UNIVERSITI UTARA MALAYSIA
SEMESTER 1 SESSION 2021/2022

SKIP1013 (A)
INTRODUCTION TO PROGRAMMING AND PROBLEM SOLVING

GROUP ASSIGNMENT

MAIN TITLE	BANK
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DATE OF SUBMISSION	19 DECEMBER 2021

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INTRODUCTION TO PROGRAMMING AND PROBLEM SOLVING

Subtopic :
BUSINESS LOAN

NAME	DAYANG FATIMAH BINTI ZAKI
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1. Identify the problem

All of us have seen a bank and most probably have also visited them. But very few of us know about their types and all of their functions. Banks are the places where we keep our money or do all our money-related work. Either it is getting a loan or something else. This type of place has been addressed as a bank. Although the word has various meanings, all of them mean the same. It is a place where you feel relaxed. When we are in pressure or have to solve some money-related problems we visit a bank.

The existence of a bank was seen for the first time in Mesopotamia in 8000 BC. The evidence of bank and temples were seen in this civilization. These banks were not made for lending money because the money came afterword. These banks were made for lending seeds and agricultural stuff. They also used to keep records of trading. Many of histories position the crucial historical development of a banking system to medieval and Renaissance Italy and particularly the affluent cities of Florence, Venice and Genoa. The Bardi and Peruzzi Families dominated banking in 14th century Florence, establishing branches in many other parts of Europe. The most famous Italian bank was the Medici Bank, established by Giovanni Medici in 1397. The oldest bank still in existence is Banca Monte dei Paschi di Siena, headquartered in Siena, Italy, which has been operating continuously since 1472. Until the end of 2019, the oldest bank still in operation was the Banco di Napoli headquartered in Naples, Italy which had been operating since 1463.

Development of banking spread from northern Italy throughout the Holy Roman Empire, and in the 15th and 16th century to northern Europe. This was followed by a number of important innovations that took place in Amsterdam during the Dutch Republic in the 17th century, and in London since the 18th century. During the 20th century, developments in telecommunications and computing caused major changes to banks' operations and let banks dramatically increase in size and geographic spread. The financial crisis of 2007 - 2008 caused many bank failures, including some of the world's largest banks, and provoked much debate about bank regulation.

Modern banking came into existence between the 17th to 19th centuries. It is said that Goldsmiths were the first bankers and they use to lend money to people and people use to keep their valuable things near goldsmiths.The first-ever bank which offered bank noted was the Bank of England. It further developed and today we have well-established banks. In modern times there are many services that are offered by the banks. This is done so that more and more customers are attracted. There are some basic services as well which are offered by the banks. All these things have made banking easy.

Following are the few services which bank provides :

- Advancements of loans
- Cheque payments
- Discounting on bills of exchange
- Collecting and paying the credit instruments
- Guarantee by banks
- Consultancy
- Credit cards
- Funds remittance
- Debit cards

For advancements of loans,

Bank runs on the profit they make. They are into the business of making profits. So, to generate the profit they give loans to the public and private organizations. Thus, in return, they get an interest paid to them which helps them in making a profit. Banks need to keep a minimum cash reserve with them.So, after deducting this cash reserve, banks provide short, medium, and long-term loans to the people who are in need of it.For example,**business loan.**

A **business loan** is a loan specifically intended for business purposes. As with all loans, it involves the creation of a debt, which will be repaid with added interest. There are a number of different types of business loans, including bank loans, mezzanine financing, asset-based financing, invoice financing, microloans, business cash advances and cash flow loans.

Types of business loans :

- Term Loans

- Personal Loans for Business Use

- Commercial Real Estate Loans

- SBA Loans

- Microloans

Situation below was given to explain more about business loan.

Mr. Steve wanted to open a café but he doesn't have enough money to do so as his salary as a chauffer is only RM3500.00. So he choosed to make a business loan at UUM Bank. First,he did some research about the bank's background,amount of loan provided and the interest rate.

RECOMMENDED BUSINESS LOAN :

AMOUNT OF LOAN	INTEREST RATE
RM5,000 – RM20,000	8%
RM20,001 – RM50,000	7%
RM50,001 – RM100,000	6.5%

MONTHLY REPAYMENT INCLUDING INTEREST RATE :

AMOUNT OF LOAN	12 MONTHS	24 MONTHS	36 MONTHS	48 MONTHS	60 MONTHS	72 MONTHS
RM5,000	RM450.00	RM241.67	RM172.22	RM137.50	RM116.67	RM102.78
RM20,000	RM1,783.33	RM950.00	RM672.22	RM533.33	RM450.00	RM394.44
RM100,000	RM8,875.00	RM4,708.33	RM3,319.44	RM2,625.00	RM2,208.33	RM1,930.56

Then he decided to make a loan in the total of RM100,000 with interest rate of 6.5% annually and the repayment needs to be settled in 3 years. By applying this loan,he will be able to rent a building to proceed with his new business. But he is still confused about the period as he thinks he might not be able to pay the repayment in total of 3 years otherwise he will be charged a penalty of 1.0% per annum.

2. Understand the problem
   - He has to pay the loan on time.
   - He needs to choose the best period to pay back the loan
   - He could've been charged a penalty of 1.0% per annum if he didn't pay the loan on time
   - He didn't think thoroughly about the repayment and his current savings.

3. Identify alternative ways to solve the problem

SOLUTIONS	PROS	CONS
He needs to be smart in spending the money.	Can save more money.	He needs to learn a lot of things.
He can borrows money from Ah-Long,friends and ex-girlfriend.	Can have more money.	Putting his life in danger if he doesn't pay on time.
He can decide to not open the café.	Can save more money.	No side income. Need to drive more.
He can just uses his house as the café.	Can save more money.	He will not have a comfortable bed to sleep.
Bank can suggest the perfect period repayment	He can pay the repayment on time.	He needs to pay it on time or he'll get a penalty.

SOLUTION	PROS	CONS
as it will charge less interest to prevent the penalty based on his annual salary.		

4. Select the best way to solve the problem from the list of alternative solutions.

SOLUTION	PROS	CONS
Bank can suggest the perfect period repayment as it will charge less interest to prevent the penalty based on his annual salary.	He can pay the repayment on time.	He needs to pay it on time or he'll get a penalty.

5. List instructions (steps) that enable you to solve the problem using the selected solution.
    -   Identify customer's background (Name,acc number,pin,phone number,salary).
    -   Checking his previous bank statement and his salary to suggest the best period to pay the loan.
    -   Making a calculation of his annual salary,monthly repayment and annual repayment which includes the interest rate.

    -   **How to calculate the perfect period for loan repayment :**
        (Current Salary x 12 Months)

Total Salary per Year	Period Suggested
More than RM50,000	3 years
Between RM50,000 and RM20,000	4 years
Below RM20,000	5 years

    -   **How to calculate the monthly payment :**
        (Amount of Loan/Year of Repayment(in months)) + Charge for Interest Rate

    -   **How to calculate the annual payment :**
        [(Amount of Loan/Year of Repayment(in months)) + Charge for Interest Rate] x 12

    -   **How to calculate the amount of charge for interest rate :**
        (Interest Rate/100) x Amount of Loan Borrowed x Year of Repayment)

    -   **How to calculate the penalty charge :**
        (1.0/100) x (Monthly Repayment x 12 Months)

- Sending or printing his bank statement to show him the recommended period to pay the loan punctually otherwise he will have to face the penalty.

6. Evaluate the solution.
   1. Declare the variables of name,acc num,pin,phone number,salary.
   2. Mr.Steve will key in his monthly salary.
   3. The system will help to calculate his annual salary.
   4. After calculating the annual salary,Mr. Steve needs to choose the suggested years of loan repayment based on his annual salary.
   5. Then,he needs to enter the amount of the loan that he wants to borrowed which is RM100,000. Another table will come out. He needs to insert the interest rate based on the amount of loan that he borrowed which is 6.5%.
   6. The system will help to calculate :
   ✓ Sum of interest
   ✓ Monthly repayment
   ✓ Annual repayment
   7. If he unable to pay on time,he will be charged 1.0% per annum of penalty by the bank.

```
===================================UUM Bank Statement===================================

Name           : STEVE ROGERS
Phone Number   : 0199399167
Account Number : 030003829900
Pin No.        : 882828
Salary         : RM 3500

Your annual salary is  : RM 42000.0

 _____
           TOTAL ANNUAL SALARY              SUGGESTED YEARS OF LOAN REPAYMENT
             MORE THAN RM50,000                        3 YEARS
   LESS THAN RM50,000 & MORE THAN RM20,000             4 YEARS
               BELOW RM20,000                          5 YEARS
 _____

Please enter the amount of years : 4

Please enter the amount of loan : RM 100000

 _____
           AMOUNT OF LOAN                   INTEREST RATE(%)
          RM5,000 - RM20,000                       8
          RM20,001 - RM50,000                      7
          RM50,001 - RM100,000                     6.5
 _____

Please enter the amount of interest rate (%) : 6.5
================================================================================
REPAYMENT :

The sum of interest is     : RM 26000.00
The monthly repayment is   : RM 2625.00
The annual repayment is    : RM 31500.00
================================================================================

If you are UNABLE to pay it on time,a PENALTY will be charged by the bank.

Penalty Charged (1.0% per annum) : RM 315.0

 ==============================================================================

                          THANK YOUR FOR CHOOSING US!

 ==============================================================================
```

7. Algorithm

Want to open coffee shop but he got no money.

Decided to make a business loan in total of RM100,000.

RM100,000.00

Still confused on how many years should he selects to pay the repayment.

How many years should he selects to pay the repayment?

Bank help him to select the perfect period to pay the repayment based on his annual salary.

Bank also help to calculate :
- Amount of interest rate
- Monthly repayment
- Annual repayment

Bank will print the bank statement to inform him about the repayment. If he didn't pay on time,a penalty will be charged.
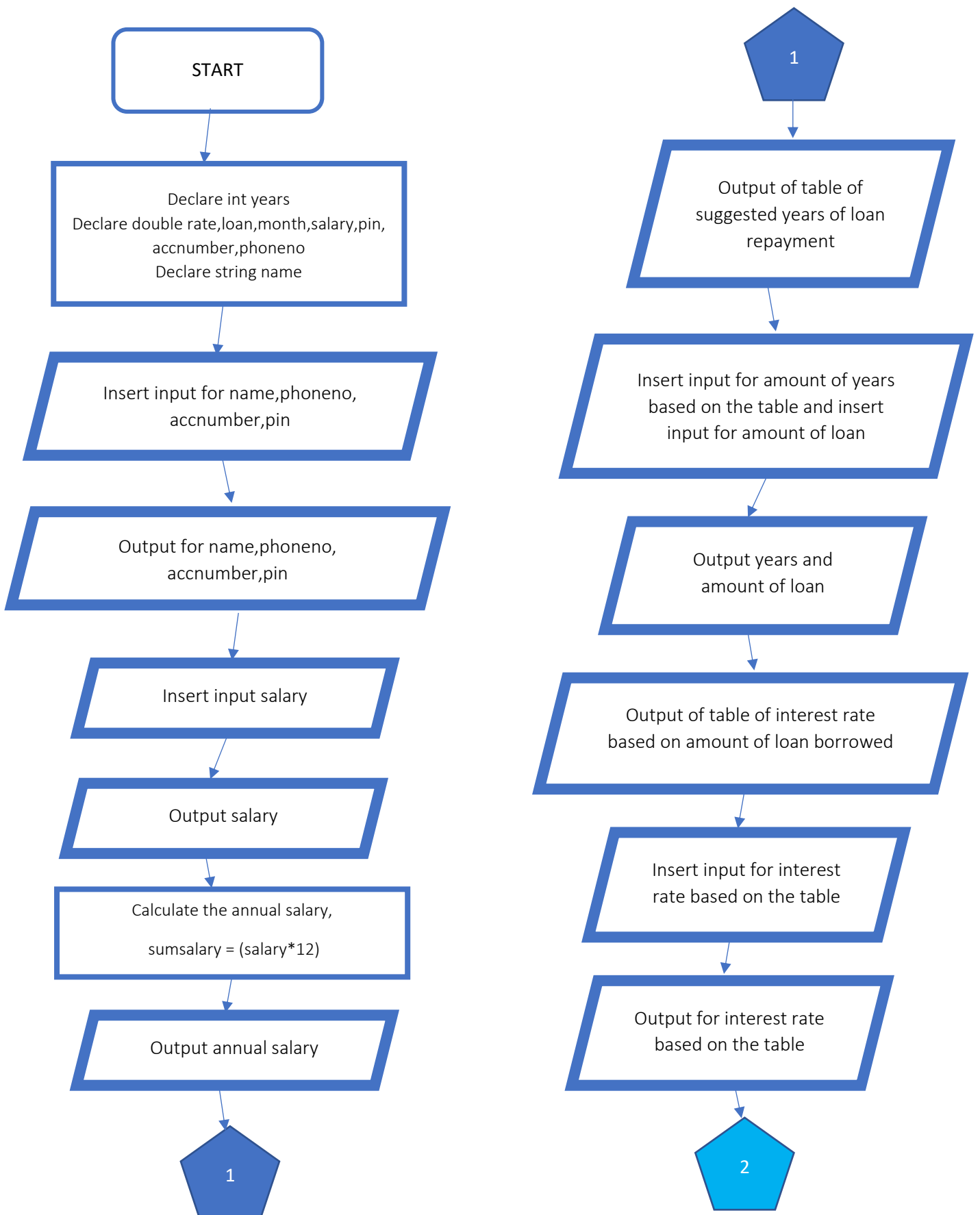
8. Pseudocode

