begin ")
print("Hello", name, "Welcome to Technical support")
nameasked = True

while goodbye == False:

    question = raw_input("Ask a question ")
#WORDS TO LOOK FOR
    checks = ['apple', 'windows', 'android', 'xbox', 'phone']
    goodbye1 = "goodbye"
    windows = "windows"
    apple = "apple"
    phone = "phone"
    android = "android"
    xbox = "xbox"
```

```
if nameasked == False:
    name = raw_input("Enter your name to begin ")
print("Hello", name, "Welcome to Technical support")
nameasked = True

while goodbye == False:

    question = raw_input("Ask a question ")
#WORDS TO LOOK FOR
    checks = ['apple', 'windows', 'android', 'xbox', 'phone']
    goodbye1 = "goodbye"
    windows = "windows"
    apple = "apple"
    phone = "phone"
    android = "android"
    xbox = "xbox"

    if question.lower() in (check.lower() for check in checks):
        # If statement checking for words

        if question.lower() == goodbye1.lower():
                print ("Goodbye", name)
                sys.exit()

        if windows.lower() in question.lower():
                print (name, "Try reboot your computer and report back!")

        if apple.lower() in question.lower():
                print (name, "Try updating your iphone to IOS 11 and report back!")

        if android.lower() in question.lower():
                print (name, "Try restarting your android smartphone!")

        if xbox.lower() in question.lower():
                print (name, "Have you checked your internet connection?")

        if phone.lower() in question.lower():
                print (name, "Try reboot your phone and report back!")

    else:
        outcome = ['Have you tried restarting the system?', 'Have you updated the system?',
                   'Have you tried plugging it in?', 'How long has it been since the problem started?',
                   'Have you backed up your data?']
        print(random.choice(outcome))
```

Week 7
Welcome to Java

Attributes	Purpose	Variable Type
accountNumber	Holds the string for an account number	string
accountHolder	Holds the name of the account holder in a string	string

balance	Holds the balance/money value - The required is a double as the balance could be a very large number	Double
hasOverdraft	True or False variable which determines if the account is eligible for an Overdraft	boolean
amount	Amount that will be withdrawn	double

METHODS TABLE

Method	**Purpose**	**Return Type**
BankAccount	Creates the account	Class, BankAccount
String	Prints the account info	string
setAccountNumber	Sets the accountNumber	String, accountNumber
getAccountNumber	Retrieves the accountNumber	string, accountNumber
setAccountHolder	Sets the accountHolder	String accountHolder
getAccountHolder	gets the accountHolder	String accountHolder
getBalance	Gets the balance	Double, balance
setBalance	Sets the balance	Double, balance
hasOverdraft	Boolean to check for overdraft	Boolean, hasOverdraf =true/false
setHasOverdraft	Sets the hasOverdraft variable to either true or false.	Boolean, true/false
deposit	To add to the balance	Double, amount value
withdraw	To take away from the balance	Double, amount
addInterest	Adds interest by doing a calculation	double
main	Main void that the program	void

	runs first.	

```
public static void main (String[] args) {
    // creates the account
    System.out.println("Creating Account.....");
    BankAccount Account001 = new BankAccount( accountNumber: "78325123", accountHolder: "Richard Branson", hasOverdraft: false);
    System.out.println("Done...");

    // adds a balance of £1500.0
    Account001.setBalance(1500.0);
    //prints the line depositing £1500.0...
    System.out.println("Depositing £" + Account001.balance + "...");

    //prints the account information.
    System.out.println(Account001);

    // prints the new balance.
    System.out.println("Balance is now £" + Account001.getBalance() + "");

    //withdraws an amount of $250.0 from the balance
    Account001.withdraw( amount: 250.0);
    //prints the line withdrawing £250.0
    System.out.println("Withdrawing £" + Account001.withdrawAmount + "");

    //prints the account information.
    System.out.println(Account001);

