Vellore Institute of Technology
(Deemed to be University under section 3 of UGC Act, 1956)

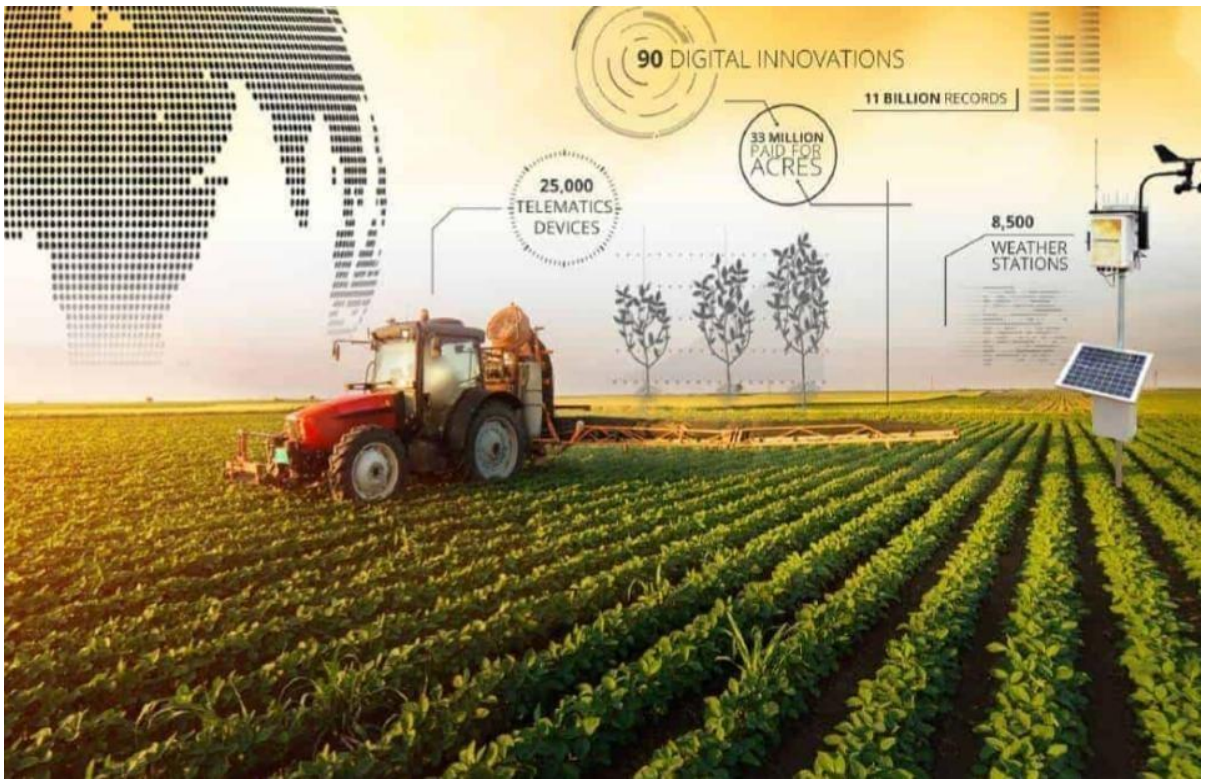
FALL SEMESTER 2022-2023

J-COMPONENT

AGRICULTURAL YIELD PREDICTION

to be submitted in partial fulfilling of the requirements for the course on

Fundamentals of Data Analytics– (CSC3005) (E1+TE1)



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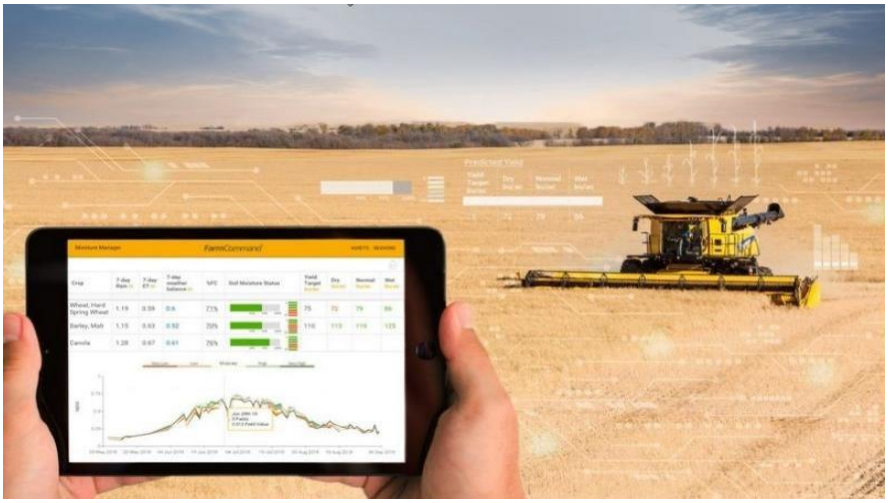
WHAT IS AGRICULTURAL YIELD PREDICTION?

In agriculture, the yield is a measurement of the amount of a crop grown, or product such as wool, meat or milk produced, per unit area of land. The seed ratio is another way of calculating yields

Yield Prediction enables growers to see what their yields will be across their farm before harvest equipment even touches the field.

PREDICTION USED :

Machine learning (ML) could be a crucial perspective for acquiring realworld and operative solution for crop yield issue. Considering the present system including manual counting, climate smart pest management and satellite imagery, the result obtained arent really accurate.



ABSTRACTION:

Agriculture is the backbone of Indian economy. Due to global warming and climate change traditional farming in the regular months have been distorted and crops have been ruined is the most common phrase seen today. This not only gives economic losses but also the main reason for farmer sucide. Now agriculture needs support, time has come for technology to take over change. For a crop to grow,favourable soil conditions, ambient rainfall and temperature is necessary. Data science in agriculture is a growing field and has a wide scope in future.

INTRODUCTION:

Agriculture forms the basis for food security and hence it is important. In India, majority of the population i.e., above 55% is dependent on agriculture as per the recent information. Agriculture is the field that enables

the farmers to grow ideal crops in accordance with the environmental balance. In India, wheat and rice are the major grown crops along with sugarcane, potatoes, oil seeds etc. Farmers also grow non-food items like rubber, cotton, jute etc. Weather plays an important role in agriculture production. Thus there is no aspect of crop culture that is immune to impact of weather. Weather factor contribute to optimal crop growth, development and yield. For rainfall variability needs to be expressed in terms of percentage so that minimum assured rainfall amounts at a level.

ASPECTS OF THE FARMING:

Yield data can also be used to monitor progress toward global goals set by governments, non-governmental organizations, and other stakeholders. In addition, yield data is used to identify strengths and weaknesses in farming practices and make recommendations based on this information. Yield data is useful in making informed decisions about many aspects of farming, such as:

Seed selection: Choosing varieties and hybrids based on yield data can help ensure that fields are planted with the most profitable seeds available.

Pest management: By monitoring plant growth, yield data can help farmers determine when to introduce pest control measures. This can reduce the use of pesticides and increase profits.

Irrigation scheduling: Using information from yield monitors allows farmers to fine-tune irrigation scheduling, which helps conserve water and money while maintaining high yields.

WORKING :

The following data sources are combined to create a varied weighting on yield projection numbers based on the present cropping season circumstances in various regions. Farmers Edge data scientists combine these data sources with the most recent advances in machine learning to update yield forecast estimates whenever a major yield component is disrupted.

- **Preseason data**
  Preseason data must be accurate to lay the groundwork for Yield Prediction. This information is available before the crop is planted, and it lays the stage for the first yield prediction readings. Data such as a field's location, current and previous crops, field-specific weather months before planting or seeding, soil test information and data, and regional weather trends over the last decade are all combined to provide insight into how to start the season with accurate yield numbers to anticipate.
- **In-season data**
  In-season data provides insight into variables that affect yield throughout the growing season after the foundation has been laid. Farmers Edge on-farm weather stations give field-centric data that enhances these datasets by delivering expected and predicted values that are stored

and then reset when data comes in each day, advancing the models.