START

- Declare the integer variable of years.
- Declare the double variables rate,loan,month,salary,accnumber,phoneno.
- Declare a string of name.
- Use a scanner to key in the informations.
- Output "Name : "
- Input customer's name
- Output "Phone Number : "
- Input phoneno
- Output "No.Pin : "
- Input no.pin
- Output "Account number : "
- Input accnumber
- Output "Salary : RM "
- Input salary
- Calculate sumsalary = (salary*12)
- Output "Your annual salary is : RM " + sumsalary
- Display the table of suggested years of loan repayment based on annual salary
- Output "Please enter the amount of years : "
- Input customer choose the year based on the table
- Output "Please enter the amount of loan : RM "
- Input amount of loan
- Display another table consist of interest rate based on amount of loan borrowed
- Output "Please enter the amount of interest rate (%) : "
- Input interest rate
- Calculate irate = ((rate/100)*loan*years)
- Calculate monthlyirate = (irate/(years*12))
- Calculate monthlyp = ((loan/years*12) + monthlyirate))
- Calculate annualp = monthlyp*12
- Calculate penalty = ((1.0/100)*monthlyp*12)
- Display "REPAYMENT"
- Output "The sum of interest is : RM " + irate
- Output "The monthly repayment is : RM " + monthly
- Output "The annual repayment is : RM " + annual
- Output "If you are UNABLE to pay it on time,a PENALTY will be charged by the bank"
- Output "Penalty Charged (1.0% per annum) : RM " + penalty
- Output "THANK YOU FOR CHOOSING US!"

END

9. Flowchart

```
            START
              │
              ▼
┌─────────────────────────────────────┐
│         Declare int years           │
│ Declare double rate,loan,month,     │
│    salary,pin,accnumber,phoneno     │
│         Declare string name         │
└─────────────────────────────────────┘
              │
              ▼
      Insert input for name,phoneno,
            accnumber,pin
              │
              ▼
      Output for name,phoneno,
            accnumber,pin
              │
              ▼
         Insert input salary
              │
              ▼
          Output salary
              │
              ▼
┌─────────────────────────────────────┐
│    Calculate the annual salary,     │
│       sumsalary = (salary*12)       │
└─────────────────────────────────────┘
              │
              ▼
        Output annual salary
              │
              ▼
             (1)
```

```
             (1)
              │
              ▼
      Output of table of
      suggested years of loan
      repayment
              │
              ▼
      Insert input for amount of years
      based on the table and insert
      input for amount of loan
              │
              ▼
      Output years and
      amount of loan
              │
              ▼
      Output of table of interest rate
      based on amount of loan borrowed
              │
              ▼
      Insert input for interest
      rate based on the table
              │
              ▼
      Output for interest rate
      based on the table
              │
              ▼
             (2)
```

2

Calculate :
irate = ((rate/100)*loan*years)
monthlyirate = (irate/(years*12))
monthlyp = ((loan/(years*12) + monthlyirate))
annualp = monthly*12

Output for sum of interest rate,monthly repayment,annual repayment

Calculate :

penalty = ((1.0/100)*monthlyp*12)

Output for penalty charge

END

10. Coding

Input Coding :

```java
package bank;
import java.util.Scanner;
public class Assignment1 {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        int years;
        double rate,loan,month,salary,pin,accnumber,phoneno;
        String name;

        Scanner sc = new Scanner (System.in);

        System.out.println("====================================UUM Bank Statement================================");

        System.out.print("\nName            : ");
        name = sc.nextLine();

        System.out.print("Phone Number    : ");
        phoneno = sc.nextDouble();

        System.out.print("Account Number : ");
        accnumber = sc.nextDouble();

        System.out.print("Pin No.         : ");
        pin = sc.nextDouble();

        System.out.print("Salary          : RM ");
        salary = sc.nextDouble();

        double sumsalary = (salary*12);
        System.out.print("\nYour annual salary is  : RM " + sumsalary);
        System.out.println("");

    System.out.print("\n_____");
        System.out.println("\n             TOTAL ANNUAL SALARY              SUGGESTED YEARS OF LOAN REPAYMENT");
        System.out.println("            MORE THAN RM50,000                     3 YEARS          ");
        System.out.println("  LESS THAN RM50,000 & MORE THAN RM20,000           4 YEARS          ");
        System.out.println("             BELOW RM20,000                        5 YEARS          ");

    System.out.println("_____");

        System.out.print("\nPlease enter the amount of years : ");
        years = sc.nextInt();

        System.out.print("\nPlease enter the amount of loan : RM ");
        loan = sc.nextDouble();
```

```java
        System.out.print("\n_____
_____");
                System.out.println("\n             AMOUNT OF LOAN
INTEREST RATE(%)      ");
                System.out.println("       RM5,000 - RM20,000
8          ");
                System.out.println("       RM20,001 - RM50,000
7          ");
                System.out.println("       RM50,001 - RM100,000
6.5           ");

        System.out.println("_____
_____");

                System.out.print("\nPlease enter the amount of interest rate (%) :
");
                rate = sc.nextDouble();

                double irate = ((rate/100)*loan*years);
                double monthlyirate = (irate/(years*12));
                double monthlyp = ((loan/(years*12) + monthlyirate));
                double annualp = monthlyp*12;



        System.out.println("==================================================
================================");

                System.out.println("REPAYMENT : ");
                System.out.printf("\nThe sum of interest is        : RM %.2f" ,
irate);
                System.out.printf("\nThe monthly repayment is      : RM %.2f" ,
monthlyp);
                System.out.printf("\nThe annual repayment is       : RM %.2f" ,
annualp);
                System.out.println("");


        System.out.println("==================================================
================================");

                System.out.println("\nIf you are UNABLE to pay it on time,a PENALTY
will be charged by the bank.");
                double penalty = ((1.0/100)*monthlyp*12);

                System.out.println("\nPenalty Charged (1.0% per annum) : RM " +
penalty);
                System.out.println("");

        System.out.println("==================================================
================================");
                System.out.println("\n                            THANK YOUR FOR
CHOOSING US!");

        System.out.println("\n==================================================
================================");
        }
```

}

Output Coding :

```
==================================UUM Bank
Statement==================================

Name            : STEVE ROGERS
Phone Number    : 0199399167
Account Number  : 03030020001030
Pin No.         : 876543
Salary          : RM 3500

Your annual salary is  : RM 42000.0


_____
_____
           TOTAL ANNUAL SALARY                SUGGESTED YEARS OF LOAN
REPAYMENT
           MORE THAN RM50,000                        3 YEARS
   LESS THAN RM50,000 & MORE THAN RM20,000            4 YEARS
              BELOW RM20,000                          5 YEARS
_____
_____

Please enter the amount of years : 4

Please enter the amount of loan : RM 100000


_____
          AMOUNT OF LOAN                INTEREST RATE(%)
       RM5,000 - RM20,000                       8
       RM20,001 - RM50,000                      7
       RM50,001 - RM100,000                     6.5
_____

Please enter the amount of interest rate (%) : 6.5
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=======
REPAYMENT :

The sum of interest is      : RM 26000.00
The monthly repayment is    : RM 2625.00
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If you are UNABLE to pay it on time,a PENALTY will be charged by the bank.

Penalty Charged (1.0% per annum) : RM 315.0


================================================================================
=======

                        THANK YOUR FOR CHOOSING US!


================================================================================
=======
```

References :

1. https://en.wikipedia.org/wiki/History_of_banking

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3. https://www.toppr.com/guides/general-awareness/financial-reforms-and-banking-innovation/services-of-banks/

UNIVERSITI UTARA MALAYSIA
SEMESTER 1 SESSION 2021/2022

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INTRODUCTION TO PROGRAMMING AND PROBLEM SOLVING

Subtopic :
PERSONAL ACCOUNT

NAME	HARSHINI A/P ALAGES
MATRIC NO.	288286

11. Identify the problem

In a personal bank account there are many categories of services. One of the most important and complicated services is bank withdrawal. A withdrawal involves removing funds from a bank account, savings plan, pension, or trust.

A withdrawal can be carried out over a period of time in fixed or variable amounts or in one lump sum and as a cash withdrawal or in-kind withdrawal. A cash withdrawal requires converting the holdings of an account, plan, pension, or trust into cash, usually through a sale, while an in-kind withdrawal simply involves taking possession of assets without converting to cash.

Some retirement accounts, known as IRAs, have special rules that govern the timing and amounts of withdrawals. As an example, beneficiaries must start taking the required minimum distribution (RMD), or withdrawal, from a traditional IRA by age 72. Otherwise, the person who owns the account is assessed a penalty equal to 50% of the RMD.

On the other hand, with few exceptions, an account owner must refrain from withdrawing funds until at least age 59½ or the Internal Revenue Service takes 10% of the withdrawal amount in a penalty. Financial institutions calculate the RMD based on the owner's age, the account balance, and other factors.

In 2013, the IRS compiled statistics about IRAs and people who withdraw money early. During the 2013 tax year, more than 690,000 people paid penalties for early withdrawals, which was much lower than the 1.2 million in 2009.

With technology continuously becoming more and more advanced, many people are switching to cloud-based withdrawal. There are many benefits to choosing this type of banking versus a traditional brick-and-mortar option. Here are some reasons people are making the switch:

◆ Online banking is incredibly convenient
◆ You can deposit checks with the push of a button
◆ Many online banks offer 24/7 help via chat
◆ There are higher interest rates
◆ It's better for the environment - less paper means fewer trees cut down
◆ Online banks often have lower fees

In some cases, conditions must be met to withdraw funds without penalty, and penalty for early withdrawal usually arises when a clause in an investment contract is broken. There are also cases where penalty will be charged for frequent withdrawal which the users are rarely notify. Customers also face an extreme amount of penalty due to their withdrawal process which are not notified by the bank system.

In UUM there are a thousands of students who face financial problem everyday. The living rate in universities these days are gradually increasing causing the students to spend more money than expected. Students with financial issues these days are struggling to survive in the modern university environment. Most students understand the struggle faced by their parents and refuse to ask any money from their parents. To support themselves they have decided to work part time to earn some money for their expenses. However some of the students income does not meet certain criteria financially. With their low in come they are unable to pay for their tuition fee and essential needs needed. Besides that when it comes to any emergency use they are unable to support themselves and caused them to withdraw more money from their bank balance. With the rising of today's economy the interest rate of every bank has raised rapidly. Students who withdraw excess money from the banks are tend to pay high interest rates and for those who are unable to pay their dept are immediately blacklisted. With all this problems faced by the student some of them are forced to drop out from the university to find a way to pay of their dept. Their entire education will be left behind all because of their financial issue.

12. Understand the problem

In the currently modernized world the price of every item we buy is increasing gradually . Students who who are assigned to their universities are tend to spend more money than usual as they have to pay for their food, transportation, laundry, and many more. Students with low income are unable to support themselves when they are staying in the campus. Although they have a part time job , their income are still not enough to support themself in the university environment. Students with not enough money are tend to withdraw more money from their bank account which currently have high interest rates. The banks also does not notify the students about the duration provided for them to pay their

dept and tend to charge them penalty . This is the current technique used by banks to gain more money from their customers.

While all of these things are great, there are some downfalls when it comes to banking on the internet. One of the main issues is that you can't withdraw cash straight from your smartphone, tablet, or laptop. There are plenty of ways, however, that you can still receive cash while online banking. If you've been wondering how to do just that, you're in the right place. Below we'll deep dive into all of the ways online-only bank customers can get cash in hand, without too much hassle. To put it simply, you can get cash with an online bank account the same way you would with a traditional account that you access in person.Anyone can withdraw cash by:

◆ Using an ATM
One of the most popular cloud-based banks is called Simple. They're known for boasting about offering over 40,000 in-network ATMs for their clients. Many online banks have a feature that allows you to pull up a map of ATMs near you that won't charge a fee. If you don't mind a $2.00 to $6.00 withdrawal fee, you can use any ATM of your choosing. In order to use this way of getting money in hand, you'll need a debit or credit card from the online bank establishment. Simply put it in the ATM and follow the prompts on the screen to get cash out quickly.

◆ Talk With Your Bank
Easily one of the biggest benefits of online banking is the many different ways you can connect with a representative. There are often 24/7 chat services, phone numbers, and even video chat options available. If you need to withdraw cash, you can chat with an employee of your bank to see what your options are. They may suggest something as simple as visiting a nearby ATM or they could offer to send you a physical check. It's important to keep in mind that just because you do your banking online, doesn't mean you have to sacrifice the personal touch that comes with traditional banking. The staff cares about your financial needs just as much as any other banking establishment.

