THE
UNIVERSITY OF
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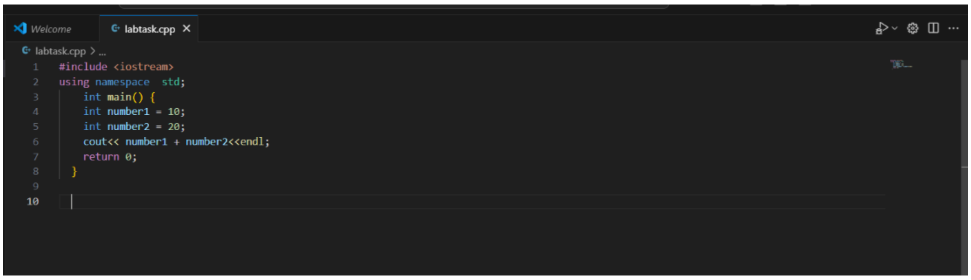
Lab task

QUESTION 1:

ALGORITHM:

- Step 1: The program starts execution.
- Step 2: Two integer variables, number1 and number2, are declared and initialized with values 10 and 20 respectively.
- Step 3: The sum of number1 and number2 is calculated and stored in a variable (though in your code, you directly print the result instead of storing it).
- Step 4: The result of the addition (sum) is printed to the screen using cout. The endl ensures that the output is followed by a new line.
- Step 5: The program ends with a return statement, indicating the program completed successfully.

CODE:

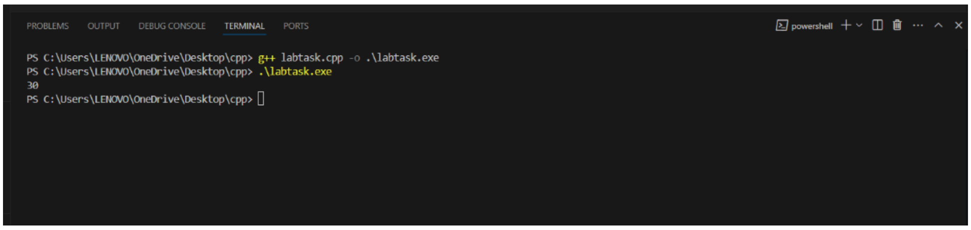


```cpp
#include <iostream>
using namespace  std;
    int main() {
    int number1 = 10;
    int number2 = 20;
    cout<< number1 + number2<<endl;
    return 0;
  }

```

Figure 1 screenshot of code

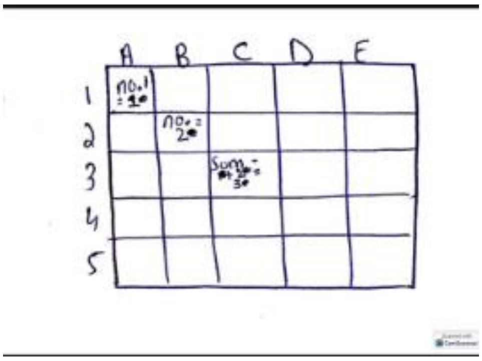
TERMINAL:



```
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> g++ labtask.cpp -o .\labtask.exe
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> .\labtask.exe
30
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> 
```

Figure 2 terminal of this code

MEMORY DIAGRAM:



	A	B	C	D	E
1	no.1 = 10				
2		no. = 20			
3			Sum = 10+20 = 30		
4					
5					

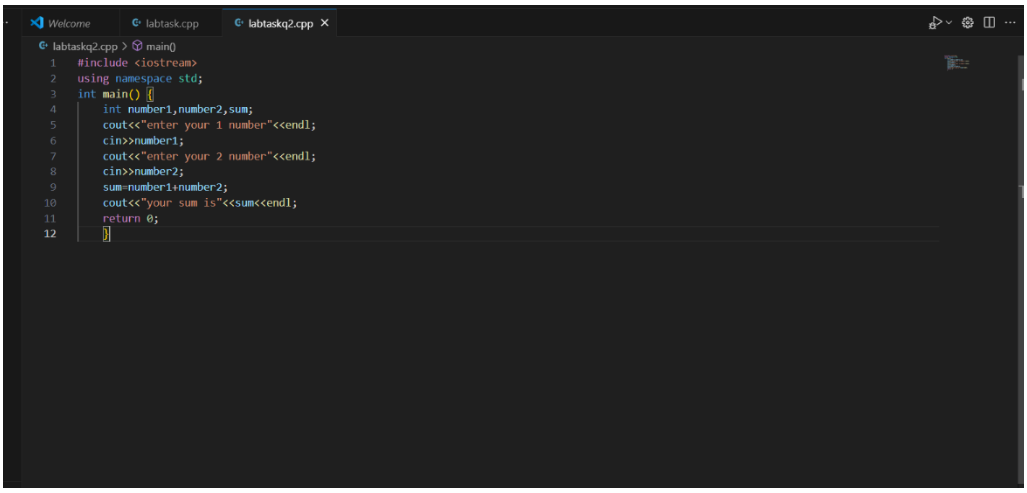
Figure 3 Memory diagram

QUESTION 2:

- **Step 1**: The program starts execution.
- **Step 2**: Two integer variables, number1 and number2, are declared and initialized with values 10 and 20 respectively.