- **Crop-specific data**

  Farmers Edge's wide network of local agronomists may also provide crop-specific data during the growing season. Farmers Edge agronomists have identified crop-specific data that impacts yield during a growing season, including water content during major growth stages or hours above cardinal temperatures for crops during key yield determining periods, for the five main crops in yield prediction.

- **Crop and field imagery**

  High-resolution satellite imagery is used to set NDVI crop health values on fields fast and precisely, allowing researchers to look for erroneous results or regional concerns with crops that could affect yield. These regional trends can be used to determine if areas are on track for forecast or whether environmental factors have distorted the prediction values.

ADVANTAGES:

- Food for Human beings
- Food for Animals
- Source of Livelihood
- Source of Income

- Food Security
- Improving Soil Structure
- Minimizing Pollution
- Absorb Heat
- Greener Environment

DISADVANTAGES:

- Deforestation
- Pest and weed resistance to chemicals
- Impact on natural habitats
- The use of chemical hormones in food
- Poor living conditions and hygiene for livestock
- Possibility of poor quality food products
- Excessive use of agro-chemicals
- Risks to human health
- Higher risks of cancer and birth defects
- Deforestation and alteration of the natural environment

IMPORTANCE OF PREDICTING CROPS:

Humanity depends on farming, not just for food but for jobs and the economy. Over 1 billion people, nearly 30% of the entire global workforce is involved in farming.

The production of food and crops directly controls the size of the population. If there is not enough food the

population can’t grow. As farming improves, the population grows. In the 1700s the population of England was around 5.7 million and it had been around this number for nearly 2,000 years. Following the invention of new farming techniques in the 1750s, the English population nearly tripled to 16.6million in just 100 years.

The invention of the fertilization process, Haber-Bosch, in the 1900s enabled the global population to explode from 1.6 billion to 7.7 billion in just over one hundred years.The population explosion in the UK and around the world are due to improved crop production.

Wheat, corn, and rice were some of the initial crops to be farmed. Wheat is one of the first known crops to be farmed. Rice farming is even more recent, starting around 5,000 years ago in India.The production of food and crops directly controls the size of the population. If there is not enough food the population can’t grow.

PREDICTION CROPS-REGRESSION MODEL:

“ Regression analysis is a set of statistical processes for estimating the relationships between a dependent variable and one or more independent variables”

The application of correlation and regression analysis has provided some qualitative understanding of the variables

and their interactions that were involved in cropping systems and has contributed to the progress of agricultural science. However, the quantitative information obtained from this type of analysis is very site specific. The information obtained can only be reliably applied to other sites where climate, important soil parameters and crop management are similar to those used in developing the original functions. Thus, the quantitative applicability of regression based crop yield models for decision making is severely limited.

OBJECTIVES OF THE AGRICULTURE MANAGEMENT SYSTEMS:

- Developing Agriculture Management System is to help Farmers in forming process.
- The farmers can sell their products and the customer can Buy that product.
- This program helps farmers to improve their productivity And profitability.

CONCLUSION:

As per the explanation given above are the main and important aspect , advantages and disadvantages of agricultural yield prediction under the fundamental of data analytics.predicitive analytics It has become a vital aspect of

precision farming in recent years. IoT devices can study crop rotation, water management, pest attacks, nutrition management, and much more. The devices then generate rich insights through spatial analysis that aid improved standards of crop production.

OUTPUT EXPECTED:

1.sandy soil:

- **Carrots gained same amount of investment for the farmer.**
- **Radishes gained profit for the farmer.**

2.black soil:

- **Sugarcane gained profit.**
- **Wheat gained profit.**

3.clay soil:

- **Groundnut gained profit.**
- **Maize gained profit.**

4.loamy soil:

- **Paddy gained profit.**
- **Wheat gained profit.**

Output snapchats are listed below…….

PROGRAM CODING:

```
#include<iostream>
Using namespace std;
Class agriculture // first class declaration
{
Private:
Double area,length,width;
Int soil;
Int vegetable;
Int crop;
Public:
Agriculture();//constructor
Void typesoil();
Void invest();
}a1;
Agriculture::agriculture()//constructor declaration
{
Cout<<"\t_____"<<endl;
Cout<<"\t----------
"<<endl;

Cout<<"\n\n\t\t**AGRICULTURE MANAGEMENT
SYSTEM**"<<endl;
Cout<<"\t_____"<<endl;
Cout<<"\t----------
"<<endl;
```

```
Cout<<"\t*Agriculture department manager asking question
to farmer!!!"<<endl;
Cout<<"\n\t#farmer land surface!!!"<<endl;
Double area,length,width;
Cout<<"\tlength=";
Cin>>length;
Cout<<"\twidth=";
Cin>>width;
Area=length*width;
Cout<<"\tArea of the land ="<<area<<"square feet"<<endl;

}
Void agriculture::typesoil()
{

Cout<<"\twhich types of soil you have !!!"<<endl;

Cout<<"\t#choose your soil!!!\n\t1.sandy soil\n\t2.Black
soil\n\t3.clay soil\n\t4.loamy soil"<<endl;
Int soil;
Cout<<"\tFarmer choose soil type(1/2/3/4):";
Cin>>soil;

Switch(soil)//switch case
{
Case 1:
Cout<<"\tsandy soil in my agriculture land !!!"<<endl;
```

```
Cout<<"\n\t*sandy soil mostly cultivation in
vegetables"<<endl;
Cout<<"\n\t1.carrots\n\t2.Radishes\n\t3.potatoes\n\t4.Tom
atoes"<<endl;
Int vegetable;
Cout<<"\n\tchoose your vegetable:";
Cin>>vegetable;
If(vegetable==1)  //else if using inside switch case
{
Cout<<"\n\tI will cultivate carrots"<<endl;
}
Else if(vegetable==2)
{
Cout<<"\n\tI will cultivate radishes"<<endl;
}
Else if(vegetable==3)
{
Cout<<"\n\tI will cultivate potatoes "<<endl;

}
Else
{
Cout<<"\n\tI will cultivate Tomatoes "<<endl;

}

Break;
```

```
Case 2:
{
Cout<<"\tBlack soil in my agriculture land !!!"<<endl;
Int crop;
Cout<<"\n\t*Black soil mostly cultivation in crops"<<endl;
Cout<<"\n\t1.wheat\n\t2.oilseeds\n\t3.sugarcane"<<endl;

Cout<<"\tEnter your crop type(1/2/3):";
Cin>>crop;

If(crop==1)
{
Cout<<"\n\tI will cultivate wheat!!!"<<endl;
}
Else if(crop==2)
{
Cout<<"\n\tI will cultivate oilseeds !!!"<<endl;
}
Else
{
Cout<<"\n\tI will cultivate sugarcane!!! "<<endl;

}
}
Break;
Case 3:
{
```

```
Cout<<"\tclay soil in my agriculture land !!!"<<endl;
Cout<<"\n\t#Types of crops\n\t1.paddy
crop\n\t2.Groundnut\n\t3.mize"<<endl;
Int crop;
Cout<<"\tEnter your crop type(1/2/3):";
Cin>>crop;
If(crop==1)
{
                Cout<<"\tI will cultivation paddy !!!"<<endl;

}
Else if(crop==2)
{
            Cout<<"\tI will cultivation Groundnut !!!"<<endl;

}
Else
{
      Cout<<"\tI will cultivation mize!!!"<<endl;

}
}
Break;

Default:
{
Cout<<"\tloamy soil in my agriculture land !!!"<<endl;
```

```
Cout<<"\n\t*loamy soil mostly cultivation in crops"<<endl;
Cout<<"\n\t1.wheat\n\t2.paddy\n\t3.sugarcane"<<endl;
Int crop;
Cout<<"\tEnter your crop type(1/2/3):";
Cin>>crop;

If(crop==1)
{
Cout<<"\n\tI will cultivate wheat!!!"<<endl;
}
Else if(crop==2)
{
Cout<<"\n\tI will cultivate paddy !!!"<<endl;
}
Else
{
Cout<<"\n\tI will cultivate sugarcane!!! "<<endl;



}
}
}


}
Class investment//second class declaration
{
```

```
Private:
Int no_employee,total_employee_amount;
   Float employee_salary,amount,investment1,travel;

Public:
Void invest();
Friend class income; //friend class declaration in second class
}f1;
Void investment::invest()
{
      Cout<<"\t-------------------------------------------------------
";
Cout<<"\n\t\t**FARMER INVESTMENT**"<<endl;
Cout<<"\t-------------------------------------------------------
"<<endl;
Cout<<"\ttotaly how many employees you want:";
 Cin>> no_employee;
Cout<<"\n\t           day employee salary:";
 Cin>>employee_salary;
Cout<<"\n\t              employees
amount:"<<no_employee*employee_salary;
Cout<<"\n\t    medicine Amount of the plants:";
Cin>>amount;
Cout<<"\n\t              traveling Amount:";
Cin>>travel;
```