◆ Transfer Funds
Transferring funds is another major benefit of online banking. While you can conveniently send money to your friends and family as needed, you can also transfer money to yourself. It's not uncommon for those who have a cloud-based bank account to also have a

separate account at a physical bank. If you need cash from your online bank, you can simply transfer it to your other account. All you need to get this done is your routing and account numbers. You can likely also move money around between your savings, checking, business, goals, and retirement accounts as well. Each bank is different, so be sure to ask how to move money if you're unsure.

◆ Take Out Cash Back While Shopping

If you've ever used your credit or debit card while running errands, you've likely been prompted with a cashback screen. While some people find the question of cashback an inconvenience, those with online-based bank accounts may see this as the opportunity that it is. Something to keep in mind is that while there are limits to how much cash you can withdraw using this system, there are typically no fees that come with it. Note that if you need a larger amount, you may have to make multiple transactions at that particular store.

◆ Utilize Wire Transfers

Last but certainly not least, you'll have the option to receive cash by sending a wire transfer. The best part about this method is that it's one of the safest ways to move money around. The majority of banks do charge a fee for using wire transfers, but it's an amazing way to send cash around the world, no matter where you are.

13. **Identify alternative ways to solve the problem**
   ◆ Banks should allow customers to withdraw amount exceeding their current bank balance with a certain amount of interest rate and duration based on their annual income.
   ◆ Banks should prepare a package to allow customers to chose if they will be needing any emergency money in the future but additional payment will be charged.
   ◆ The bank can evaluate the customers finance and get a update in their monthly income before opening a personal bank account to help customers save up for emergency purposes.
   ◆ Banks can allow their customers to withdraw amount exceeding their bank balance if only the amount is directly reached to a certain organization.

14. **Select the best way to solve the problem from the list of alternative solutions.**
   The best way to solve this problem is to allow customers to withdraw amount exceeding their bank balance and charge them an interest rate based on their annual income, provide them a fix duration of time for repayment and notify them about all the details about their withdrawal

15. **List instructions (steps) that enable you to solve the problem using the selected solution.**
   Step 1 : Enter the customers age to check the eligibility
   Step 2 : Enter name, account number, monthly salary and account balance
   Step 3 : Enter amount that wished to be withdraw

Step 4 : The bank systems calculates the the exceeding amount and users annual salary to to suggest an interest rate.
Step5 : The bank calculates the total repayment amount and provide a duration of repayment for the customer
Step 6 : the bank prints out the bank statement to notify the user about the repayment and the penalty that will be charged for late payment

16. Evaluate the solution.

First the system will declare the variable and initialized the variable.

Description	Variable	Calculation
age	age	-
rate	rate	-
year	year	-
name	name	-
Account number	accnumber	-
Bank balance	accbalance	-
Monthly salary	msalary	-
Annual salary	asalary	msalary*12
Withdraw amount	withdram	-
Exceeding amount	exceed	withdram - accbalance
Repayment amount	repayment	exceed + (exceed*(rate/100)
Monthly payment	monthlyp	repayment/(year*12)
Penalty for late payment	penalty	monthlyp*(0.5/100)

Example of variables: **age, rate , year, name, accnumber, accbalance, msalary, asalary,withdram, exceed, repayment, monthlyp and penalty.**

Then the users is required to enter their age, name, bank account number, salary account balance and withdraw amount. The bank systems calculates the exceeding amount of money that wished to be withdraw by using the formula **exceed = withdram - accbalance**. Next the bank system will calculate the uses annual salary by using the formula **asalary = msalary*12.** Based on the annual salary the user is required to enter the interest rate based on the bank interest rate table.

ANNUAL SALARY	INTEREST RATE (%)
More than RM20,000	3.0
Between RM20,000 and RM10,000	2.5
Below RM10,000	2.0

After entering the interest rate the bank system calculates the total amount of repayment by using the formula **repayment = exceed*(rate/100).** The duration of

repayment will then be displayed by the bank system based on the repayment amount as below.

REPAYMENT AMOUNT	DURATION
More than RM10,000	3 years
Between RM10,000 and RM1,000	2 years
Below RM1,000	1 year

The user is required to select the duration of repayment based on the repayment amount. The system helps the user calculate the monthly repayment by using the formula **monthlyp = repayment/(year*12)**. Finally the bank statement is printed with the users personal details, withdrawal amount, bank balance, repayment amount, duration of repayment and penalty of 1% that will be charged for late payment using the formula **penalty = monthlyp *(1/100).**

PRONS AND CONS OF THIS METHOD

PROS	CONS
● **Flexibility – can change the amount borrowed within limits** ● **Interest is only paid on amounts borrowed**	● **Cannot be used for large borrowing** ● **Rates of interest higher than loans** ● **Bank can change limit at any time or ask for money to be paid back sooner than expected**

17. Algorithm

ALLGORITHM

1. Need money exceeding bank balance.

2. Open UUM Bank application.

3. Enter age to check eligibility

4. Enter personal details , salary and account balance

5. System provide interest rate table based on annual salary

6. User selects a interest rate based on annual salary

7. System calculates repayment and provide duration of repayment table

8. User select duration base on amount of repayment

9. System prints out bank statement with amount of repayment and duration

18. Pseudocode

Start

Declare a string name

Declare the integer variable age , year and accnumber

Declare the double variables accbalance, msalary, asalary, withdram, exceed, repayment, montlyp, and penalty

Output "Please enter you age:"

Input age

Output "Name:"

Input name

Output "Account number:"

Input accnumber

Output "Monthly Salary :"

Input msalary

Output "Bank balance:"

Input accbalance

Output "Withdraw Amount:"

Input withdam

Calculate exceed = withdram - accbalance

Output "Exceeding amount:" + exceed

Calculate asalary = msalary*12

Output"Annual Salary : " +asalary

Output interest rate table

Input rate

Calculate repayment = exceed+(exceed*(rate/100))

Output "Repayment amount:" +repayment

Output duration of repayment table

Input year

Output "Name: " + name

Output "Account number: " + accnumber

Output "Withdraw amount : " withdram

Output "Bank balance: " + accbalance

Output "total repayment:" +repayment

Calculate monthlyp = repayment/(year*12)

Output "monthly repayment:" + monthlyp

Calculate penalty = monthlyp*(0.5/100)

Output "Penalty of 0.5% per month will be charged for late payment" + penalty

Output"Thank you !"

End

19. Flowchart

Start

Input age, name, accnumber, msalary, accbalance, withdram

exceed= withdram - accbalance

asalary= msalary*12

Output exceeding amount, annual salary ,interest rate table

Input rate

repayment = exceed + (exceed* (rate/100)

1

1

Output repayment amount, duration of repayment table

Input year

monthlyp = repayment/(year*12)

penalty = monthlyp*(0.5/100)

Output personal details, withdraw amount, bank balance, total repayment, monthly repayment, penalty notice and duration of repayment

End

20. Coding
INPUT

```java
package assignment;

import java.util.*;

public class assignmnet1 {


    public static void main(String[] args) {

        // TODO Auto-generated method stub

Scanner sc = new Scanner (System.in);


int age;

int year;

int accnumber;

double rate;

double accbalance;

double msalary;

double asalary;

double withdram;

double exceed;

double repayment;

double monthlyp;

double penalty;

String name;


System.out.println("********************************************************"
);

System.out.println("                              UUM BANK");

System.out.println("********************************************************"
);


System.out.println("");


System.out.print("Please enter you age : ");

age = sc.nextInt();

System.out.print("Name            : ");
```

```java
name = sc.next();

System.out.print("Account Number : ");

accnumber = sc.nextInt();

System.out.print("Monthly Salary : RM ");

msalary = sc.nextDouble();

System.out.print("Bank Balance   :RM ");

accbalance = sc.nextDouble();

System.out.println("*********************************************************"
);

System.out.print("Withdraw Amount :RM ");

withdram = sc.nextDouble();

exceed = withdram - accbalance;

System.out.printf("\nThe exceeding amount is RM %.2f", exceed);

System.out.println("");

System.out.println("*********************************************************"
);

asalary= msalary*12;

System.out.printf("Your annual salary is RM %.2f", asalary);

System.out.print("\n_____");

System.out.println("\n          ANNUAL SALARY            INTEREST RATE(%)     ");

System.out.println("         RM20,000 and above                3.0           ");

System.out.println("        RM10,001 - RM19,999                2.5           ");

System.out.println("          below RM 10,000                  2.0           ");

System.out.println("_____")
;

System.out.println("Please enter the interest rate based on your annual salary");

rate = sc.nextDouble();

System.out.println("*********************************************************"
);

repayment = (exceed*(rate/100)) + exceed;

System.out.printf("Your total amount of repayment is RM %.2f", repayment);

System.out.print("\n_____");

System.out.println("\n        REPAYMENT AMOUNT                DURATION      ");

System.out.println("         RM10,000 and above             3 YEARS          ");

System.out.println("          RM1,001 - RM9,999             2 YEARS          ");
```

```java
System.out.println("              below RM 1,000                1 YEAR           ");
System.out.println("_____"
);

System.out.println("Please enter the duration of years based on repayment amount");

year = sc.nextInt();

System.out.println("*********************************************************"
);

monthlyp = repayment/(year*12);

penalty = monthlyp*(0.5/100);

System.out.println("                         UUM BANK");
System.out.println("*********************************************************"
);

System.out.println("Name            : " + name);

System.out.println("Account Number  : " + accnumber);

System.out.printf("Withdraw Amount : RM " + withdram );

System.out.println("\nBank Balance    : RM 0.00");

System.out.println("");

System.out.println("*********************************************************"
);

System.out.printf("\nTotal repyment     : RM %.2f" , repayment);

System.out.printf("\nMonthly repayment  : RM %.2f" , monthlyp);

System.out.println("");

System.out.printf("\nA monthly penalty of 0.5%% will be charge for any late payment");

System.out.println("\nThe repayment should be paid in " + year + " year time");

System.out.println("");

System.out.printf("\nPenalty amount   (0.5%%)    : RM %.2f" ,penalty);

System.out.println("");

System.out.println("                         THANK YOU!");

System.out.println("*********************************************************"
);

    }


}
```

OUTPUT

```
************************************************************
                        UUM BANK
************************************************************


Please enter you age : 19

Name            : HARSHINI

Account Number : 12345678

Monthly Salary : RM 10000.00


Bank Balance   :RM 1000.00
************************************************************
Withdraw Amount :RM 10000.00


The exceeding amount is RM 9000.00
************************************************************
Your annual salary is RM 120000.00

_____

        ANNUAL SALARY           INTEREST RATE(%)

        RM20,000 and above            3.0

      RM10,001 - RM19,999             2.5

        below RM 10,000               2.0

_____
Please enter the interest rate based on your annual salary

2.0
************************************************************
Your total amount of repayment is RM 9180.00

_____

        REPAYMENT AMOUNT          DURATION

        RM10,000 and above         3 YEARS

        RM1,001 - RM9,999          2 YEARS

          below RM 1,000           1 YEAR
```

_____

Please enter the duration of years based on repayment amount

2

****
                        UUM BANK
****

Name   : HARSHINI

Account Number : 12345678

Withdraw Amount : RM 10000.0

Bank Balance   : RM 0.00

****

Total repayment   : RM 9180.00

Monthly repayment   : RM 382.50

A monthly penalty of 0.5% will be charge for any late payment

The repayment should be paid in 2 year time

Penalty amount   (0.5%)   : RM 1.91

                    THANK YOU!

****

REFERENCE

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UNIVERSITI UTARA MALAYSIA
SEMESTER 1 SESSION 2021/2022

SKIP1013 (A)
INTRODUCTION TO PROGRAMMING AND PROBLEM SOLVING

Subtopic :
CREDIT CARD

NAME	SUCHIRA A/P SUMON
MATRIC NO.	288316

1. **Identify the problem**

A credit card is a [payment card](#) issued to users (cardholders) to enable the cardholder to pay a [merchant](#) for [goods and services](#) based on the cardholder's accrued. The card creates a [revolving account](#) and grants a [line of credit](#) to the cardholder, from which the cardholder can borrow money for payment to a merchant or as a [cash advance](#). There are two credit card groups which is consumer credit cards and business credit cards. Most cards are plastic, but some are metal cards (stainless steel, gold, [palladium](#), [titanium](#)) and a few gemstone-encrusted metal cards.

A regular credit card is different from a [charge card](#), which requires the balance to be repaid in full each month or at the end of each statement cycle. In contrast, credit cards allow the consumers to build a continuing balance of debt, subject to [interest](#) being charged. A credit card differs from a charge card also in that a credit card typically involves a third-party entity that pays the seller and is reimbursed by the buyer, whereas a charge card simply defers payment by the buyer until a later date.

A credit card also differs from a [debit card](#), which can be used like currency by the owner of the card.

In 2018, there were 1.12 billion credit cards in circulation in the U.S., and 72% of adults had at least one card.