    //displays the new balance in £
    System.out.println("Balance is now £" + Account001.getBalance() + "");

    //adds interest using the method
    Account001.addInterest( interestRate: 10);

    //prints the account information.
    System.out.println(Account001);

    //displays the final balance in £
    System.out.println("Final Balance is £" + Account001.getBalance() + "");


}
```

```
BankAccount
"C:\Program Files\Java\jdk1.8.0_131\bin\java" ...
Creating Account.....
Done...
Depositing £1500.0...
BankAccount{accountNumber='78325123', accountHolder='Richard Branson', balance= £1500.0, hasOverdraft=false}
Balance is now £1500.0
Withdrawing £250.0
BankAccount{accountNumber='78325123', accountHolder='Richard Branson', balance= £1250.0, hasOverdraft=false}
Balance is now £1250.0
BankAccount{accountNumber='78325123', accountHolder='Richard Branson', balance= £1375.0, hasOverdraft=false}
Final Balance is £1375.0

Process finished with exit code 0
```

I have created my own variable called withdrawAmount which equals the amount that will be withdrawn and is used to display the withdraw value.

```
public class BankAccount {

   private String accountNumber;
```

```
   private String accountHolder;
   private double balance;
   private double withdrawAmount;
   public boolean hasOverdraft;

   public BankAccount (String accountNumber, String accountHolder, boolean
hasOverdraft) {
       this.accountNumber = accountNumber;
       this.accountHolder = accountHolder;
       this.balance = 0.0;
       this.hasOverdraft = hasOverdraft;
   }

   public BankAccount (String accountNumber, String accountHolder, double balance,
boolean hasOverdraft) {
       this.accountNumber = accountNumber;
       this.accountHolder = accountHolder;
       this.balance = balance;
       this.hasOverdraft = hasOverdraft;
   }

   public String getAccountNumber () {
       return accountNumber;
   }

   public void setAccountNumber (String accountNumber) {
       this.accountNumber = accountNumber;
   }

   public String getAccountHolder () {
       return accountHolder;
   }

   public void setAccountHolder (String accountHolder) {
       this.accountHolder = accountHolder;
   }

   public double getBalance () {
       return balance;
   }

   public void setBalance (double balance) {
       this.balance = balance;
   }

   public boolean hasOverdraft () {
       return hasOverdraft;
   }

   public void setHasOverdraft (boolean hasOverdraft) {
```

```
        this.hasOverdraft = hasOverdraft;
    }

    public void deposit (double amount) {
        this.balance += amount;
    }

    public void withdraw (double amount) {
        this.balance -= amount;
        withdrawAmount = amount;
    }

    public void addInterest (int interestRate) {
        this.balance += this.balance * (interestRate / 100.0);
    }

    @Override
    public String toString () {
        return "BankAccount{" +
                "accountNumber='" + accountNumber + '\'' +
                ", accountHolder='" + accountHolder + '\'' +
                ", balance= £" + balance +
                ", hasOverdraft=" + hasOverdraft +
                '}';
    }


    public static void main (String[] args) {
        // creates the account
        System.out.println("Creating Account.....");
        BankAccount Account001 = new BankAccount( "78325123", "Richard Branson",
false);
        System.out.println("Done...");

        // adds a balance of £1500.0
        Account001.setBalance(1500.0);
        //prints the line depositing £1500.0...
        System.out.println("Depositing £" + Account001.balance + "...");

        //prints the account information.
        System.out.println(Account001);

        // prints the new balance.
        System.out.println("Balance is now £" + Account001.getBalance() + "");

        //withdraws an amount of $250.0 from the balance
        Account001.withdraw(250.0);
        //prints the line withdrawing £250.0
        System.out.println("Withdrawing £" + Account001.withdrawAmount + "");
```

```
        //prints the account information.
        System.out.println(Account001);

        //displays the new balance in £
        System.out.println("Balance is now £" + Account001.getBalance() + "");