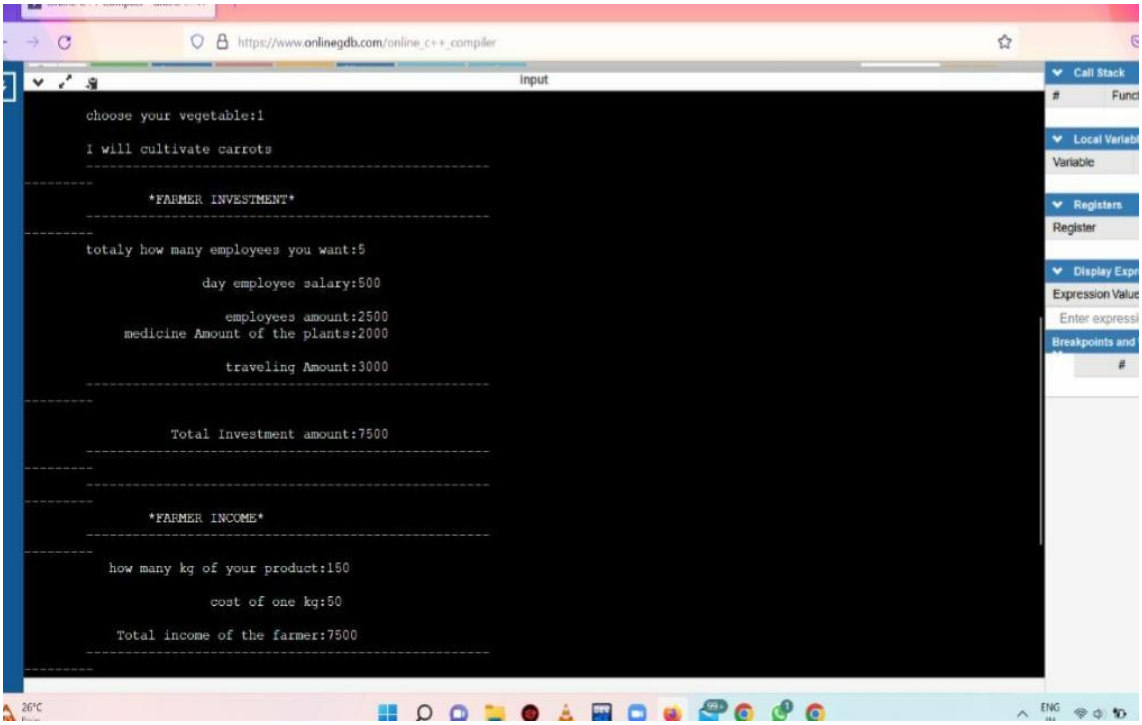
```
Cout<<"\t-------------------------------------------------------
"<<endl;
Investment1=no_employee*employee_salary+amount+travel
;
Cout<<"\n\t         Total Investment
amount:"<<investment1<<endl;
Cout<<"\t-------------------------------------------------------
"<<endl;

}
Class income //third class declaration
{
Private:
Int
income,weight,cost,inv,profit_lose,weight1,saleman,profit_lo
se1;
Public:
Void income_amount(investment&x) //friend class using third
class
{
Cout<<"\t-------------------------------------------------------";
Cout<<"\n\t\t**FARMER INCOME**"<<endl;
Cout<<"\t-------------------------------------------------------
"<<endl;
Cout<<"\t   how many kg of your product:";
Cin>>weight;
Cout<<"\n\t              cost of one kg:";
Cin>>cost;
```

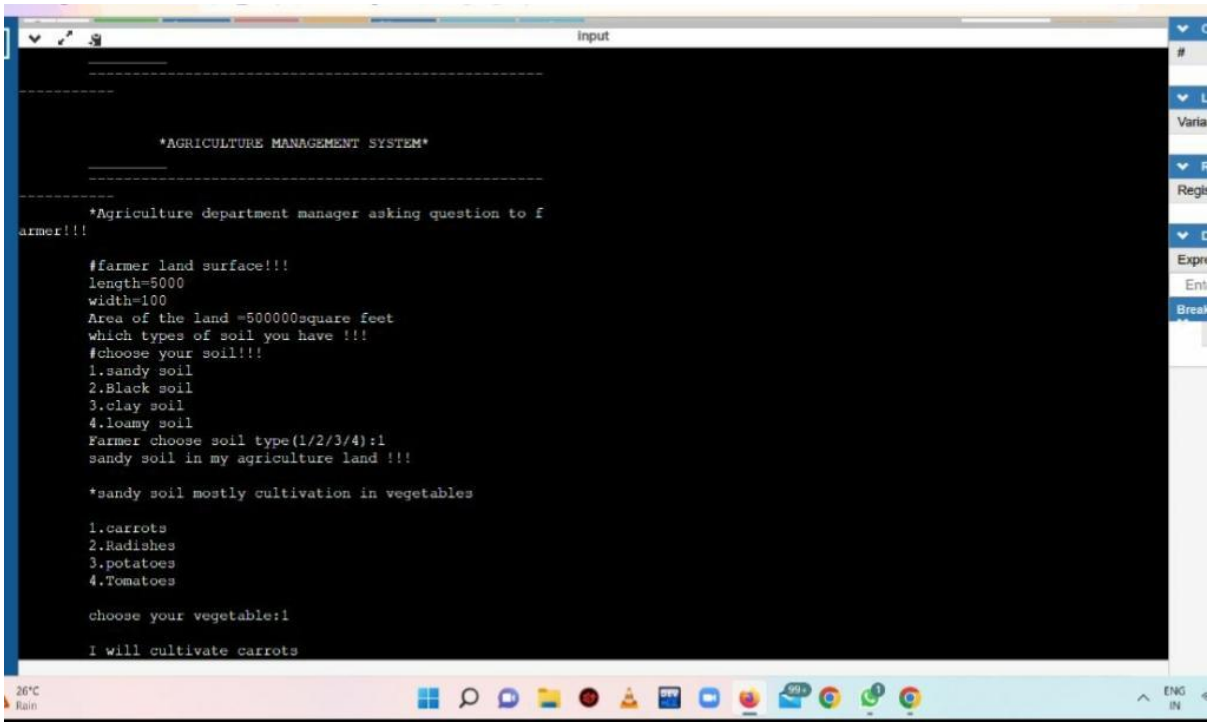
```
Income=weight*cost;
Cout<<"\n\t    Total income of the farmer:"<<income;

Inv=x.investment1;
}
Void bussiness()
{
Cout<<"\n\t-----------------------------------------------------------";
Cout<<"\n\t\t**SALESMAN VS CUSTOMER**"<<endl;
Cout<<"\t-----------------------------------------------------------
"<<endl;
Cout<<"\tsales man to sale the product customer one kg:";
Cin>>weight1;
Saleman=weight1*weight;
Cout<<"\n\t           totally salesman earning
amount:"<<saleman;

}

~income()//destructor
{

Cout<<"\n\t-----------------------------------------------------------";
Cout<<"\n\t\t**PROFIT OR LOSE**"<<endl;
Cout<<"\t-----------------------------------------------------------
"<<endl;
```