The size of most credit cards is 85.60 by 53.98 millimetres ($3+\frac{3}{8}$ in × $2+\frac{1}{8}$ in) and rounded corners with a radius of 2.88–3.48 millimetres ($\frac{9}{80}$–$\frac{11}{80}$ in) conforming to the [ISO/IEC 7810 ID-1](#) standard, the same size as [ATM cards](#) and other [payment cards](#), such as [debit cards](#).

Credit cards have a printed or embossed [bank card number](#) complying with the [ISO/IEC 7812](#) numbering standard. The card number's prefix, called the [Bank Identification Number](#) (known in the industry as a BIN), is the sequence of digits at the beginning of the number that determine the bank to which a credit card number belongs. This is the first six digits for MasterCard and Visa cards. The next nine digits are the individual account number, and the final digit is a validity [check](#) digit.

Both of these standards are maintained and further developed by [ISO/IEC JTC 1/SC 17/WG 1](#). Credit cards have a [magnetic stripe](#) conforming to the [ISO/IEC 7813](#). Most modern credit cards use [smart card](#) technology, they have a [computer chip](#) embedded in them as a security feature. In addition, complex smart cards, including peripherals such as a keypad, a display or a fingerprint sensor are increasingly used for credit cards.

In addition to the main credit card number, credit cards also carry issue and expiration dates (given to the nearest month), as well as extra codes such as issue numbers and [security codes](#). Complex smart cards allow to have a variable security code, thus increasing security for online transactions. Not all credit cards have the same sets of extra codes nor do they use the same number of digits.

Credit card numbers were originally embossed to allow easy transfer of the number to charge slips. With the decline of paper slips, some credit cards are no longer embossed and in fact the card number is no longer in the front. In addition, some cards are now vertical in design, rather than horizontal.
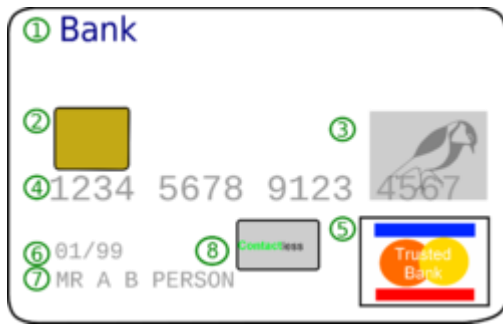
An example of the front in a typical credit card:

1. Issuing bank logo
2. EMV chip (only on "smart cards")
3. Hologram
4. Card number
5. Card network logo
6. Expiration date
7. Card holder name
8. Contactless chip
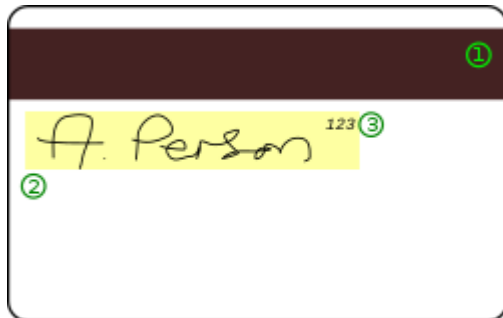
An example of the reverse side of a typical credit card:

1. Magnetic stripe
2. Signature strip
3. Card security code

The concept of using a card for purchases was described in 1887 by Edward Bellamy in his utopian novel *Looking Backward*. Bellamy used the term *credit card* eleven times in this novel, although this referred to a card for spending a citizen's dividend from the government, rather than borrowing,[12] making it more similar to a debit card.

Charge coins and other similar items were used from the late 19th century to the 1930s. They came in various shapes and sizes; with materials made out of celluloid (an early type of plastic), copper, aluminum, steel, and other types of whitish metals. Each charge coin usually had a little hole, enabling it to be put in a key ring, like a key. These charge coins were usually given to customers who had charge accounts in department stores, hotels, and so on. A charge coin usually had the charge account number along with the merchant's name and logo.

The charge coin offered a simple and fast way to copy a charge account number to the sales slip, by imprinting the coin onto the sales slip. This sped up the process of copying, previously done by handwriting. It also reduced the number of errors, by having a standardized form of numbers on the sales slip, instead of various kinds of handwriting style.

Because the customer's name was not on the charge coin, almost anyone could use it. This sometimes led to a case of mistaken identity, either accidentally or intentionally, by acting on behalf of the charge account owner or out of malice to defraud both the charge account owner and the merchant. Beginning in the 1930s, merchants started to move from charge coins to the newer Charga-Plate.

The Charga-Plate, developed in 1928, was an early predecessor of the credit card and was used in the U.S. from the 1930s to the late 1950s. It was a 2+$\frac{1}{2}$-by-1+$\frac{1}{4}$-inch (64 mm × 32 mm) rectangle of sheet metal related to Addressograph and military dog tag systems. It was embossed with the customer's name, city, and state. It held a small paper card on its back for a signature. In recording a purchase, the plate was laid into a recess in the imprinter, with a paper "charge slip" positioned on top of it. The record of the transaction included an impression of the embossed information, made by the imprinter pressing an inked ribbon against the charge slip. Charga-Plate was a trademark of Farrington

Manufacturing Co. Charga-Plates were issued by large-scale merchants to their regular customers, much like department store credit cards of today. In some cases, the plates were kept in the issuing store rather than held by customers. When an authorized user made a purchase, a clerk retrieved the plate from the store's files and then processed the purchase. Charga-Plates sped up back-office bookkeeping and reduced copying errors that were done manually in paper ledgers in each store.

In 1934, American Airlines and the Air Transport Association simplified the process even more with the advent of the Air Travel Card. They created a numbering scheme that identified the issuer of the card as well as the customer account. This is the reason the modern UATP cards still start with the number 1. With an Air Travel Card, passengers could "buy now, and pay later" for a ticket against their credit and receive a fifteen percent discount at any of the accepting airlines. By the 1940s, all of the major U.S. airlines offered Air Travel Cards that could be used on 17 different airlines. By 1941, about half of the airlines' revenues came through the Air Travel Card agreement. The airlines had also started offering installment plans to lure new travelers into the air. In 1948, the Air Travel Card became the first internationally valid charge card within all members of the International Air Transport Association.

The concept of customers paying different merchants using the same card was expanded in 1950 by Ralph Schneider and Frank McNamara, founders of Diners Club, to consolidate multiple cards. The Diners Club, which was created partially through a merger with Dine and Sign, produced the first "general purpose" charge card and required the entire bill to be paid with each statement. That was followed by Carte Blanche and in 1958 by American Express which created a worldwide credit card network (although these were initially charge cards that later acquired credit card features).

Until 1958, no one had been able to successfully establish a revolving credit financial system in which a card issued by a third-party bank was being generally accepted by a large number of merchants, as opposed to merchant-issued revolving cards accepted by only a few merchants. There had been a dozen attempts by small American banks, but none of them were able to last very long. In 1958, Bank of America launched the BankAmericard in Fresno, California, which would become the first successful recognizably modern credit card. This card succeeded where others failed by breaking the chicken-and-egg cycle in which consumers did not want to use a card that few merchants would accept and merchants did not want to accept a card that few consumers used. Bank of America chose Fresno because 45% of its residents used the bank, and by sending a card to 60,000 Fresno residents at once, the bank was able to convince merchants to accept the card. It was eventually licensed to other banks around the United States and then around the world, and in 1976, all BankAmericard licensees united themselves under the common brand Visa. In 1966, the ancestor of MasterCard was born when a group of banks established Master Charge to compete with BankAmericard, it received a significant boost when Citibank merged its own Everything Card, launched in 1967, into Master Charge in 1969.

Early credit cards in the U.S., of which BankAmericard was the most prominent example, were mass-produced and mass mailed unsolicited to bank customers who were thought to be good credit risks. They have been mailed off to unemployable people, drunks, narcotics addicts and to compulsive debtors, a process President Johnson's Special Assistant Betty Furness found very like "giving sugar to diabetics". These mass mailings were known as "drops" in banking terminology, and were outlawed in 1970 due to the financial chaos they caused. However, by the time the law came into effect, approximately 100 million credit cards had been dropped into the U.S. population. After 1970, only credit card applications could be sent unsolicited in mass mailings.

Before the computerization of credit card systems in America, using a credit card to pay at a merchant was significantly more complicated than it is today. Each time a consumer wanted to use a credit card, the merchant would have to call their bank, who in turn had to call the credit card company, which then had to have an employee manually look up the customer's name and credit balance. This system was computerized in 1973 under the leadership of Dee Hock, the first CEO of Visa, allowing transaction time to decrease substantially to less than one minute. However, until always-connected payment terminals became ubiquitous at the beginning of the 21st century, it was common for a merchant to accept a charge, especially below a threshold value or from a known and trusted customer, without verifying it by phone. Books with lists of stolen card numbers were distributed to merchants who were supposed in any case to check cards against the list before accepting them, as well as verifying the signature on the charge slip against that on the card. Merchants who failed to take the time to follow the proper verification procedures were liable for fraudulent charges, but because of the cumbersome nature of the procedures, merchants would often simply skip some or all of them and assume the risk for smaller transactions.

The fractured nature of the U.S. banking system under the Glass–Steagall Act meant that credit cards became an effective way for those who were traveling around the country to move their credit to places where they could not directly use their banking facilities. There are now countless variations on the basic concept of revolving credit for individuals (as issued by banks and honored by a network of financial institutions), including organization-branded credit cards, corporate-user credit cards, store cards and so on.

In 1966, Barclaycard in the United Kingdom launched the first credit card outside the United States.

Although credit cards reached very high adoption levels in the U.S., Canada and the U.K. during the latter 20th century, many cultures were more cash-oriented or developed alternative forms of cashless payments, such as Carte bleue or the Eurocard (Germany, France, Switzerland, and others). In these places, adoption of credit cards was initially much slower. Due to strict regulations regarding bank overdrafts, some countries, France in particular, were much quicker to develop and adopt chip-based credit cards which are seen as major anti-fraud credit devices. Debit cards and online banking (using either ATMs or PCs[clarification needed]) are used more widely than credit cards in some countries. It took until the 1990s to reach anything like the percentage market penetration levels achieved in the U.S., Canada, and U.K. . In some countries, acceptance still remains low as the use of a credit card system depends on the banking system of each country while in others, a country sometimes had to develop its own credit card network, example U.K.'s Barclaycard and Australia's Bankcard. Japan remains a very cash-oriented society, with credit card adoption being limited mainly to the largest of merchants, although stored value cards (such as telephone cards) are used as alternative currencies, the trend is toward RFID-based systems inside cards, cellphones, and other objects.

Receipt from 1997 - card physically swiped and information imprinted on the receipt

The design of the credit card itself has become a major selling point in recent years. A growing field of numismatics (study of money), or more specifically exonumia (study of money-like objects), credit card collectors seek to collect various embodiments of credit

from the now familiar plastic cards to older paper merchant cards, and even metal tokens that were accepted as merchant credit cards. Early credit cards were made of celluloid plastic, then metal and fiber, then paper, and are now mostly polyvinyl chloride (PVC) plastic. However, the chip part of credit cards is not made from plastic but from metals

A credit card issuing company, such as a bank or credit union, enters into agreements with merchants for them to accept their credit cards. Merchants often advertise in signage or other company material which cards they accept by displaying acceptance marks generally derived from logos. Alternatively, this may be communicated, for example, via a restaurant's menu or orally, or stating, "We don't take credit cards".

The credit card issuer issues a credit card to a customer at the time or after an account has been approved by the credit provider, which need not be the same entity as the card issuer. The cardholders can then use it to make purchases at merchants accepting that card. When a purchase is made, the cardholder agrees to pay the card issuer. The cardholder indicates consent to pay by signing a receipt with a record of the card details and indicating the amount to be paid or by entering a personal identification number (PIN). Also, many merchants now accept verbal authorizations via telephone and electronic authorization using the Internet, known as a card not present transaction (CNP).

Electronic verification systems allow merchants to verify in a few seconds that the card is valid and the cardholder has sufficient credit to cover the purchase, allowing the verification to happen at time of purchase. The verification is performed using a credit card payment terminal or point-of-sale (POS) system with a communications link to the merchant's acquiring bank. Data from the card is obtained from a magnetic stripe or chip on the card; the latter system is called Chip and PIN in the United Kingdom and Ireland, and is implemented as an EMV card.

For card not present transactions where the card is not shown such as e-commerce, mail order, and telephone sales, merchants additionally verify that the customer is in physical possession of the card and is the authorized user by asking for additional information such as the security code printed on the back of the card, date of expiry, and billing address.

Each month, the cardholder is sent a statement indicating the purchases made with the card, any outstanding fees, the total amount owed and the minimum payment due. In the U.S., after receiving the statement, the cardholder may dispute any charges that he or she thinks are incorrect. The Fair Credit Billing Act gives details of the U.S. regulations.