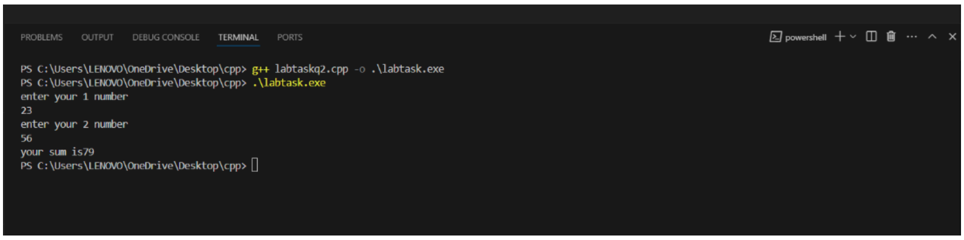
- **Step 3**: The sum of number1 and number2 is calculated and stored in a variable (though in your code, you directly print the result instead of storing it).
- **Step 4**: The result of the addition (sum) is printed to the screen using cout. The endl ensures that the output is followed by a new line.
- **Step 5**: The program ends with a return statement, indicating the program completed successfully.

Code:



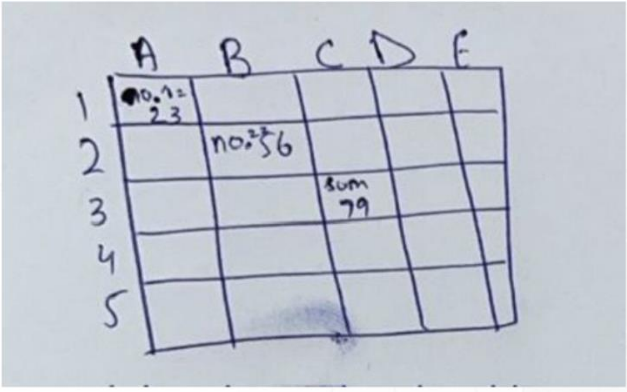
```cpp
#include <iostream>
using namespace std;
int main() {
    int number1,number2,sum;
    cout<<"enter your 1 number"<<endl;
    cin>>number1;
    cout<<"enter your 2 number"<<endl;
    cin>>number2;
    sum=number1+number2;
    cout<<"your sum is"<<sum<<endl;
    return 0;
    }
```

Terminal:



```
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> g++ labtaskq2.cpp -o .\labtask.exe
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> .\labtask.exe
enter your 1 number
23
enter your 2 number
56
your sum is79
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> 
```

Memory diagram:



	A	B	C	D	E
1	no.1= 23				
2		no.2=56			
3			sum 79		
4					
5					

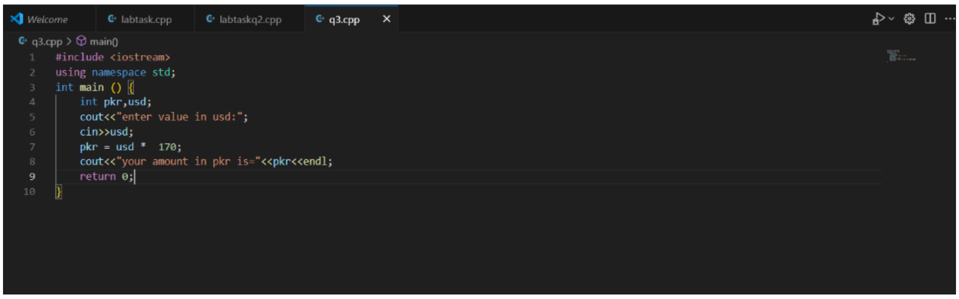
QUESTION 3:

ALGORITHM Steps:

Here the steps of algorithms:

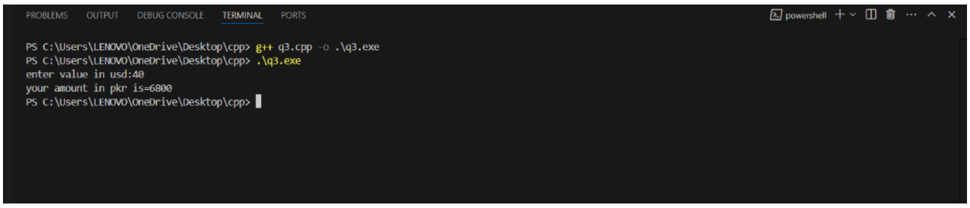
1. **Start**
2. Print “Enter value in USD”
3. Input USD value from the user
4. Calculate PKR as pkr = usd * 170
5. Print the value of PKR
6. Stop

Code:



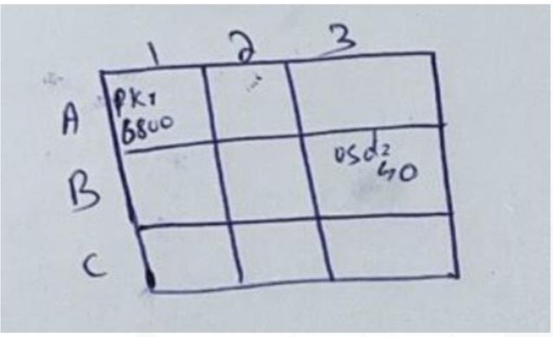
```cpp
#include <iostream>
using namespace std;
int main () {
    int pkr,usd;
    cout<<"enter value in usd:";
    cin>>usd;
    pkr = usd *  170;
    cout<<"your amount in pkr is="<<pkr<<endl;
    return 0;
}
```