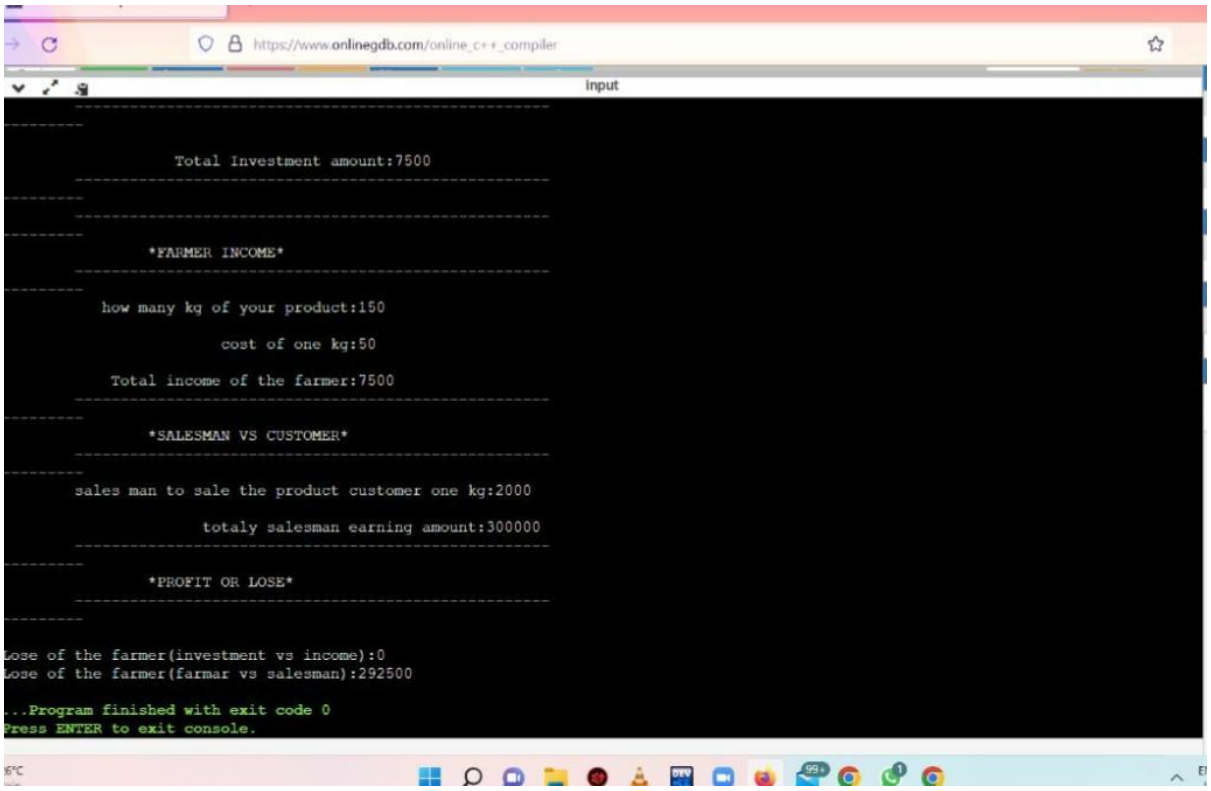
```
Profit_lose=income-inv;
Profit_lose1=income-saleman;

If(income>inv)
{
Cout<<"\nprofit of the farmer(investment vs
income):"<<profit_lose;

}
Else
{
Cout<<"\nLose of the farmer(investment vs income):"<<-
profit_lose;

}
If(income>saleman)
{
Cout<<"\nprofit of the farmer(farmar vs
salesman):"<<profit_lose1;

}
Else
{
Cout<<"\nLose of the farmer(farmar vs salesman):"<<-
profit_lose1;

}
```

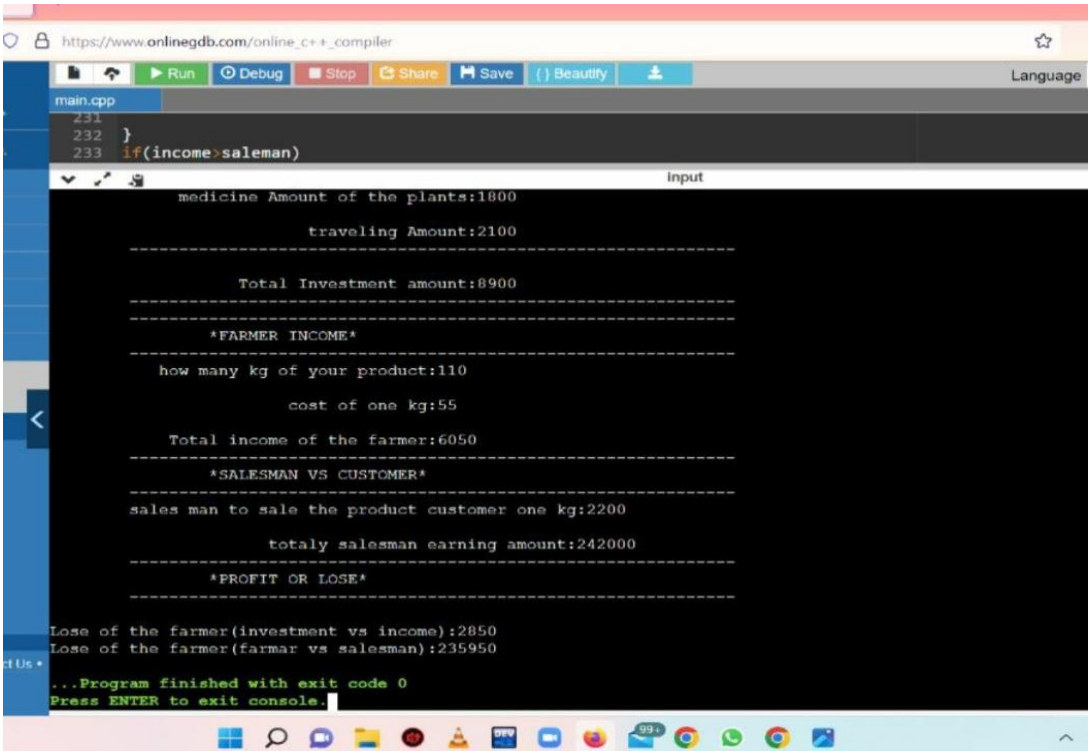
```
}
}i1;
Int main()
{

   A1.typesoil();
F1.invest();
I1.income_amount(f1);
I1.bussiness();
a1.profitlose();
}
```