Many banks now also offer the option of electronic statements, either in lieu of or in addition to physical statements, which can be viewed at any time by the cardholder via the issuer's online banking website. Notification of the availability of a new statement is generally sent to the cardholder's email address. If the card issuer has chosen to allow it, the cardholder may have other options for payment besides a physical check, such as an electronic transfer of funds from a checking account. Depending on the issuer, the cardholder may also be able to make multiple payments during a single statement period, possibly enabling him or her to utilize the credit limit on the card several times.

The cardholder must pay a defined minimum portion of the amount owed by a due date, or may choose to pay a higher amount. The credit issuer charges interest on the unpaid balance if the billed amount is not paid in full (typically at a much higher rate than most other forms of debt). In addition, if the cardholder fails to make at least the minimum payment by the due date, the issuer may impose a late fee or other penalties. To help mitigate this, some financial institutions can arrange for automatic payments to be deducted

from the cardholder's bank account, thus avoiding such penalties altogether, as long as the cardholder has sufficient funds.

In cases where the minimum payment is less than the finance charges and fees assessed during the billing cycle, the outstanding balance will increase in what is called negative amortization. This practice tends to increase credit risk and mask the lender's portfolio quality, and consequently has been banned in the U.S. since 2003.

Credit card advertising regulations in the U.S. include the Schumer box disclosure requirements. A large fraction of junk mail consists of credit card offers created from lists provided by the major credit reporting agencies. In the United States, the three major U.S. credit bureaus (Equifax, TransUnion and Experian) allow consumers to opt out from related credit card solicitation offers via its Opt Out Pre Screen program.

Credit card issuers usually waive interest charges if the balance is paid in full each month, but typically will charge full interest on the entire outstanding balance from the date of each purchase if the total balance is not paid.

For example, if a user had a $1,000 transaction and repaid it in full within this grace period, there would be no interest charged. If, however, even $1.00 of the total amount remained unpaid, interest would be charged on the $1,000 from the date of purchase until the payment is received. The precise manner in which interest is charged is usually detailed in a cardholder agreement which may be summarized on the back of the monthly statement. The general calculation formula most financial institutions use to determine the amount of interest to be charged is (APR/100 x ADB)/365 x number of days revolved. Take the annual percentage rate (APR) and divide by 100 then multiply to the amount of the average daily balance (ADB). Divide the result by 365 and then take this total and multiply by the total number of days the amount revolved before payment was made on the account. Financial institutions refer to interest charged back to the original time of the transaction and up to the time a payment was made, if not in full, as a residual retail finance charge (RRFC). Thus, after an amount has revolved and a payment has been made, the user of the card will still receive interest charges on their statement after paying the next statement in full.

The credit card may simply serve as a form of revolving credit, or it may become a complicated financial instrument with multiple balance segments each at a different interest rate, possibly with a single umbrella credit limit, or with separate credit limits applicable to the various balance segments. Usually, this compartmentalization is the result of special incentive offers from the issuing bank, to encourage balance transfers from cards of other issuers. If several interest rates apply to various balance segments, then payment allocation is generally at the discretion of the issuing bank, and payments will therefore usually be allocated towards the lowest rate balances until paid in full before any money is paid towards higher rate balances. Interest rates can vary considerably from card to card, and the interest rate on a particular card may jump dramatically if the card user is late with a payment on that card or any other credit instrument, or even if the issuing bank decides to raise its revenue.

A credit card's grace period is the time the cardholder has to pay the balance before interest is assessed on the outstanding balance. Grace periods may vary, but usually range from 20 to 55 days depending on the type of credit card and the issuing bank. Some policies allow for reinstatement after certain conditions are met.

Usually, if a cardholder is late paying the balance, finance charges will be calculated and the grace period does not apply. Finance charges incurred depend on the grace period and balance; with most credit cards there is no grace period if there is any outstanding balance from the previous billing cycle or statement (interest is applied on both the previous balance

and new transactions). However, there are some credit cards that will only apply finance charge on the previous or old balance, excluding new transactions.

Parties involved

- Cardholder: The holder of the card used to make a purchase; the consumer.
- Card-issuing bank: The financial institution or other organization that issued the credit card to the cardholder. This bank bills the consumer for repayment and bears the risk that the card is used fraudulently. American Express and Discover were previously the only card-issuing banks for their respective brands, but as of 2007, this is no longer the case. Cards issued by banks to cardholders in a different country are known as offshore credit cards.
- Merchant: The individual or business accepting credit card payments for products or services sold to the cardholder.
- Acquiring bank: The financial institution accepting payment for the products or services on behalf of the merchant.
- Independent sales organization: Re-sellers (to merchants) of the services of the acquiring bank.
- Merchant account: This could refer to the acquiring bank or the independent sales organization, but in general is the organization that the merchant deals with.
- Card association: An association of card-issuing banks such as Discover, Visa, MasterCard, American Express, etc. that set transaction terms for merchants, card-issuing banks, and acquiring banks.
- Transaction network: The system that implements the mechanics of the electronic transactions. May be operated by an independent company, and one company may operate multiple networks.
- Affinity partner: Some institutions lend their names to an issuer to attract customers that have a strong relationship with that institution, and get paid a fee or a percentage of the balance for each card issued using their name. Examples of typical affinity partners are sports teams, universities, charities, professional organizations, and major retailers.
- Insurance providers: Insurers underwriting various insurance protections offered as credit card perks, for example, Car Rental Insurance, Purchase Security, Hotel Burglary Insurance, Travel Medical Protection etc.

The flow of information and money between these parties—always through the card associations—is known as the interchange, and it consists of a few steps.

Transaction steps

- Authorization: The cardholder presents the card as payment to the merchant and the merchant submits the transaction to the acquirer (acquiring bank). The acquirer verifies the credit card number, the transaction type and the amount with the issuer (card-issuing bank) and reserves that amount of the cardholder's credit limit for the merchant. An authorization will generate an approval code, which the merchant stores with the transaction.
- Batching: Authorized transactions are stored in "batches", which are sent to the acquirer. Batches are typically submitted once per day at the end of the business day. Batching can be done manually (initiated by a merchant's action) or automatically (on a pre-determined schedule, using a payment processing platform). If a transaction is not submitted in the batch, the authorization will stay valid for a period determined by the issuer, after which the held amount will be returned to the cardholder's available credit (see authorization hold).

Some transactions may be submitted in the batch without prior authorizations, these are either transactions falling under the merchant's floor limit or ones where the authorization was unsuccessful but the merchant still attempts to force the transaction through. (Such may be the case when the cardholder is not present but owes the merchant additional money, such as extending a hotel stay or car rental.)

- Clearing and Settlement: The acquirer sends the batch transactions through the credit card association, which debits the issuers for payment and credits the acquirer. Essentially, the issuer pays the acquirer for the transaction.
- Funding: Once the acquirer has been paid, the acquirer pays the merchant. The merchant receives the amount totaling the funds in the batch minus either the "discount rate", "mid-qualified rate", or "non-qualified rate" which are tiers of fees the merchant pays the acquirer for processing the transactions.
- Chargebacks: A chargeback is an event in which money in a merchant account is held due to a dispute relating to the transaction. Chargebacks are typically initiated by the cardholder. In the event of a chargeback, the issuer returns the transaction to the acquirer for resolution. The acquirer then forwards the chargeback to the merchant, who must either accept the chargeback or contest it.
- A credit card register is a transaction register used to ensure the increasing balance owed from using a credit card is enough below the credit limit to deal with authorization holds and payments not yet received by the bank and to easily look up past transactions for reconciliation and budgeting.
- The register is a personal record of banking transactions used for credit card purchases as they affect funds in the bank account or the available credit. In addition to check number and so forth the code column indicates the credit card. The balance column shows available funds after purchases. When the credit card payment is made the balance already reflects the funds were spent. In a credit card's entry, the deposit column shows the available credit and the payment column shows total owed, their sum being equal to the credit limit.
- Each check written, debit card transaction, cash withdrawal, and credit card charge is entered manually into the paper register daily or several times per week. Credit card register also refers to one transaction record for each credit card. In this case the booklets readily enable the location of a card's current available credit when ten or more cards are in use. Sheila is confused with her total interest rate of credit card. She carried a balance on her credit card in January. Her balance on 1st January is RM2500.00. She paid RM1500.00 on 16th January. So, total of the balance that she carried is RM1000.00. She needs to use UUM Bank services to help her calculate the total of interest charge from the bank.

2. **Understand the problem**
   - The customer want to know how much annual percentage rate (APR) for purchases.
   - The customer want to know how much daily period rates.
   - The customer want to know how much their total interest charge.

3. **Identify alternative ways to solve the problem**
   i. Bank need to make a system that can calculate average daily balance in customer's account.
   ii. Bank need to make a system that customer can check daily period rates easily.
   iii. Bank need to make a system that calculate the total interest that customer need to pay for.

4. **Best way to solve the problem**
    - The bank has to create a system that can calculate average daily balance in customer's account.
    - The bank has to create a system for customer to check daily period rates.
    - The bank has to create a system that can calculate total interest that customer need to pay for.

5. **List instruction (steps) that enable to solve the problem**
    a. Asking for personal information from the customer.
    - Age
    - Name
    - Income
    - Phone number registered
    b. Show the annual percentage rate (APR) for purchases and daily periodic rate.
    c. Ask for total of balance carried by customer of the month to calculate the average daily balance in your account.
    d. Calculate the total interest rates for customer.
    e. Print out the total of interest rates for customer.

6. **Evaluate the solution**

First, the system will declare the variable and initialized the variable. The system will identify customer's age to confirm that customer is eligible to apply for bank services. The system will ask for customer personal information such as name, gender, account number, income and phone number registered. Then, customer need to choose the type of services such as business loan, personal account, credit card, housing loan or investment. The customer will be asked about their total balance carried of the month they have made. System will calculate the total interest for customer.

_____UUM BANK_____

Please enter your age: 20
Congratulations you're eligible for the bank services!

Please enter your personal information:
Name: SUCHIRA
Account number: 100399201
Income (RM): 1800.00
Phone number registered: 0139879900

_____UUM BANK_____

Please read the information below:

The annual percentage rate (APR) for purchases = 14%

The daily period rate is = 0.038%

Please enter information needed:

Enter month(1-12): 1

Enter amount of credit card being use: RM 2500.00

Enter the date for amount of credit card being use(1-30): 1

Enter amount of the payment that have done: RM 1500.00

Enter the date for amount of the payment that have done(1-30): 16

_____UUM BANK_____

Balance that been carried is : RM 1000.00

Sum of daily balances (RM): 58500

Days in billing period: 30

Average daily balance: 1950

Interest charge: 1950*(0.038/100)*30

Your interest charge is RM22.23

The less your average daily balance, the less your interest charge!!!

Thank you for using our services!

7. Algorithm

1. Open UUM Bank application or website.

2. Enter user's age.
3. Check user's eligibility based on age.
4. Enter personal information.

5. System will show annual percentage rate and daily period rate.
6. Enter total and date of amount credit card being use and payment that have done by customer of the month.

7. Calculate sum of daily balances, average daily balance and interest charge.
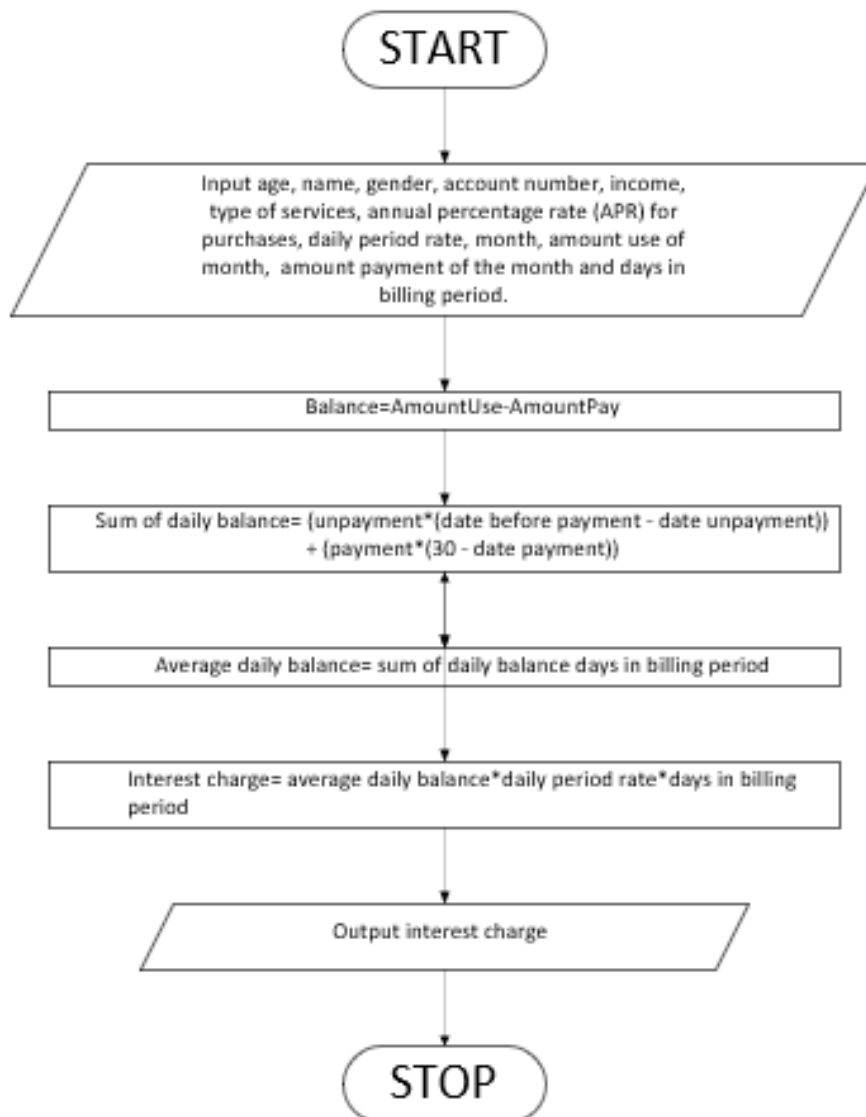8. Print total of interest charge.