Terminal:



```
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> g++ q3.cpp -o .\q3.exe
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> .\q3.exe
enter value in usd:40
your amount in pkr is=6800
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> 
```

Memory diaram:



	1	2	3
A	PK1 6800		
B			usd2 40
C			

QUESTION 4:

ALGORITHMS STEPS:

1 Start

2. Reserve three memory cells: MA1, MA2, MA3.

3. Input values for a, b, and c from the user.

4. Calculate b + c and store it in MA1.

5. Calculate a * MA1 (i.e., a * (b + c)) and store it in MA2.

6. Calculate a + c and reuse MA1 to store it.

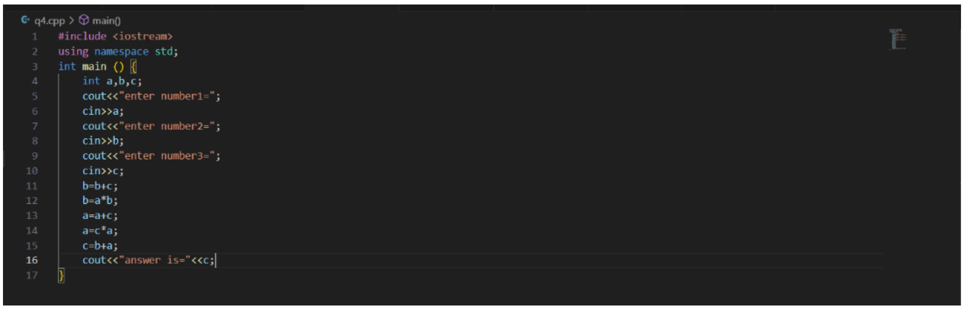
7. Calculate c * MA1 (i.e., c * (a + c)) and store it in MA3.

8. Calculate the result as MA2 + MA3.

9. Print the result.

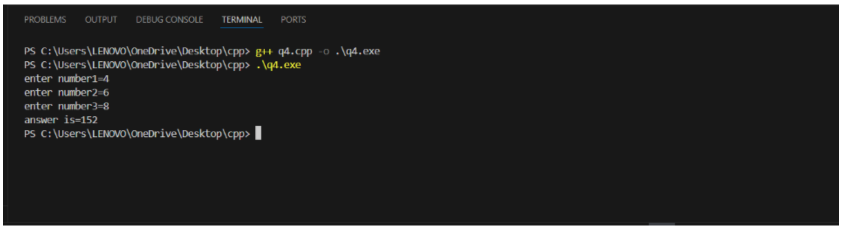
10. Stop

Code:



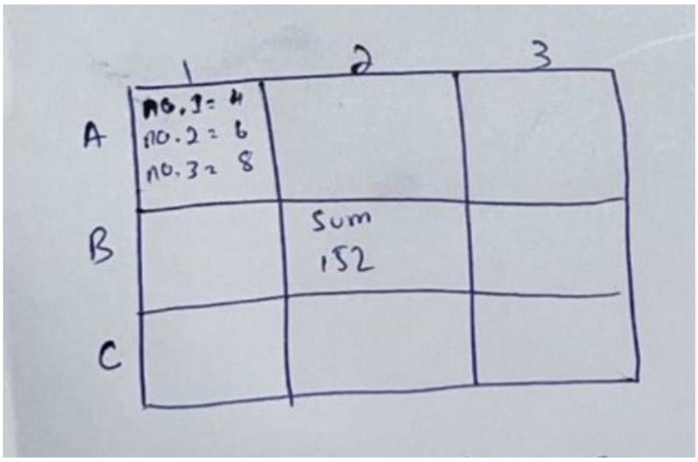
```cpp
#include <iostream>
using namespace std;
int main () {
    int a,b,c;
    cout<<"enter number1=";
    cin>>a;
    cout<<"enter number2=";
    cin>>b;
    cout<<"enter number3=";
    cin>>c;
    b=b+c;
    b=a*b;
    a=a+c;
    a=c*a;
    c=b+a;
    cout<<"answer is="<<c;
}
```

Terminal:



```
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> g++ q4.cpp -o .\q4.exe
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> .\q4.exe
enter number1=4
enter number2=6
enter number3=8
answer is=152
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> 
```

Memory diagram:



	1	2	3

A	no.1= 4
	no.2 = 6
	no.3 = 8		

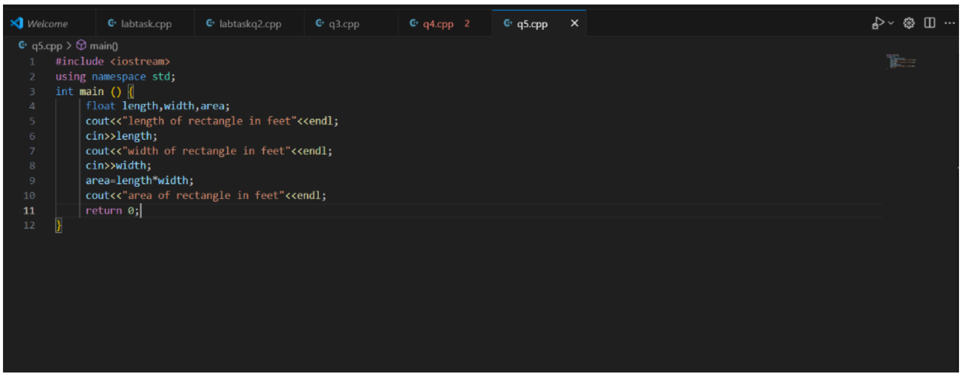
B		Sum 152	
C			

QUESTION 5:

ALGORITHM STEP:

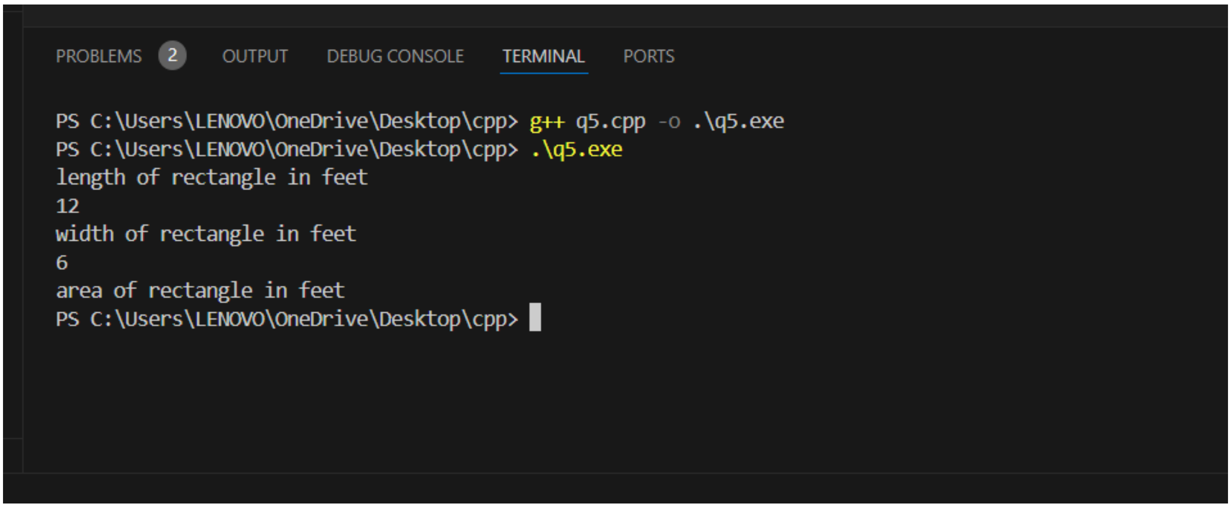
1. Start
2. Print “Enter the length of the fence in feet”
3. Input the length from the user
4. Print “Enter the width of the fence in feet”
5. Input the width from the user
6. Calculate the area as Area = Length * Width
7. Print the area in square feet
8. Stop

Code:



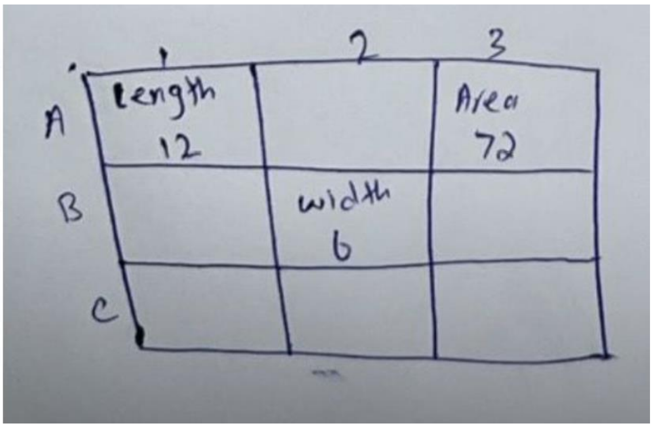
```cpp
#include <iostream>
using namespace std;
int main () {
    float length,width,area;
    cout<<"length of rectangle in feet"<<endl;
    cin>>length;
    cout<<"width of rectangle in feet"<<endl;
    cin>>width;
    area=length*width;
    cout<<"area of rectangle in feet"<<endl;
    return 0;
}
```

Terminal:



```
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> g++ q5.cpp -o .\q5.exe
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> .\q5.exe
length of rectangle in feet
12
width of rectangle in feet
6
area of rectangle in feet
PS C:\Users\LENOVO\OneDrive\Desktop\cpp>
```

Memory diagram:



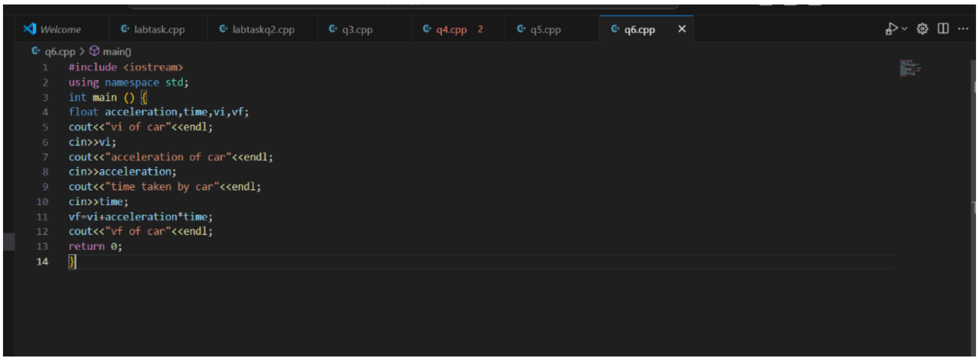
	1	2	3
A	length 12		Area 72
B		width 6	
C			

QUESTION6:

ALGORITHM STEPS:

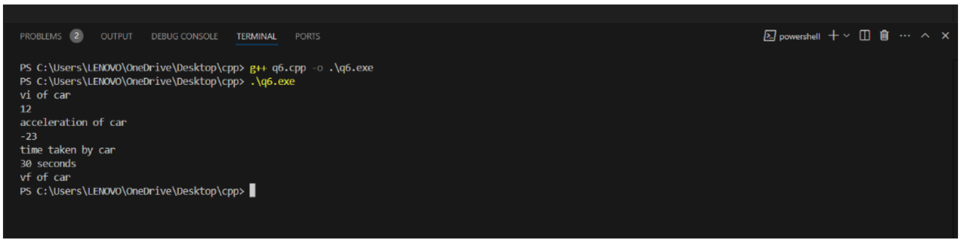
```
1.  Start
    2.  Print "Enter the initial velocity (m/s)"
    3.  Input initial velocity from the user
    4.  Print "Enter the acceleration ($m/s^2$)"
    5.  Input acceleration from the user
    6.  Print "Enter the time (seconds)"
    7.  Input time from the user
    8.  Calculate final velocity using the formula:
    9.  Print the final velocity
    10. Stop
```

Code:



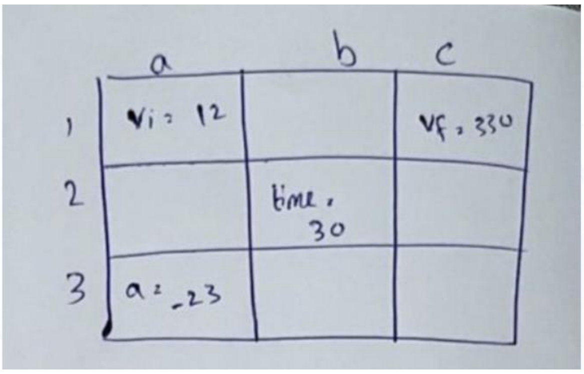
```cpp
#include <iostream>
using namespace std;
int main () {
float acceleration,time,vi,vf;
cout<<"vi of car"<<endl;
cin>>vi;
cout<<"acceleration of car"<<endl;
cin>>acceleration;
cout<<"time taken by car"<<endl;
cin>>time;
vf=vi+acceleration*time;
cout<<"vf of car"<<endl;
return 0;
}
```

Terminal:



```
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> g++ q6.cpp -o .\q6.exe
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> .\q6.exe
vi of car
12
acceleration of car
-23
time taken by car
30 seconds
vf of car
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> 
```

Memory diagram:



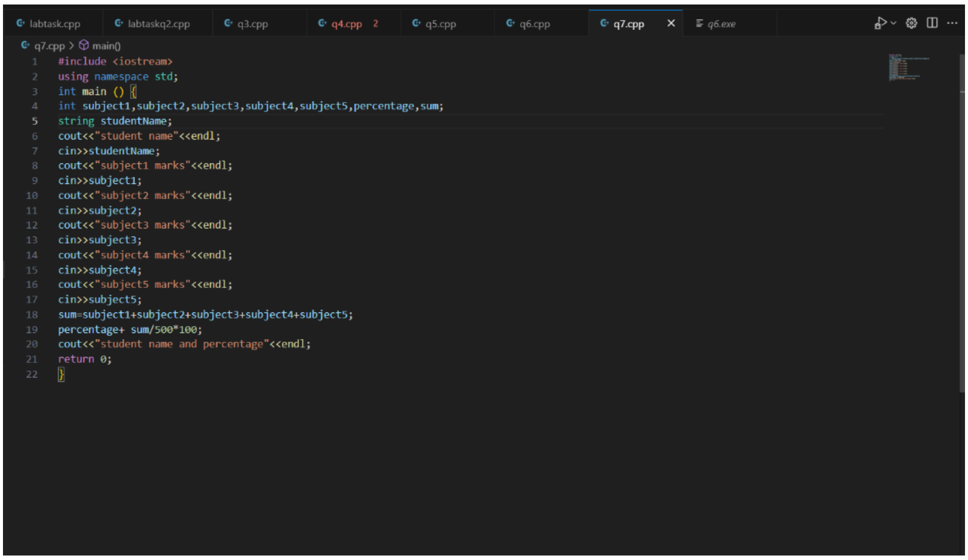
	a	b	c
1	Vi = 12		Vf = 330
2		time = 30	
3	a = -23		

QUESTION7:

ALGORITHM STEPS:

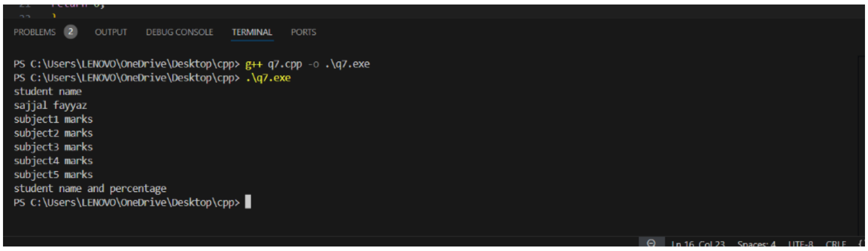
1. Start
2. Print “Enter your name”
3. Input student’s name
4. Print messages to guide the user for each subject:
   - “Enter subject 1 marks”
   - “Enter subject 2 marks”
   - “Enter subject 3 marks”
   - “Enter subject 4 marks”
   - “Enter subject 5 marks”
5. Input marks for all 5 subjects
6. Calculate total obtained marks by summing all 5 subjects’ marks
7. Calculate percentage using the formula:
8. Print the student’s name and the calculated percentage
9. Stop

Code:



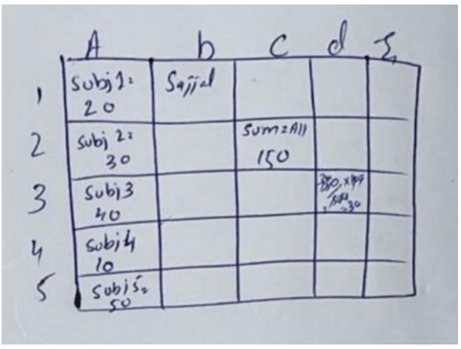
```cpp
#include <iostream>
using namespace std;
int main () {
int subject1,subject2,subject3,subject4,subject5,percentage,sum;
string studentName;
cout<<"student name"<<endl;
cin>>studentName;
cout<<"subject1 marks"<<endl;
cin>>subject1;
cout<<"subject2 marks"<<endl;
cin>>subject2;
cout<<"subject3 marks"<<endl;
cin>>subject3;
cout<<"subject4 marks"<<endl;
cin>>subject4;
cout<<"subject5 marks"<<endl;
cin>>subject5;
sum=subject1+subject2+subject3+subject4+subject5;
percentage+ sum/500*100;
cout<<"student name and percentage"<<endl;
return 0;
}
```

Terminal:



```
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> g++ q7.cpp -o .\q7.exe
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> .\q7.exe
student name
sajjal fayyaz
subject1 marks
subject2 marks
subject3 marks
subject4 marks
subject5 marks
student name and percentage
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> 
```

Memory diagram:



	A	b	c	d	Σ
1	subj1: 20	Sajjal			
2	subj 2: 30		sum=All 150		
3	subj3 40			150×100 /500 =30	
4	subj4 10				
5	subj5: 50				

QUESTION8:

ALGORITHM STEPS:

1. Start
2. Print “Enter the size of the fertilizer bag in pounds”
3. Input the size of the fertilizer bag (in pounds)
4. Print “Enter the cost of the bag”

5. Input the cost of the fertilizer bag

6. Print “Enter the area in square feet that can be covered by the bag”

7. Input the area covered (in square feet)

8. Calculate the cost per pound using the formula:

   Cost per pound = cost of the bag/size of the bag in pound

9. Calculate the cost per square foot using the formula:

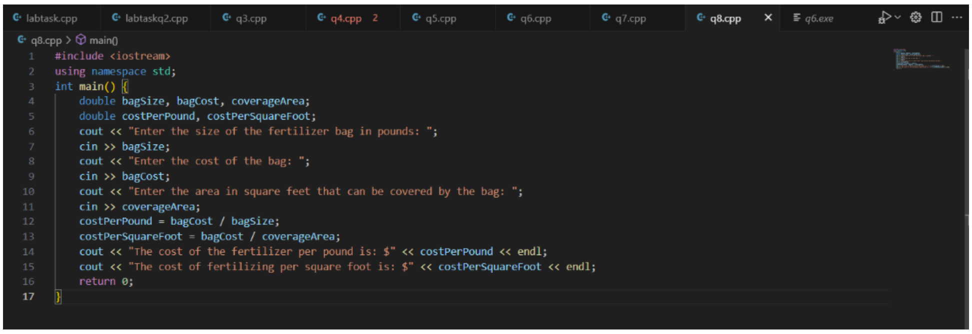
   Cost per square foot = cost of the bag/ area covered