        //adds interest using the method
        Account001.addInterest(10);

        //prints the account information.
        System.out.println(Account001);

        //displays the final balance in £
        System.out.println("Final Balance is £" + Account001.getBalance() + "");

    }

}
```

WEEK 8
JAVA CLASSES

Deposit method

```
public void deposit (double amount) {
   // if the amount is bigger than 0 then return true otherwise returns false.
    if (amount > 0)
    {
//if the amount is above 0 then the DepositSuccess bool will be true
// the process will go ahead
        this.balance += amount;
        DepositSuccess = true;
        System.out.println("Successfully Deposited £" + amount + "");

    }
    else
    {
       // DepositSuccess will be false
     DepositSuccess = false;
        // the below message will be shown.
        System.out.println("Amount entered must be above £0");
    }
}
```

Withdraw method

```
public void withdraw (double amount) {
   // protects the field allowing anything below 0
```

```
   // except if an overdraft is true;
   if (amount <= 0){
       System.out.println("Amount entered must be above £0");
   }
   //checks if amounts is less than 0
   if (balance == 0) {
       // checks if hasOverdraft is true
       if (hasOverdraft == true) {
           this.balance -= amount;
       } else {
           System.out.println("Insufficient Funds & Overdraft is unavailable");

       }
   }
   // otherwise go ahead with the withdraw process
   else {
       this.balance -= amount;
       withdrawAmount = amount;
   }
}
```

Add Interest Method

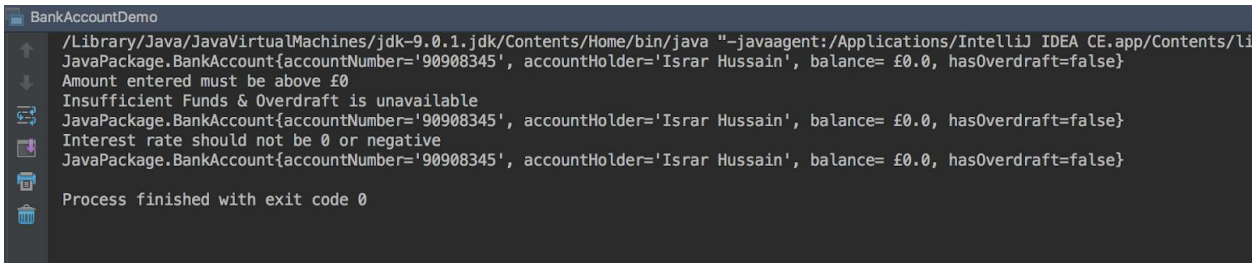
```
public void addInterest (int interestRate) {

// checks if the interestRate variable is below or equal to 0.0
   if (interestRate <= 0.0)
   {
       // prints out the message
       System.out.println("Interest rate should not be 0 or negative");
       return;
   }
//otherwise the addInterest will go ahead with the process.
   else {
       this.balance += this.balance * (interestRate / 100.0);
   }
}
```

BANK ACCOUNT DEMO

Testing a value of 0

```
public static void main (String[] args) {
// new BankAccount object
       BankAccount AccountObj = new BankAccount( "90908345", "Israr Hussain", false);

       // tests the balance
   AccountObj.setBalance(0);
       //prints the line depositing £1500.0...
```

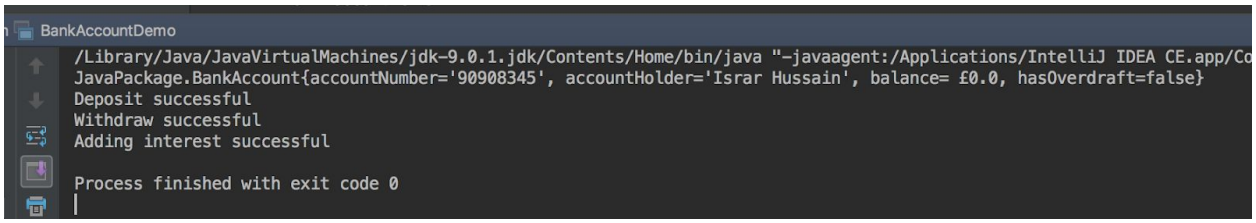
```
        //prints the account information.
        System.out.println(AccountObj);