8. Pseudocode

START

    Declare integer age, accnum, month, dateUse, datePay, apr, daysBilling,numPhone
    Declare string name, gender
    Declare double income, dailyPeriod, AmountUse, AmountPay, sumDaily, avgDaily,
    interest, balance
    Output "Please enter your age:"
    Input age
    Output "Congratulations you're eligible for the bank services!"
    Output "Please enter your personal information:"
    Output "Name:"
    Input name
    Output "Gender:"
    Input gender
    Output "Account number:"
    Input accnum
    Output "Income(RM):"
    Input income
    Output "Phone number registered:"
    Input numPhone
    Output "Please read the information below:"
    Output "The annual percentage rate (APR) for purchases = "+apr
    Output "The daily period rate is = "+dailyPeriod
    Output "Please enter information needed:"
    Output "Enter month(1-12): "
    Input month
    Output "Enter amount of credit card being use: RM"
    Input AmountUse
    Output "Enter the date for amount of credit card being use (1-30):"
    Input dateUse
    Output "Enter amount of the payment that have done: RM"
    Input AmountPay
    Output "Enter the date for amount of the payment that have done (1-30):"
    Input datePay
    Calculate balance=AmountUse-AmountPay
    Output "Balance that been carried is: RM"+balance
    Calculate sumDaily= AmountUse(datePay-dateUnpay) + AmountPay(30-datePay)
    Output "Sum of daily balances (RM): "+sumDaily
    Output "Days in billing period:"+daysBilling
    Calculate avgDaily=sumDaily/30
    Output "Average daily balance:"+avgDaily
    Calculate interest=avgDaily*(dailyPeriod/100)*daysBilling
    Output "Interest charge: " + avgDaily + "*("+dailyPeriod+"/100)*"+daysBilling
    Output "Your interest charge is RM"+interest

STOP

9. Flowchart

```
                    ┌─────────────┐
                    │   START     │
                    └─────────────┘
                           │
                           ▼
        ╱──────────────────────────────────────────╲
       ╱  Input age, name, gender, account number,   ╲
      ╱   income, type of services, annual            ╲
      ╲   percentage rate (APR) for purchases, daily  ╱
       ╲  period rate, month, amount use of          ╱
        ╲ month, amount payment of the month and    ╱
         ╲ days in billing period.                 ╱
          ╲──────────────────────────────────────╱
                           │
                           ▼
        ┌──────────────────────────────────────────┐
        │       Balance=AmountUse-AmountPay          │
        └──────────────────────────────────────────┘
                           │
                           ▼
        ┌──────────────────────────────────────────┐
        │ Sum of daily balance= (unpayment*(date     │
        │ before payment - date unpayment))          │
        │ + (payment*(30 - date payment))            │
        └──────────────────────────────────────────┘
                           │
                           ▼
        ┌──────────────────────────────────────────┐
        │ Average daily balance= sum of daily        │
        │ balance days in billing period             │
        └──────────────────────────────────────────┘
                           │
                           ▼
        ┌──────────────────────────────────────────┐
        │ Interest charge= average daily             │
        │ balance*daily period rate*days in billing  │
        │ period                                     │
        └──────────────────────────────────────────┘
                           │
                           ▼
         ╱────────────────────────────────╲
        ╱   Output interest charge          ╱
        ╲──────────────────────────────────╱
                           │
                           ▼
                    ┌─────────────┐
                    │   STOP      │
                    └─────────────┘
```

10. Coding

Input:

```java
package assignment;

import java.util.Scanner;

public class CreditCard {

    public static void main(String[] args) {
        // TODO Auto-generated method stub

        int age, accnum, month, dateUse, datePay, numPhone;
        String name;
        double income, AmountUse, AmountPay, sumDaily, avgDaily, interest,
        balance;
        int apr=14;
        double dailyPeriod=0.038;
        int daysBilling=30;

        System.out.println("_____UUM
        BANK_____");

        Scanner a = new Scanner(System.in);

        System.out.println("\nPlease enter your age: ");
        age=a.nextInt();
        System.out.println("Congratulations you're eligible for the bank
        services!");

        System.out.println("\nPlease enter your personal information:");

        System.out.println("Name: ");
        name=a.next();

        System.out.println("Account number: ");
        accnum=a.nextInt();

        System.out.println("Income (RM): ");
        income=a.nextDouble();

        System.out.println("Phone number registered: ");
        numPhone=a.nextInt();
        System.out.println("_____UUM
        BANK_____");

        System.out.println("Please read the information below: ");
        System.out.println("The annual percentage rate (APR) for purchases =
        "+ apr +"%");
        System.out.println("The daily period rate is = "+dailyPeriod+"%");
        System.out.println("\nPlease enter information needed:");
        System.out.println("Enter month(1-12): ");
        month=a.nextInt();
        System.out.println("Enter amount of credit card being use: RM");
        AmountUse=a.nextDouble();
```

```
            System.out.println("Enter the date for amount of credit card being
use(1-30): ");
            dateUse=a.nextInt();
            System.out.println("Enter amount of the payment that have done:
RM");
            AmountPay=a.nextDouble();
            System.out.println("Enter the date for amount of the payment that
have done(1-30): ");
            datePay=a.nextInt();
            System.out.println("_____UUM
BANK_____");

            balance=AmountUse-AmountPay;
            sumDaily=(AmountUse*(datePay-dateUse))+ (AmountPay*(30-datePay));
            avgDaily=sumDaily/30;
            interest=avgDaily*(dailyPeriod/100)*daysBilling;

            System.out.println("Balance that been carried is : RM"+balance);
            System.out.println("Sum of daily balances (RM): "+sumDaily);
            System.out.println("Days in billing period:"+daysBilling);
            System.out.println("Average daily balance: "+avgDaily);
            System.out.println("Interest charge: " + avgDaily +
"("+dailyPeriod+"/100)"+daysBilling);
            System.out.println("Your interest charge is RM"+interest);
            System.out.println("\n\t\t\tThe less your average daily balance, the
less your interest charge!!!");
            System.out.println("\t\t\t\t\tThank you for using our services!");
        }
    }
```

Output:

```
_____UUM BANK_____

Please enter your age:
20
Congratulations you're eligible for the bank services!

Please enter your personal information:
Name:
SUCHIRA
Account number:
100399201
Income (RM):
1800.00
Phone number registered:
0139879900
_____UUM BANK_____
Please read the information below:
The annual percentage rate (APR) for purchases = 14%
The daily period rate is = 0.038%

Please enter information needed:
Enter month(1-12):
1
Enter amount of credit card being use: RM
2500
Enter the date for amount of credit card being use(1-30):
1
```

Enter amount of the payment that have done: RM
1500
Enter the date for amount of the payment that have done(1-30):
16
_____UUM BANK_____
Balance that been carried is : RM1000.0
Sum of daily balances (RM): 58500.0
Days in billing period:30
Average daily balance: 1950.0
Interest charge: 1950.0(0.038/100)30
Your interest charge is RM22.229999999999997

                    The less your average daily balance, the less your interest
charge!!!
                         Thank you for using our services!

UNIVERSITI UTARA MALAYSIA
SEMESTER 1 SESSION 2021/2022

SKIP1013 (A)
INTRODUCTION TO PROGRAMMING AND PROBLEM SOLVING

Subtopic :
HOUSING LOAN

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1. **Identify problem**

A loan is the lending of money by one or more individuals, organizations, or other entities to other individuals, organizations. The recipient incurs a debt and is usually liable to pay interest on that debt until it is repaid as well as to repay the principal amount borrowed. The document evidencing the debt will normally specify, among other things, the principal amount of money borrowed, the interest rate the lender is charging, and the date of repayment. A loan entails the reallocation of the subject asset for a period of time, between the lender and the borrower. The interest provides an incentive for the lender to engage in the loan. In a legal loan, each of these obligations and restrictions is enforced by contract, which can also place the borrower under additional restrictions known as loan covenants. Although this article focuses on monetary loans, in practice, any material object might be lent. Acting as a provider of loans is one of the main activities of financial institutions such as banks and credit card companies. For other institutions, issuing of debt contracts such as bonds is a typical source of funding. Interest rates on unsecured loans are nearly always higher than for secured loans because an unsecured lender's options for recourse against the borrower in the event of default are severely limited, subjecting the lender to higher risk compared to that encountered for a secured loan. An unsecured lender must sue the borrower, obtain a money judgment for breach of contract, and then pursue execution of the judgment against the borrower's unencumbered assets. In insolvency proceedings, secured lenders traditionally have priority over unsecured lenders when a court divides up the borrower's assets. Thus, a higher interest rate reflects the additional risk that in the event of insolvency, the debt may be uncollectible. Common personal loans include mortgage loans, car loans, home equity lines of credit, credit cards, installment loans, and payday loans. The credit score of the borrower is a major component in and underwriting and interest rates of these loans. The monthly payments of personal loans can be decreased by selecting longer payment terms, but overall interest paid increases as well. A personal loan can be obtained from banks, alternative (non-bank) lenders, online loan providers and private lenders.

A house loan or home loan simply means a sum of money borrowed from a financial institution or bank to purchase a house. Home loans consist of an adjustable or fixed interest rate and payment terms. People generally take a home loan for either buying a house/flat or a plot of land for construction of a house, or renovation, extension and repairs to the existing house. The property is mortgaged to the lender as a security till the repayment of the loan. The bank or financial institution will hold the title or deed to the property till the loan has been paid back with the interest due for it. The interest rates for housing loan can be fixed, floating, partly fixed or partly floating suiting the needs of the borrower. There are also certain tax benefits available on housing loan under the Section 80EE of Income Tax Act. However, the income tax deduction can be claimed on housing loan interest by the first time home buyers only.

Nowadays, there are many people who got rejected to make a housing loan because of they are does not meet the required requirements. There are many conditions that the customers need to fulfill to make a housing loan. The problem is when the customers do not know the conditions. The absence of facilities to check their eligibility status makes it

difficult for them to know whether or not they are eligible to apply for a loan. Although a list of eligibility requirements has been displayed, it is not enough to ensure that they are eligible to apply for a housing loan.

 UUM Bank providing service housing loan. To make the loan, customer needs to pass the stipulated conditions. Firstly, they must be over than 18 years old not over than 55 years old. The next condition is 10% from their salary must not less than 0.1% from the loan. The maximum loan that they can make is 90% from the house price. The customers need to pay 15% from the loan amount as the interest. The customer needs to pay the monthly payment according to the amount and period specified. The amount for monthly payments is 0.005% from the total amount of loan.

2. Understand the problem

 Nowadays, the house prices have soared every year which has caused many people especially young people who still do not have their own homes. So, they need a financial source that makes them able to afford a house. With homes often costing thousands or million ringgits, most people can't afford to pay cash for the entire property up front. As a result, they need to take out a housing loan.

  To apply the housing loan, the customer must be awarded the eligibility set by the bank. The conditions set by UUM Bank are :

- Age must between 18 to 55 years old
- 10% from the salary not less than 0.1% from the loan

 If the customers eligible to apply a loan, there are also conditions that they must accept and follow:

- Maximum loan they can make is 90% from the house price

- 15% interest
- The payment must be completed within 200 months
- Customer must pay 0.005% from loan every month

The customer needs a facility that allow them to:

- Check whether they are eligible or not to make a housing loan.
- Know maximum amount of loan that they can make.
- Know the total amount of loan.
- Know the period and amount for monthly payment of the loan.
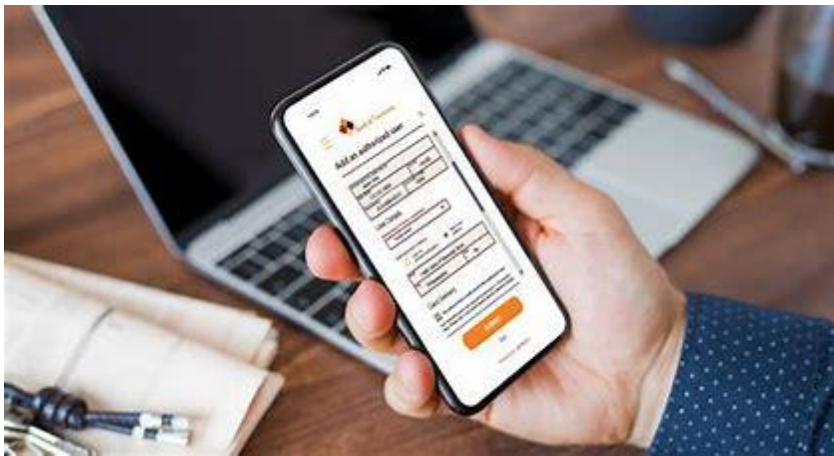
3. **Identify the alternative ways to solve the problem**
- Bank needs to create a system where customer can check their eligibility to make a loan.
- Bank needs to create a system where customer can know maximum amount loan that they can make.
- Bank needs to create a system where customer can calculate the total amount of the loan.
- Bank needs to create a system where customer can know the period of their loan and how much amount for the monthly payment.