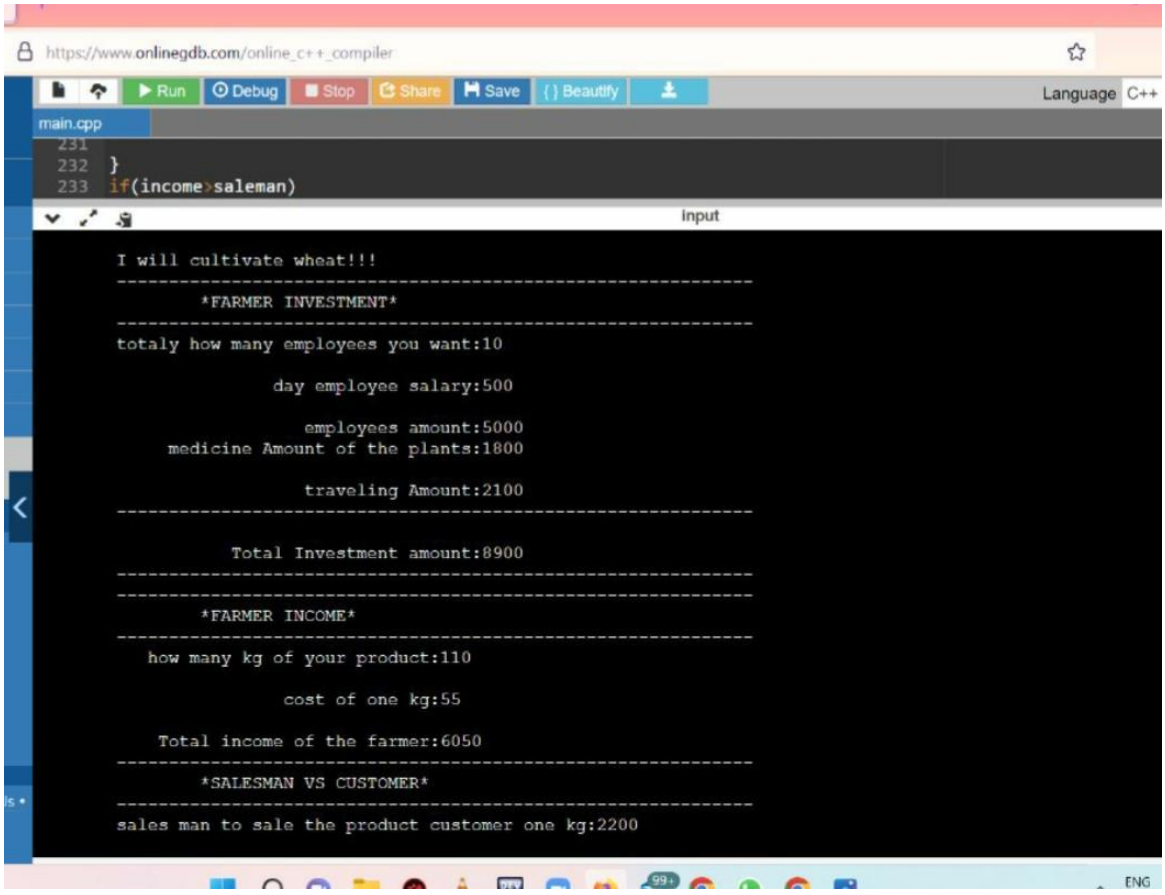
OUTPUT:

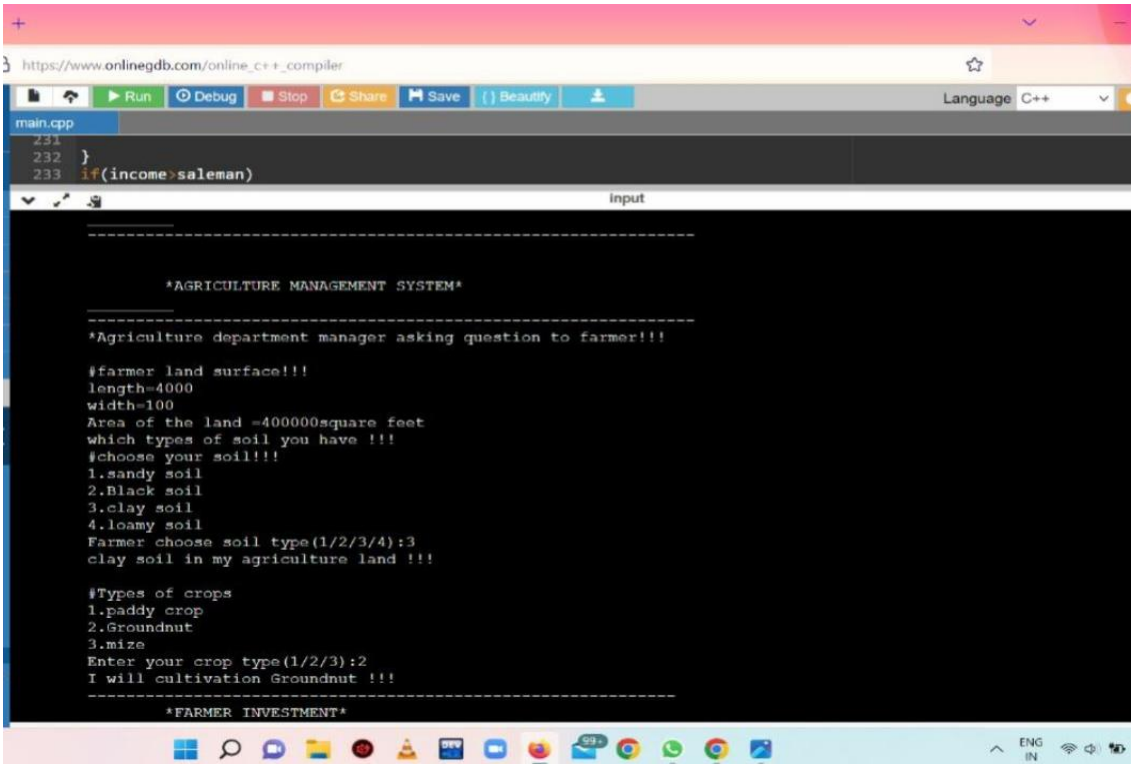


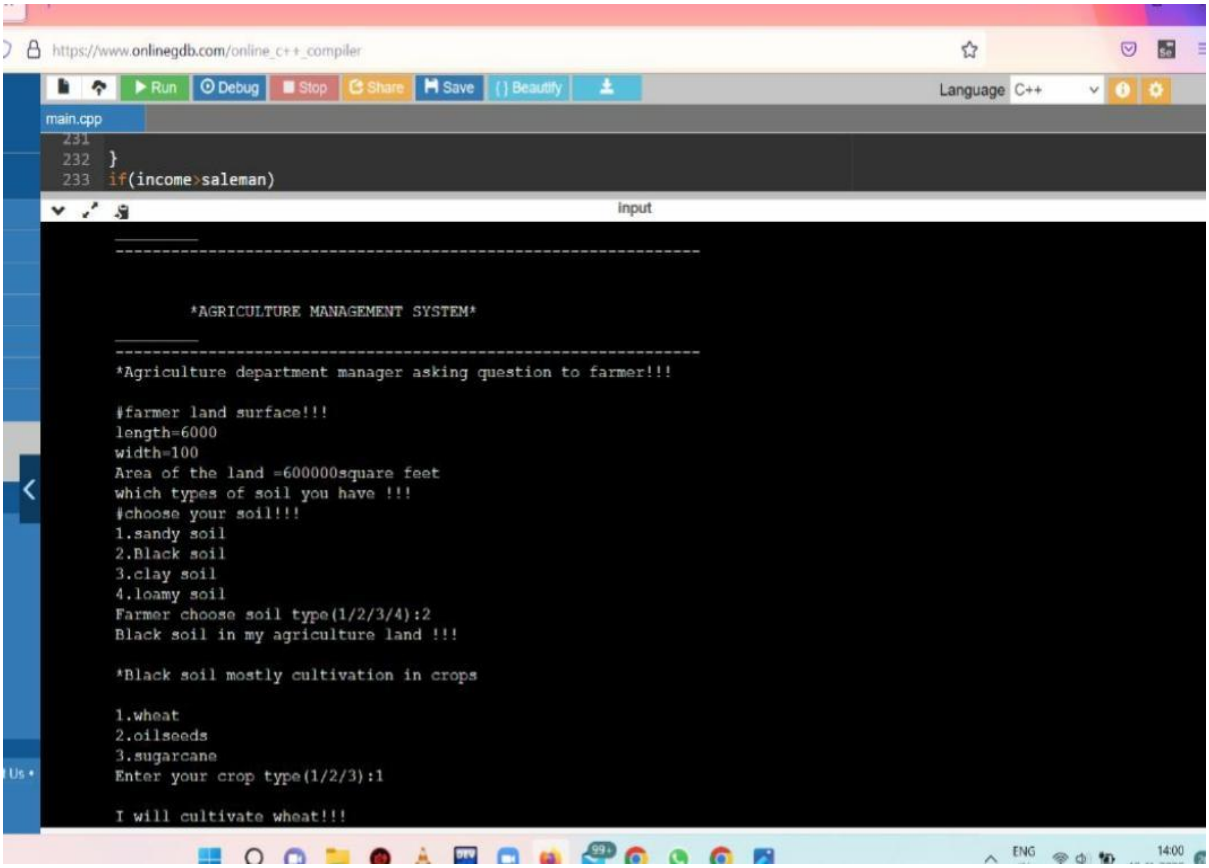

Input
AGRICULTURE MANAGEMENT SYSTEM
*Agriculture department manager asking question to f
armer!!!
#farmer land surface!!!
length=5000
width=100
Area of the land =500000square feet
which types of soil you have !!!
#choose your soil!!!
1.sandy soil
2.Black soil
3.clay soil
4.loamy soil
Farmer choose soil type(1/2/3/4):1
sandy soil in my agriculture land !!!
*sandy soil mostly cultivation in vegetables
1.carrots
2.Radishes
3.potatoes
4.Tomatoes
choose your vegetable:1
I will cultivate carrots