        //testing an amount of 0
    AccountObj.withdraw(0);
    //prints the account information.
    System.out.println(AccountObj);

        //adds interest of 0 (testing)
    AccountObj.addInterest(0);
    //prints the account information.
    System.out.println(AccountObj);

}
```



Testing of values more than 0

```
public static void main (String[] args) {
// new BankAccount object
        BankAccount AccountObj = new BankAccount( "90908345", "Israr Hussain", false);

    System.out.println(AccountObj);
        // tests the balance
    AccountObj.setBalance(3400);
        //prints the line depositing £1500.0...
    System.out.println("Deposit successful");
        //prints the account information.



        //testing an amount of 0
    AccountObj.withdraw(2000);
    //prints the account information.
    System.out.println("Withdraw successful");

        //adds interest of 0 (testing)
    AccountObj.addInterest(10);
    System.out.println("Adding interest successful");
    //prints the account information.
```

```
}
```



WEEK 9

Collections

Club Class

```
package Collections;


import java.util.ArrayList;
import java.util.Collections;
import java.util.stream.*;


public class Club {

   //ArrayList called Membership.
   private ArrayList <Members> Membership;


   public void JoinClub ()
   {
// adding the members to the Membership ArrayList
        Membership.add(new Members("Gary", 25));
        Membership.add(new Members("Tony", 20));
        Membership.add(new Members("Rubiya", 22));
        Membership.add(new Members("Steve", 18));

        //prints out the Membership ArrayList including the toString()
        System.out.println (Membership);
   }

   public void Total()
   {
        //all the contributed values in a int array
        int[] contribute = {25,20,22,18};
        //works out the total sum of the array using IntSteam
        int sum = IntStream.of(contribute).sum();
```

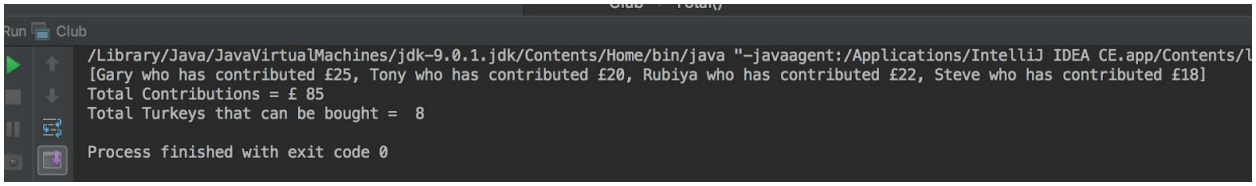
```
        //prints out the "Total Contributions = £85"
        System.out.println("Total Contributions = £ " + sum);
        // prints out "Total Turkeys that can be bought = 10"
        System.out.println("Total Turkeys that can be bought =  " + sum/10);

    }



    public static void main(String args[]){
        // creates a new Club object called club2
      Club club2 = new Club();
      //the club2 object is used to run the void JoinClub()
        club2.JoinClub();
        // the club2 object is used to run the void called Total();
        club2.Total();


    }
}
```

Members CLASS

```
package Collections;


public class Members {

    // Variable name
    private String Membername;
    // Variable Amount Contributed
    public int Contributed;

    public Members(String Membername, int Contributed)
    {
        //Sets the Membername to Membername
        this.Membername = Membername;
        //Sets Contributed to Contributed
        this.Contributed = Contributed;
    }

    @Override
    public String toString()
    {
        // returns the Membername and the contributed amounts for every member
        return "" + Membername + " who has contributed £" + Contributed +
                "";
    }
```

```
}
```

Working Example.



End of Logbook