4. **Select the best way to solve the problem**

Bank needs to create a system where the customers can check their eligibility to make a loan, maximum amount loan, total loan that they can make period and the amount for the monthly payment of their loan.

5. List instruction (steps) that enables you to solve the problem

- Ask customer's personal information.
- Ask the house price.
- Calculate the maximum amount loan.
- Calculate the total loan.
- Calculate the period and amount for monthly payment of loan.

6. Evaluation of solution

Firstly, the system will declare the variable and initialize the variable. Then, the user needs to enter the information needed which is name, age, salary and the house price. The system will calculate the maximum amount of loan that can customer make. After that, system will tell whether the user eligible or not to make the loan. If the customer is eligible to make the loan, the system will calculate the amount of monthly payment that the customers need to pay every month and the period of the loan. Finally, the system will print a receipt.

Eligibility	- Age > 18 < 55 - 10% salary must not less than 0.1% from the loan
Loan	- Not more than 90% from house price - 15% interest - Monthly payment = 0.005% from loan

********************************UUM BANK**********************************

WELCOME TO UUM BANK!

Name   : Tahfizzudeen

Account Number :15413326

Age   : 23

Monthly Salary   : RM 2500.00

===
===

House Price   : RM 160000.00

Maximum Loan : RM 165600.00

You're Eligible To Make A Loan

===
===

Loan   : RM 144 000.00

Total loan   : RM 146 160.00

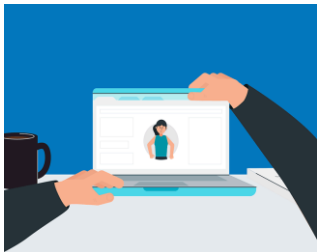Monthly Payment   : RM 828.00

Loan Period   : 200 months

===
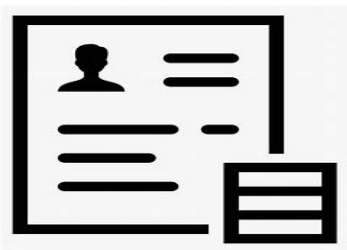===

Thank You For Using Our Service

7. Algorithm

1. Open application

2. Enter personal information

3. Calculate the maximum loan amount

4. Check customer's eligibility to make a loan

5. Enter amount of loan

"Thank you, I shall always be in your debt."

6. Calculate loan period and monthly payment

7. Print receipt

8. **Pseudocode**

Start

Declare a string name

Declare the integer variable age, accnumber

Declare the double variables salary, houseprice, maximumloan, loan, totalloan, monthlypayment, loanperiod

Output "Name:"

Input name

Output "Account Number:"

Input accnumber

Output "Age:"

Input age

Output "Monthly Salary:"

Input salary

Output"House Price:"

Input houseprice

Calculate maximum loan = (90/100)* houseprice

Input maximumloan

Output "Loan Amount:"

Input loan

Calculate total loan = 1.15 * loan

Input totalloan

Calculate monthly payment = 0.005 * totalloan

Input monthlypayment

Calculate loanperiod = totalloan / monthlypayment

Output "Name: " + name

Output "Age: " + age

Output "Monthly salary: " + salary

Output "House price" + houseprice

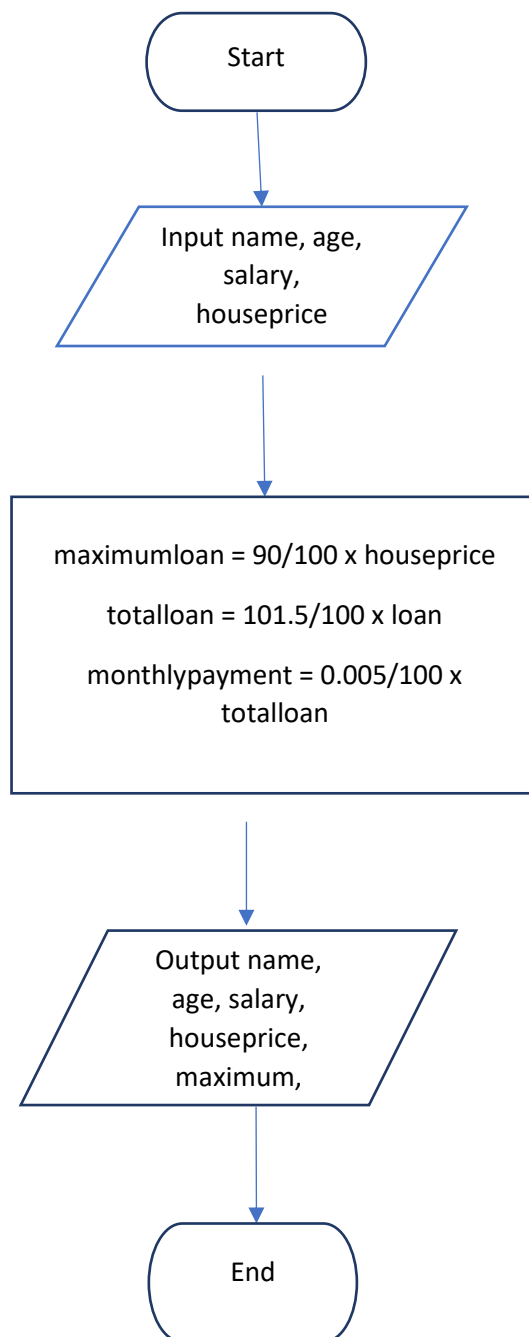Output "Maximum loan amount you can make: " + maximumloan

Output "Loan : " + loan

Output "Total Loan: " + totalloan

Output "Monthly Payment: " + monthlypayment

Output "Loan period: " + loanperiod

End

9. Flowchart

Start

Input name, age, salary, houseprice

maximumloan = 90/100 x houseprice

totalloan = 101.5/100 x loan

monthlypayment = 0.005/100 x totalloan

Output name, age, salary, houseprice, maximum,

End

10. Coding

```java
package bank;

import java.util.Scanner;

public class Assignment1 {


    public static void main(String[] args) {
        // TODO Auto-generated method stub


        String name;

        int age, accnumb;

        double salary, houseprice, maximumloan, loan, totalloan, monthlypayment;


        Scanner input = new Scanner(System.in);


        System.out.println("*********************************UUM BANK*****************************************");


        System.out.print("WELCOME TO UUM BANK!");


        System.out.print("\nName          :");
        name = input.nextLine();


        System.out.print("Account Number :");
        accnumb = input.nextInt();


        System.out.print("Age           :");
                age = input.nextInt();


        System.out.print("Monthly Salary : RM");
```

```java
salary = input.nextDouble();


System.out.print("===========================================================
==============================");


System.out.print("\nHouse Price    : RM");

houseprice = input.nextDouble();


maximumloan = 0.9 * houseprice;

System.out.printf("Maximum Loan   : RM %.2f" , maximumloan);


System.out.println();


System.out.print("\n            You're Aligible To Make A Loan            ");


System.out.print("\n===========================================================
==============================");


System.out.print("\nLoan         : RM");

loan = input.nextDouble();


totalloan = 1.15 * loan;

System.out.printf("Total Loan    : RM%.2f" , totalloan);


            monthlypayment = 0.005 * totalloan;

System.out.printf("\nMonthly Payment: RM%.2f" , monthlypayment);


        loanperiod = totalloan / monthlypayment;

System.out.print("\nLoan Period    :" + loanperiod + "months");
```

```java
System.out.print("\n=================================================================================");

System.out.println("\nThank You For Using Our Service");



}


}
```

Output:

```
*******************************UUMBANK*******************************

WELCOME TO UUM BANK!

Name        :Tahfizzudeen

Account Number :15413326

Age         :23

Monthly Salary : RM2500

=======================================================================

House Price   : RM160000.00

Maximum Loan  : RM 144000.00


        You're Aligible To Make A Loan
```

===
===

Loan   : RM144000.00

Total Loan   : RM165600.00

Monthly Payment: RM828.00

Loan Period   : 200 months

===
===

Thank You For Using Our Service

References :

- house loan: What is a house loan? - Times of India (indiatimes.com)
- Loan - Wikipedia
- Home equity loan - Wikipedia

UNIVERSITI UTARA MALAYSIA
SEMESTER 1 SESSION 2021/2022

SKIP1013 (A)
INTRODUCTION TO PROGRAMMING AND PROBLEM SOLVING

Subtopic :
INVESTMENT
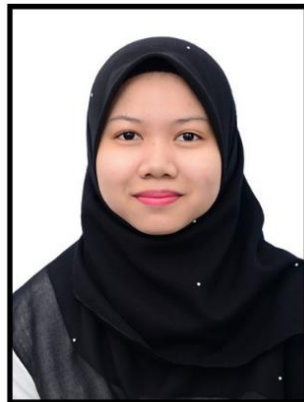
NAME	FASIHATUL AMIRA BINTI JAMALUDIN
MATRIC NO.	288341

1.   Identify the problem

Investment is the dedication of an asset to attain an increase in value over a period of time. Investment requires a sacrifice of some present asset, such as time, money, or effort. In finance, the purpose of investing is to generate a return from the invested asset. The return may consist of a gain (profit) or a loss realized from the sale of a property or an investment, unrealized capital appreciation (or depreciation), or investment income such as dividends, interest, or rental income, or a combination of capital gain and income. The return may also include currency gains or losses due to changes in the foreign currency exchange rates. Investors generally expect higher returns from riskier investments. When a low-risk investment is made, the return is also generally low. Similarly, high risk comes with a chance of high returns. Investors, particularly novices, are often advised to diversify their portfolio. Diversification has the statistical effect of reducing overall risk.

2.   Understand the problem

Amilia a 30 years old investor wants to start her investment. The main reason she wants to invest in for her general saving and she has no experience in investing. She sets a target from investment by RM 1,00,000. Her yearly investment is RM 10,000 and only wants to invest for 20 years only. She chose to invest in bonds that interest rate charged at 2.5%. By the end, if she entire investment lost at 10%, she chose to invest to other market that not related to past investment. By the point of view given, the bank will calculate the investment return and set her investment portfolio.

3.   Identify alternative ways to solve the problem

1. The bank need to show how many that the investor will get in the future and it is worth with the goal.

2. The bank provide the statement weither the investment can achieve the goal or not.

3. Investor make the goal by their self and calculate the earnings in the future before investment.

4.   Select the best way to solve the problem from the list of alternative solutions.

The best way to solve the problem is the bank needs to show how many that the investor will get in the future and it is worth with the goal. The bank will provide investment portfolio for user and the user can see the return value that the user will get in the future.