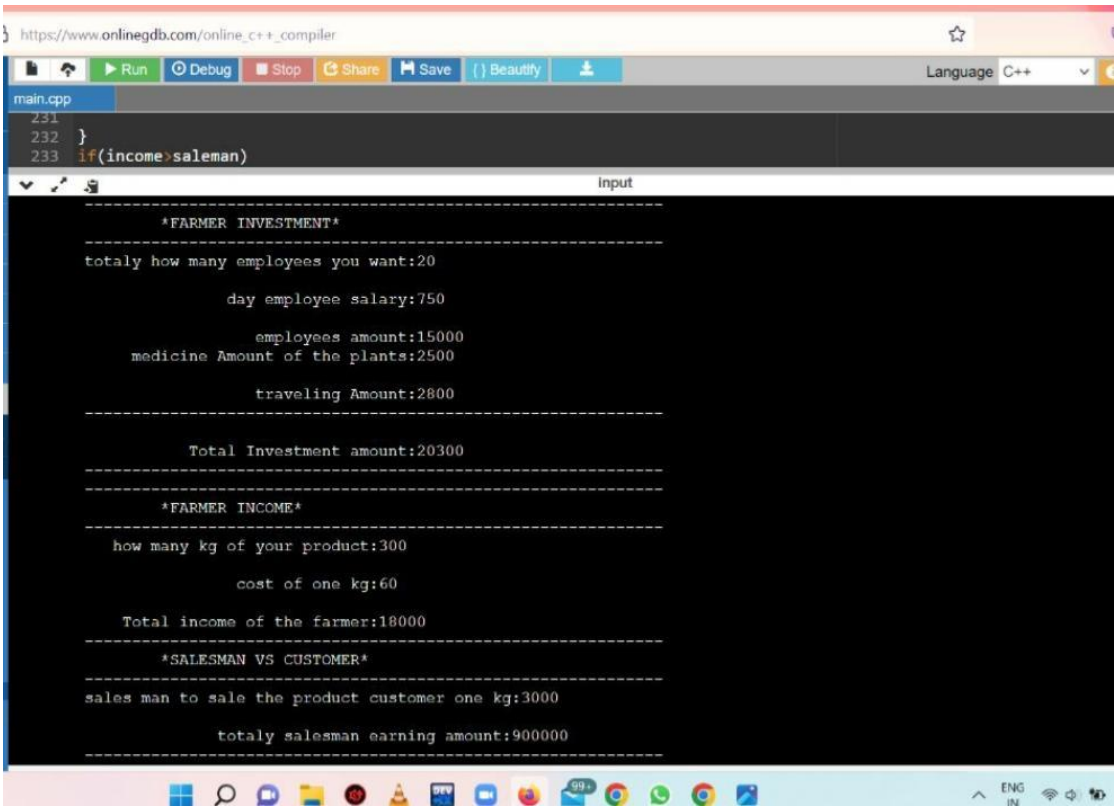

https://www.onlinegdb.com/online_c++_compiler
Input
Total Investment amount:7500
FARMER INCOME
how many kg of your product:150
cost of one kg:50
Total income of the farmer:7500
SALESMAN VS CUSTOMER
sales man to sale the product customer one kg:2000
totaly salesman earning amount:300000
PROFIT OR LOSE
Lose of the farmer(investment vs income):0
Lose of the farmer(farmar vs salesman):292500
...Program finished with exit code 0
Press ENTER to exit console.

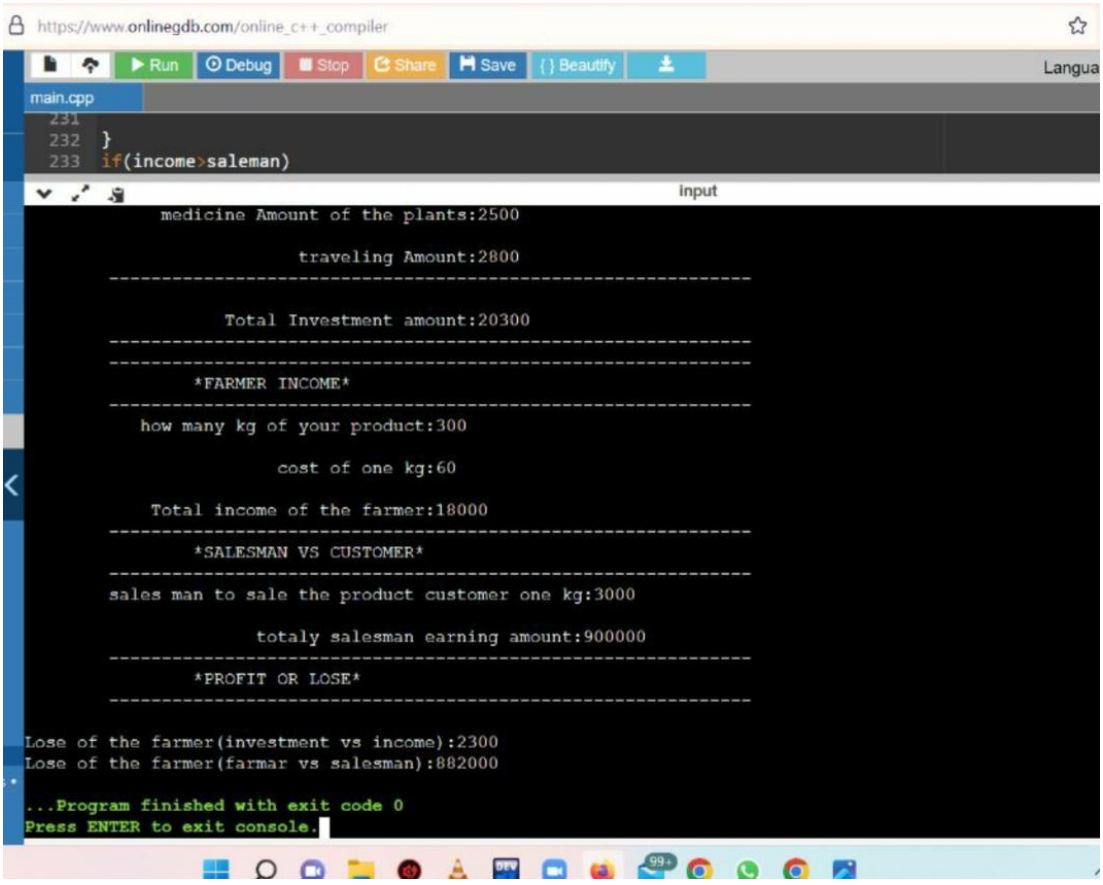

https://www.onlinegdb.com/online_c++_compiler
Run
Debug
Stop
Share
Save
{ } Beautify
Language
main.cpp
231
232 }
233 if(income>saleman)
Input
medicine Amount of the plants:1800
traveling Amount:2100
Total Investment amount:8900
FARMER INCOME
how many kg of your product:110
cost of one kg:55
Total income of the farmer:6050
SALESMAN VS CUSTOMER
sales man to sale the product customer one kg:2200
totaly salesman earning amount:242000
PROFIT OR LOSE
Lose of the farmer(investment vs income):2850
Lose of the farmer(farmar vs salesman):235950
...Program finished with exit code 0
Press ENTER to exit console.