10. Print the cost per pound

11. Print the cost per square foot

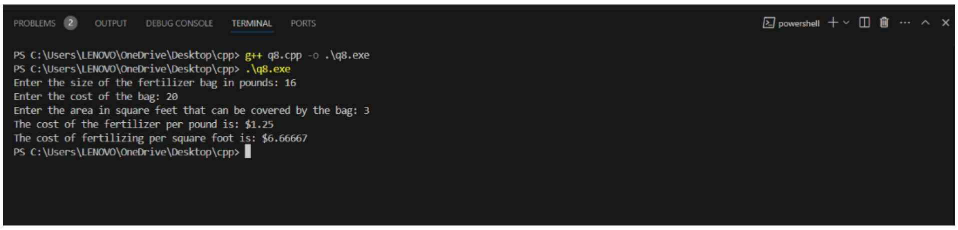
12. Stop

Code:



```cpp
#include <iostream>
using namespace std;
int main() {
    double bagSize, bagCost, coverageArea;
    double costPerPound, costPerSquareFoot;
    cout << "Enter the size of the fertilizer bag in pounds: ";
    cin >> bagSize;
    cout << "Enter the cost of the bag: ";
    cin >> bagCost;
    cout << "Enter the area in square feet that can be covered by the bag: ";
    cin >> coverageArea;
    costPerPound = bagCost / bagSize;
    costPerSquareFoot = bagCost / coverageArea;
    cout << "The cost of the fertilizer per pound is: $" << costPerPound << endl;
    cout << "The cost of fertilizing per square foot is: $" << costPerSquareFoot << endl;
    return 0;
}
```

Terminal:



```
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> g++ q8.cpp -o .\q8.exe
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> .\q8.exe
Enter the size of the fertilizer bag in pounds: 16
Enter the cost of the bag: 20
Enter the area in square feet that can be covered by the bag: 3
The cost of the fertilizer per pound is: $1.25
The cost of fertilizing per square foot is: $6.66667
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> 
```

QUESTION 9:

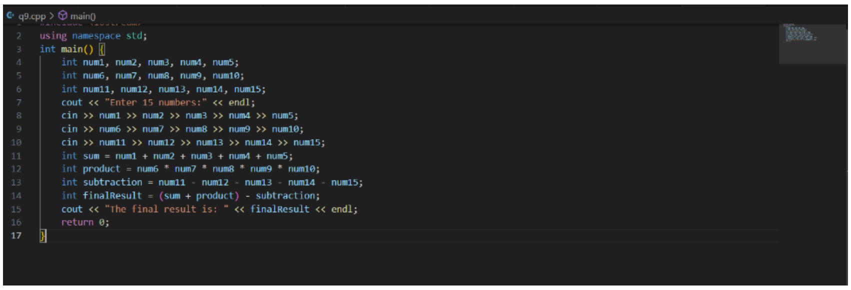
ALGORITHM STEPS:

1. Start

2. Input 15 numbers
    - Num1
    - Num2
    - Num3
    - Num4
    - Num5
    - Num6
    - Num7
    - Num8
    - Num9
    - Num10
    - Num11
    - Num12
    - Num13
    - Num14
    - Num15

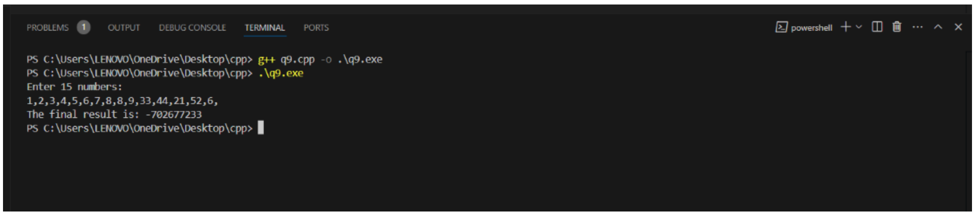
3. Calculate first 5 numbers to get sum
4. Calculate next 5 numbers to get multiply
5. Calculate last 5 numbers to get substract
6. Calculate all values to get final result
7. Print final result on screen
8. Stop

Code:



```
using namespace std;
int main() {
    int num1, num2, num3, num4, num5;
    int num6, num7, num8, num9, num10;
    int num11, num12, num13, num14, num15;
    cout << "Enter 15 numbers:" << endl;
    cin >> num1 >> num2 >> num3 >> num4 >> num5;
    cin >> num6 >> num7 >> num8 >> num9 >> num10;
    cin >> num11 >> num12 >> num13 >> num14 >> num15;
    int sum = num1 + num2 + num3 + num4 + num5;
    int product = num6 * num7 * num8 * num9 * num10;
    int subtraction = num11 - num12 - num13 - num14 - num15;
    int finalResult = (sum + product) - subtraction;
    cout << "The final result is: " << finalResult << endl;
    return 0;
}
```

Terminal:



```
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> g++ q9.cpp -o .\q9.exe
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> .\q9.exe
Enter 15 numbers:
1,2,3,4,5,6,7,8,8,9,33,44,21,52,6,
The final result is: -702677233
PS C:\Users\LENOVO\OneDrive\Desktop\cpp>
```

QUESTION10:

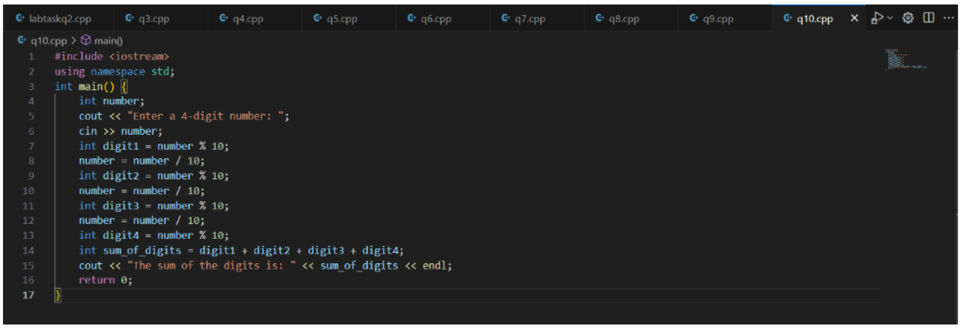
ALGORITHMS STEPS:

1. Input the 4-digit number from the user.
2. Initialize a variable sum to 0, which will store the sum of the digits.
3. Extract the digits one by one using the modulus and division operators:

- Get the rightmost digit using the modulus operator (% 10).
- Add the extracted digit to the sum.
- Remove the rightmost digit by performing integer division (// 10).