5.   List instructions (steps) that enable you to solve the problem using the selected solution.

1. System will ask the personal information

2. System ask the main reason for investing

3. System ask the types of investment that user want to invest in

4. System will show the rate of invest based on types of investment that choose by user

5. System will calculate Age end investment, total amount invested and accumulated value.

6. System will show year end investment, total amount invested and accumulated value.

7. System will ask if the investment lost, what they will do. System will keep the choice for future needs.

6.   Evaluate the solution

Types of investment	Rate/charge
Unit trust fund	1.8%
Gold	0.5%
Bonds	2.5%
sukuk	1.2%

Name	Amilia
Starting age	30
Investment period(years)	20
Yearly investment (RM)	10,000
Total amount invested (RM)	200,000

Calculation based on the above statement:

Reference	formula	calculation

Rate	rate = rate/12;	*unit trust fund
		rate=1.8/12
		   =0.15
		*gold
		Rate=0.5/12
		   =0.0417
		*bonds
		Rate=2.5/12
		   =0.208
		*sukuk
		Rate=1.2/12
		   =0.1

Accumulated value	future = amount*Math.*pow* ((1 + rate / 100), (year * 12));	*unit trust fund
		future amount=10000*(1+0.15/100) ^240
		       =14329.42854
		*gold
		future amount=10000*(1+0.0417/100) ^240
		       =11052.36279
		
		*bonds
		future amount=10000*(1+0.20833/100)

		^240
		$\quad$=16478.63975
		*sukuk
		future amount=10000*(1+0.1/100) ^240
		$\quad$=12710.96711
Age end investment	total=year+age;	total year=30+20 $\quad$=50
Total Investment amount	inv=year*amount;	total investment=20*10000 $\quad$=20000
Simple interest : Total after-tax return if your investment profit is simple interest with no compounding.	simpleInterest=(rate/100)*amount*year;	*unit trust fund Simple interest=(1.8/100)*10000*20 $\quad$=3600 *gold Simple interest=(0.5/100)*10000*20 $\quad$=1000 *bonds Simple interest=(2.5/100)*10000*20 $\quad$=5000 *sukuk Simple interest=(1.2/100)*10000*20 $\quad$=2400
Compound interest: Total after-tax return if your investment profit is compounded annually.	compound=future-amount-simpleInterest;	*unit trust fund Compound interest=14329.42854-10000-3600 $\quad$=729.42854

7. ALGORITHM

1. Open the application
2. Enter personal details
3. Choose your primary reason and experience
4. Enter your investment amount and period
5. Select type of investment
6. Enter the rate that shown by system
7. System will show your investment detail
8. Select your investment lost choice
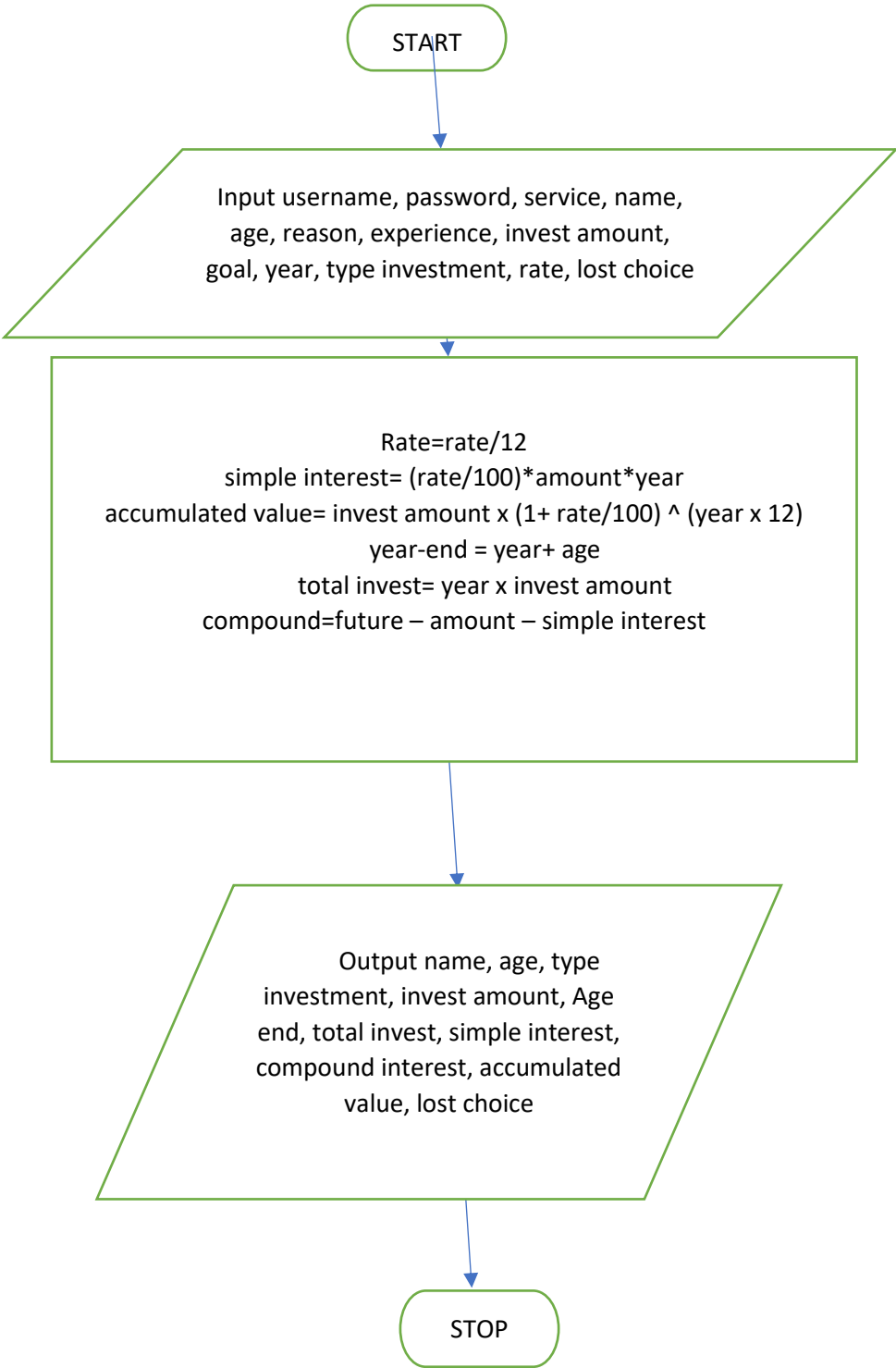9. System keep your choice for future need
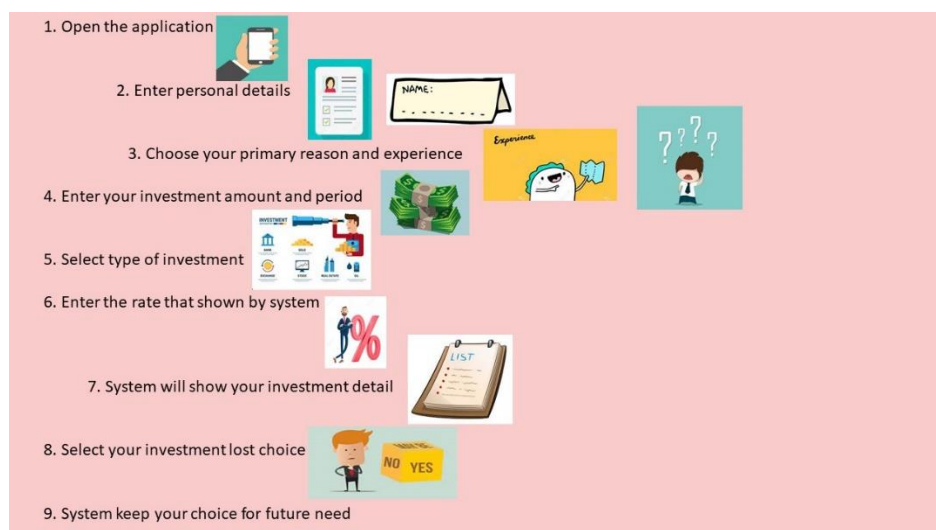
8.PSEUDOCODE

START

      declare double future, investment, trustFund, gold, bonds, sukuk, amount, rate, simpleInterest,compound

      declare int total, password, choose, age, reason, goal, year, typeInvest, lostChoice

      declare String username, name, currentInvest

      output "Enter your username and password"

      input username, password

      output "Choose service"

      input service

      output "Enter name:"

      input name

      output "Enter age:"

      input age

      output "What's your primary reason for investing"

      input reason

      output "are you currently investing? (Y/N)"

      input current

      output "Enter your investment amount:"

      input amount

      output "Enter your financial goal:"

      input goal

      output "Enter your investment period(year):"

      input year

      output "Choose your investment:"

      input investment

      output investment, rate

      output "Enter interest rate:"

      input rate

      calculate rate=rate/12

      calculate simple interest= (rate/100) * amount * year

      calculate accumulated value= invest amount x (1+ rate/100) ^ (year x 12)

      calculate year-end = year+ age

      calculate total invest= year x invest amount

      calculate compound= future-amount-simple interesr

      output name, starting age, yearly invested, age end investment, total amount invested, simple interest, compound interest, accumulated value

      output "if your entire investment lost 10%, what would you do?"

      input lost choice

      output lost choice

END

9.FLOWCHART

START

Input username, password, service, name,
age, reason, experience, invest amount,
goal, year, type investment, rate, lost choice

Rate=rate/12
simple interest= (rate/100)*amount*year
accumulated value= invest amount x (1+ rate/100) ^ (year x 12)
year-end = year+ age
total invest= year x invest amount
compound=future – amount – simple interest

Output name, age, type
investment, invest amount, Age
end, total invest, simple interest,
compound interest, accumulated
value, lost choice

STOP

10.CODING

```java
package assg;
import java.util.Scanner;
public class drafassg2 {
public static void main(String[] args) {

        Scanner sc= new Scanner(System.in);

        double future,investment,simpleInterest,compound;
        int total;
        double trustFund=1.8;
        double gold=0.5;
        double bonds=2.5;
        double sukuk=1.2;

        System.out.println("**********WELCOME TO UUM BANK**********\n");

        System.out.println("Enter your username and password");
        System.out.print("username: " );
        String username=sc.next();
        System.out.print("password: " );
        int password=sc.nextInt();

        System.out.println("_____")
;

        System.out.println("\nChoose service: \n1.Business loan\n2.Personal
loan\n3.Credit card\n4.Housing loan\n5.Investment");
        int choose=sc.nextInt();
        System.out.println("_____")
;

        System.out.println("\nEnter name: ");
        String name=sc.next();

        System.out.println("Enter age:");
        int age=sc.nextInt();

        System.out.println("What's your primary reason for investing?");
        System.out.println(" 1.saving for retirement\n 2.general saving\n
3.emergency fund\n 4.major purchase");
        int reason=sc.nextInt();

        System.out.println("are you currently investing? (Y/N):");
        String currentInvest=sc.next();

        System.out.println("Enter your investment amount: ");
        double amount=sc.nextDouble();

        System.out.println("Enter your financial goal:");
        int goal=sc.nextInt();

        System.out.println("Enter investment period(years): ");
        int year=sc.nextInt();

        System.out.println("Choose your investment:");
        System.out.println("    INVESTMENT             RATE");
        System.out.println("\n1.unit trust fund        " + trustFund+"%");
```

```java
        System.out.println("\n2.     gold                " + gold+"%");
        System.out.println("\n3.     bonds               " + bonds+"%");
        System.out.println("\n4.     sukuk               " + sukuk+"%");
        int typeInvest=sc.nextInt();
        System.out.println(typeInvest);

        System.out.println("Enter interest rate : ");
        double rate=sc.nextDouble();

        rate = rate/12;
        simpleInterest=(rate/100)*amount*year;
        future = amount*Math.pow((1 + rate / 100),(year * 12));
        total=year+age;
        investment=year*amount;
        compound=future-amount-simpleInterest;
            System.out.println("********** YOUR INVESTMENT PORTFOLIO **********");

                System.out.println("\nName                : "+name);
                System.out.println("Starting age        : "+age);
                System.out.println("Age end investment : "+total);
                System.out.printf("\nyearly investment     : RM %.2f ",amount);
                System.out.printf("\nTotal amount invested : RM %.2f
",investment);
                System.out.printf("\nSimple interest       : RM %.2f
",simpleInterest);
                System.out.printf("\nCompound interest     : RM %.2f ",compound);
                System.out.printf("\nAccumulated value is  : RM %.2f " , future);

System.out.println("\n_____");
                System.out.println("\n\nif your entire investment lost 10%, what
would you do?");
                System.out.println("1.sell all investment\n2.keep all
investment\n3.invest to other market");
                int lostChoice=sc.nextInt();
                System.out.println(lostChoice);

            System.out.println("\nWE KEEP YOUR CHOICE FOR FUTURE NEEDS. THANK
YOU!!");

System.out.println("***************************************************");
}}
```

OUTPUT:

```
**********WELCOME TO UUM BANK**********

Enter your username and password
```

```
username: mellia
password: 12345
_____

Choose service:
1.Business loan
2.Personal loan
3.Credit card
4.Housing loan
5.Investment
5

_____

Enter name:
Amilia
Enter age:
30
What's your primary reason for investing?
 1.saving for retirement
 2.general saving
 3.emergency fund
 4.major purchase
2
are you currently investing? (Y/N):
N
Enter your investment amount:
10000
Enter your financial goal:
100000
Enter investment period(years):
20
Choose your investment:
     INVESTMENT            RATE

1.unit trust fund         1.8%

2.    gold               0.5%

3.    bonds              2.5%

4.    sukuk              1.2%
3
3
Enter interest rate :
2.5
********** YOUR INVESTMENT PORTFOLIO **********

Name              : Amilia
Starting age      : 30
Age end investment : 50

yearly investment    : RM 10000.00
Total amount invested : RM 200000.00
Simple interest      : RM 416.67
Compound interest    : RM 6061.97
Accumulated value is  : RM 16478.64

_____
```

```
if your entire investment lost 10%, what would you do?
1.sell all investment
2.keep all investment
3.invest to other market
3
3

WE KEEP YOUR CHOICE FOR FUTURE NEEDS. THANK YOU!!
****************************************************
```

*__Invest to other market__: user will choose other type of investment.

As example, current investment is bonds then if user lost and want to invest other market, user will choose either unit trust fund, gold or sukuk.

References:

https://en.wikipedia.org/wiki/Investment

https://www.aarp.org/money/investing/investment_return_calculator.html

https://getmoneyrich.com/how-to-know-if-investment-portfolio-is-well-made-or-not/