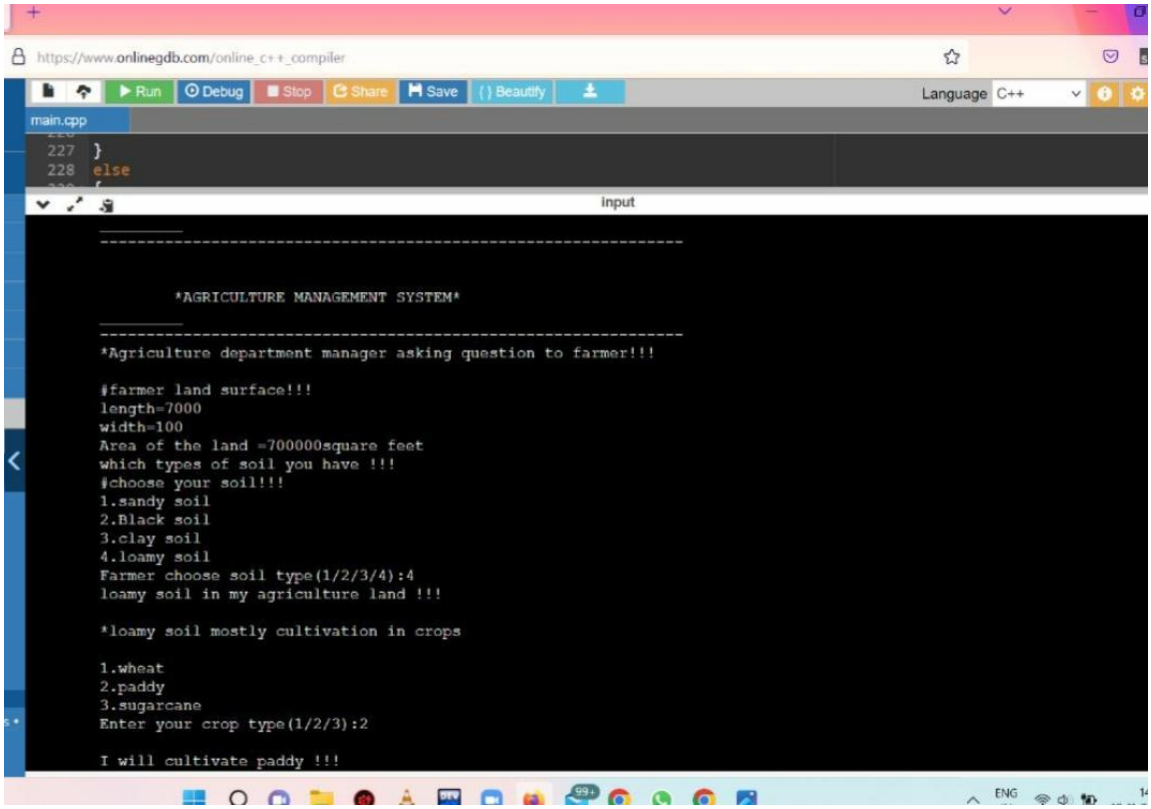

https://www.onlinegdb.com/online_c++_compiler
Run
Debug
Stop
Share
Save
{ } Beautify
Language C++
main.cpp
231
232 }
233 if(income>saleman)
Input
I will cultivate wheat!!!
FARMER INVESTMENT
totaly how many employees you want:10
day employee salary:500
employees amount:5000
medicine Amount of the plants:1800
traveling Amount:2100
Total Investment amount:8900
FARMER INCOME
how many kg of your product:110
cost of one kg:55
Total income of the farmer:6050
SALESMAN VS CUSTOMER
sales man to sale the product customer one kg:2200

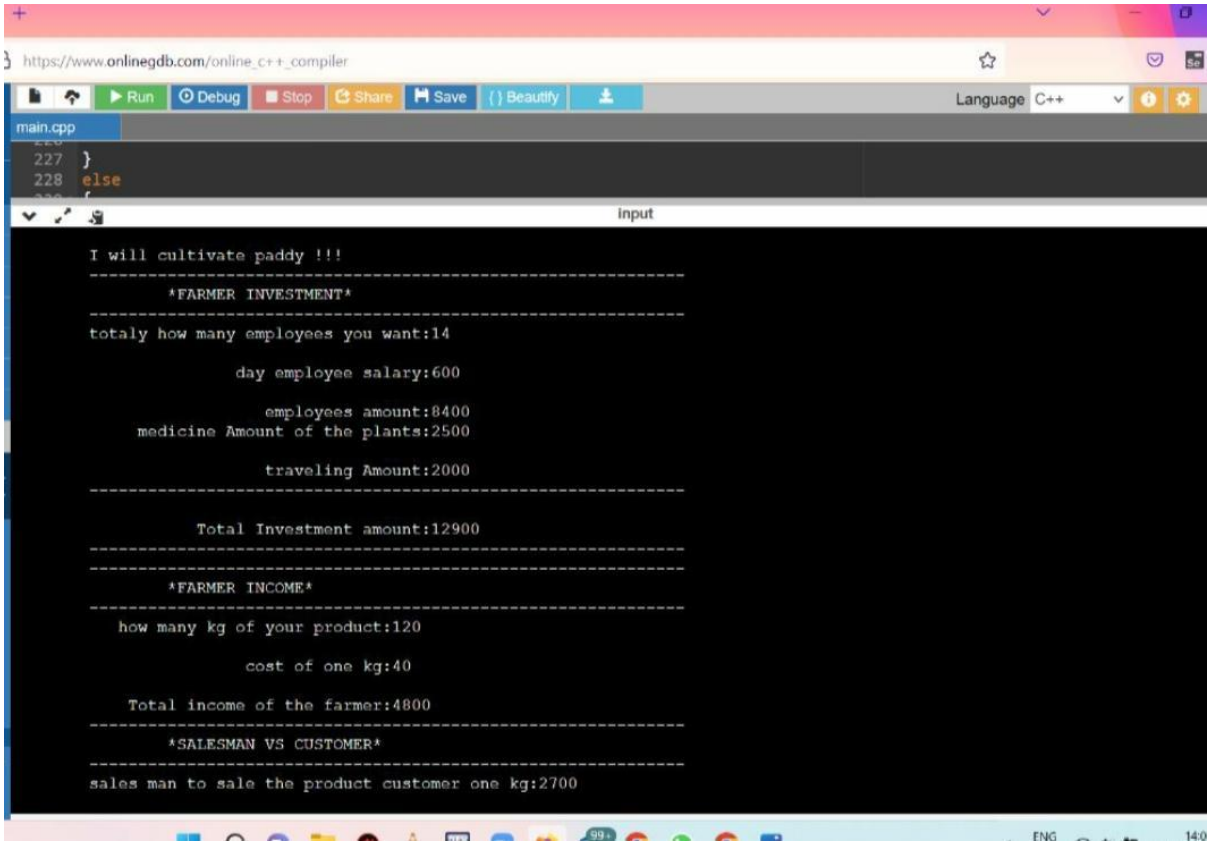

https://www.onlinegdb.com/online_c++_compiler
Run
Debug
Stop
Share
Save
{ } Beautify
Language C++
main.cpp
231
232 }
233 if(income>saleman)
input
AGRICULTURE MANAGEMENT SYSTEM
*Agriculture department manager asking question to farmer!!!
#farmer land surface!!!
length=4000
width=100
Area of the land =400000square feet
which types of soil you have !!!
#choose your soil!!!
1.sandy soil
2.Black soil
3.clay soil
4.loamy soil
Farmer choose soil type(1/2/3/4):3
clay soil in my agriculture land !!!
#Types of crops
1.paddy crop
2.Groundnut
3.mize
Enter your crop type(1/2/3):2
I will cultivation Groundnut !!!
FARMER INVESTMENT