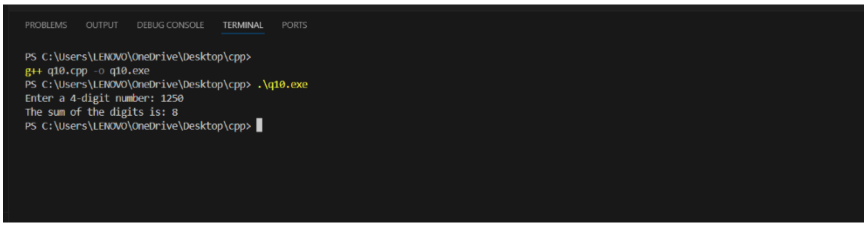
4. Repeat step 3 until the number is reduced to 0.
5. Output the sum of the digits**.**

Code:



```cpp
#include <iostream>
using namespace std;
int main() {
    int number;
    cout << "Enter a 4-digit number: ";
    cin >> number;
    int digit1 = number % 10;
    number = number / 10;
    int digit2 = number % 10;
    number = number / 10;
    int digit3 = number % 10;
    number = number / 10;
    int digit4 = number % 10;
    int sum_of_digits = digit1 + digit2 + digit3 + digit4;
    cout << "The sum of the digits is: " << sum_of_digits << endl;
    return 0;
}
```

Terminal:



```
PS C:\Users\LENOVO\OneDrive\Desktop\cpp>
g++ q10.cpp -o q10.exe
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> .\q10.exe
Enter a 4-digit number: 1250
The sum of the digits is: 8
PS C:\Users\LENOVO\OneDrive\Desktop\cpp>
```

QUESTION11:

ALGORITHM STEPS:

1. Input the number from the user.

2. Initialize a variable reverse_number to 0, which will store the reversed number.

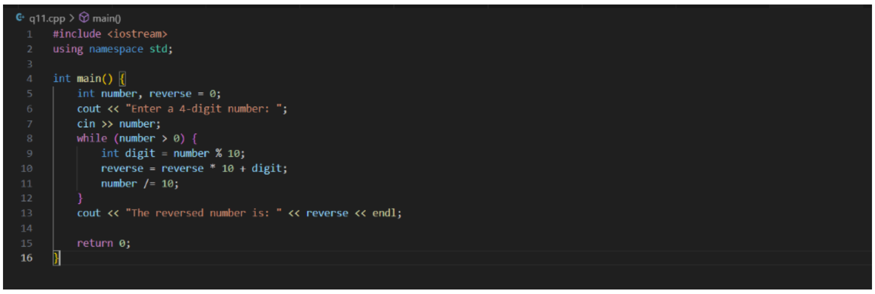
3. Extract the digits one by one from the right:

- Use the modulus operator (% 10) to get the rightmost digit.
- Add the extracted digit to reverse_number after multiplying reverse_number by 10 (to shift left).
- Remove the rightmost digit from the original number using integer division (// 10).

4. Repeat step 3 until the number becomes 0.

5. Output the reversed number.

Code:

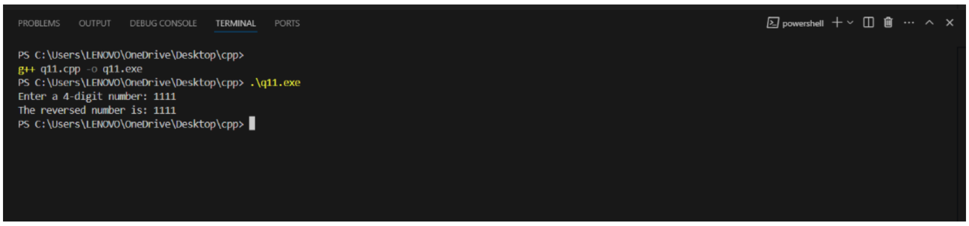


```cpp
#include <iostream>
using namespace std;

int main() {
    int number, reverse = 0;
    cout << "Enter a 4-digit number: ";
    cin >> number;
    while (number > 0) {
        int digit = number % 10;
        reverse = reverse * 10 + digit;
        number /= 10;
    }
    cout << "The reversed number is: " << reverse << endl;

    return 0;
}
```

Terminal:



```
PS C:\Users\LENOVO\OneDrive\Desktop\cpp>
g++ q11.cpp -o q11.exe
PS C:\Users\LENOVO\OneDrive\Desktop\cpp> .\q11.exe
Enter a 4-digit number: 1111
The reversed number is: 1111
PS C:\Users\LENOVO\OneDrive\Desktop\cpp>
```