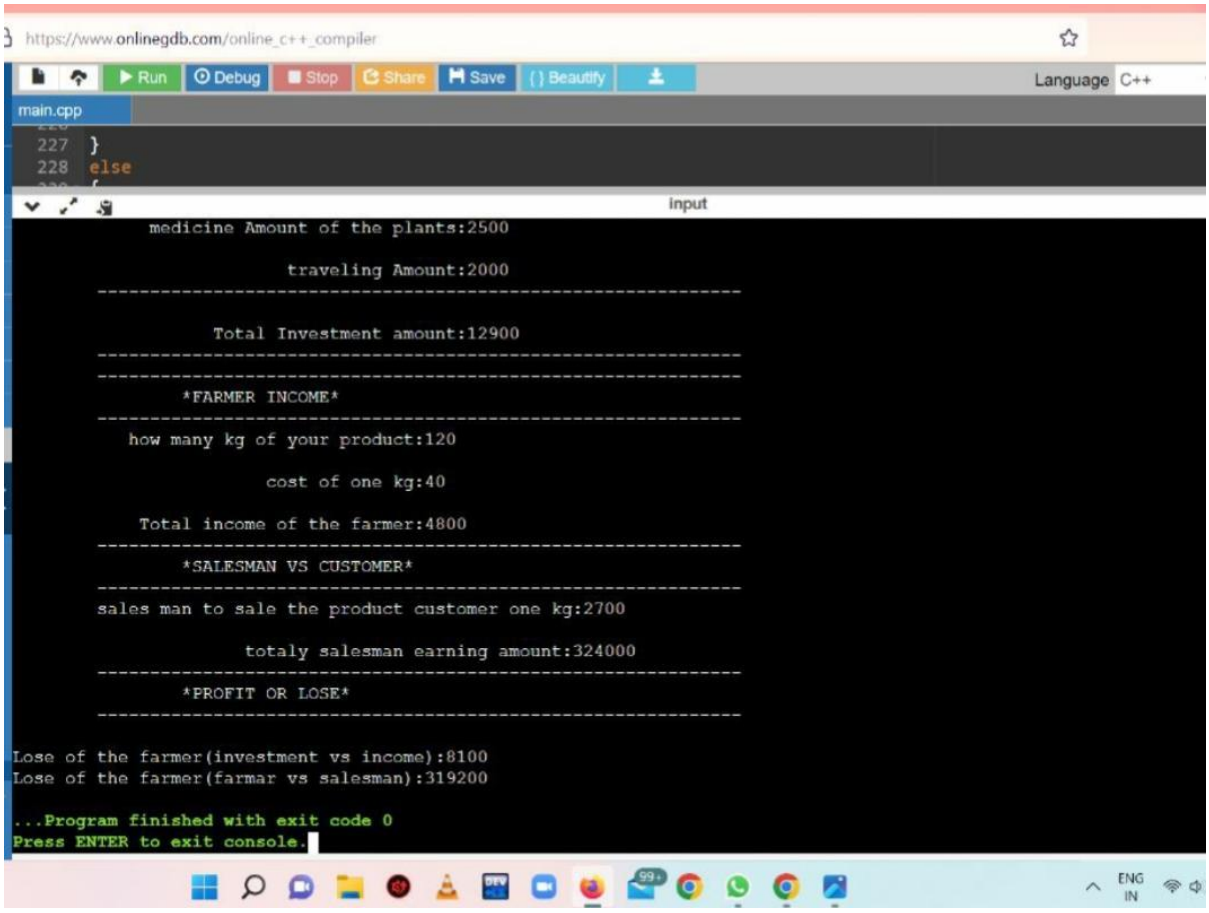

https://www.onlinegdb.com/online_c++_compiler
Run
Debug
Stop
Share
Save
{ } Beautify
Language C++
main.cpp
231
232 }
233 if(income>saleman)
input
AGRICULTURE MANAGEMENT SYSTEM
*Agriculture department manager asking question to farmer!!!
#farmer land surface!!!
length=6000
width=100
Area of the land =600000square feet
which types of soil you have !!!
#choose your soil!!!
1.sandy soil
2.Black soil
3.clay soil
4.loamy soil
Farmer choose soil type(1/2/3/4):2
Black soil in my agriculture land !!!
*Black soil mostly cultivation in crops
1.wheat
2.oilseeds
3.sugarcane
Enter your crop type(1/2/3):1
I will cultivate wheat!!!


https://www.onlinegdb.com/online_c++_compiler
Run
Debug
Stop
Share
Save
{ } Beautify
Language C++
main.cpp
231
232 }
233 if(income>saleman)
Input
FARMER INVESTMENT
totaly how many employees you want:20
day employee salary:750
employees amount:15000
medicine Amount of the plants:2500
traveling Amount:2800
Total Investment amount:20300
FARMER INCOME
how many kg of your product:300
cost of one kg:60
Total income of the farmer:18000
SALESMAN VS CUSTOMER
sales man to sale the product customer one kg:3000
totaly salesman earning amount:900000


https://www.onlinegdb.com/online_c++_compiler
Run
Debug
Stop
Share
Save
{ } Beautify
main.cpp
231
232 }
233 if(income>saleman)
input
medicine Amount of the plants:2500
traveling Amount:2800
Total Investment amount:20300
FARMER INCOME
how many kg of your product:300
cost of one kg:60
Total income of the farmer:18000
SALESMAN VS CUSTOMER
sales man to sale the product customer one kg:3000
totaly salesman earning amount:900000
PROFIT OR LOSE
Lose of the farmer(investment vs income):2300
Lose of the farmer(farmar vs salesman):882000
...Program finished with exit code 0
Press ENTER to exit console.


https://www.onlinegdb.com/online_c++_compiler
Run
Debug
Stop
Share
Save
{ } Beautify
Language C++
main.cpp
227 }
228 else
Input
AGRICULTURE MANAGEMENT SYSTEM
*Agriculture department manager asking question to farmer!!!
#farmer land surface!!!
length=7000
width=100
Area of the land =700000square feet
which types of soil you have !!!
#choose your soil!!!
1.sandy soil
2.Black soil
3.clay soil
4.loamy soil
Farmer choose soil type(1/2/3/4):4
loamy soil in my agriculture land !!!
*loamy soil mostly cultivation in crops
1.wheat
2.paddy
3.sugarcane
Enter your crop type(1/2/3):2
I will cultivate paddy !!!


https://www.onlinegdb.com/online_c++_compiler
Run
Debug
Stop
Share
Save
{ } Beautify
Language C++
main.cpp
227 }
228 else
Input
I will cultivate paddy !!!
FARMER INVESTMENT
totaly how many employees you want:14
day employee salary:600
employees amount:8400
medicine Amount of the plants:2500
traveling Amount:2000
Total Investment amount:12900
FARMER INCOME
how many kg of your product:120
cost of one kg:40
Total income of the farmer:4800
SALESMAN VS CUSTOMER
sales man to sale the product customer one kg:2700


https://www.onlinegdb.com/online_c++_compiler
Run
Debug
Stop
Share
Save
{ } Beautify
Language C++
main.cpp
227 }
228 else
input
medicine Amount of the plants:2500
traveling Amount:2000
Total Investment amount:12900
FARMER INCOME
how many kg of your product:120
cost of one kg:40
Total income of the farmer:4800
SALESMAN VS CUSTOMER
sales man to sale the product customer one kg:2700
totaly salesman earning amount:324000
PROFIT OR LOSE
Lose of the farmer(investment vs income):8100
Lose of the farmer(farmar vs salesman):319200
...Program finished with exit code 0
Press ENTER to exit console.
ENG
IN

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----------END----------