DAYANANDA SAGAR UNIVERSITY

SCHOOL OF ENGINEERING

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USN: **ENG24AD0001**

ROLL NO. - **01**

COURSE: **DSA-DATA STRUCTURES & ALGORITHMS IN C**

COURSE CODE :

B.TECH IN CSE - AI & DS PROGRAM

1. A

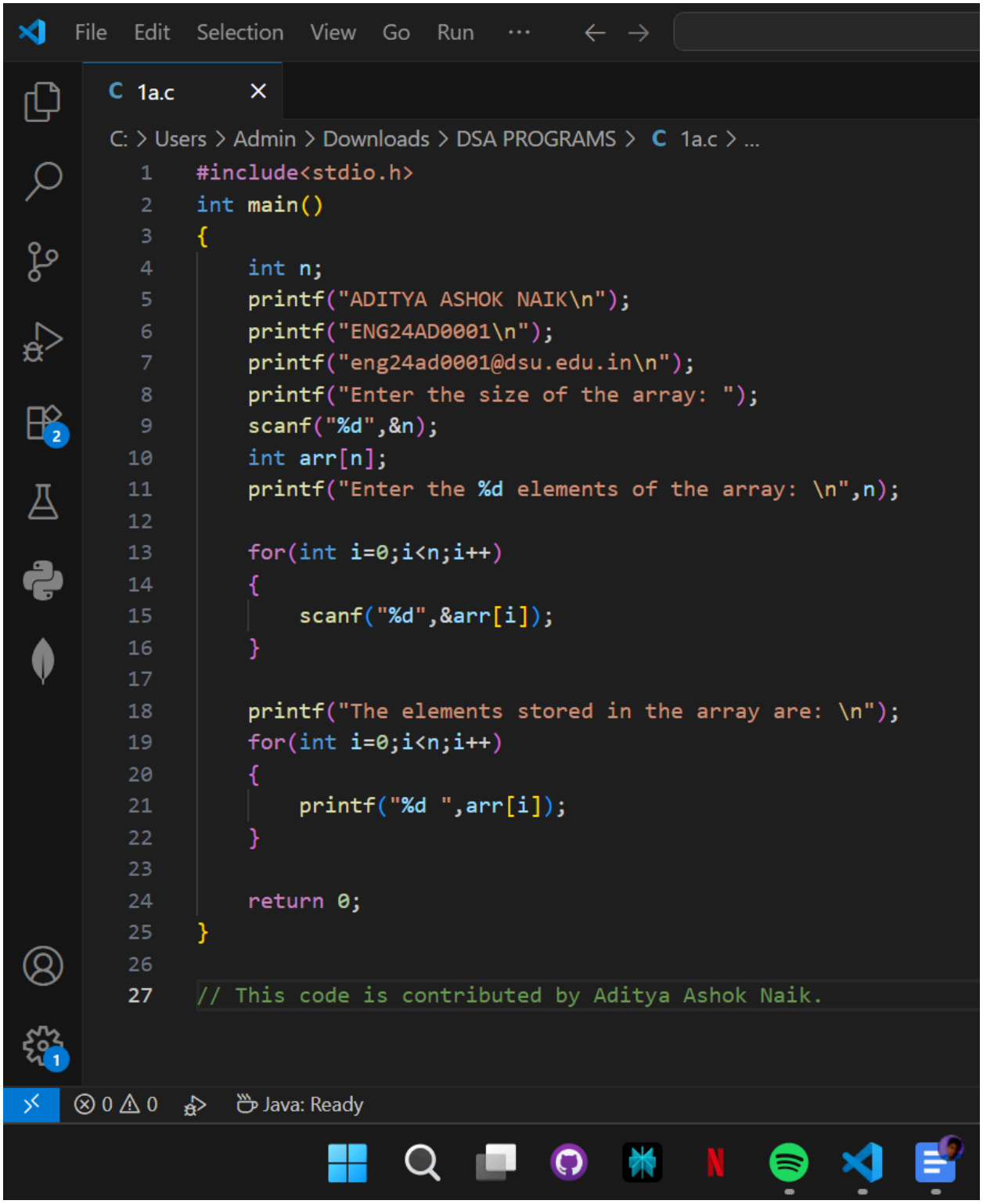
PROGRAM 1A (Question Statement)-

- Write a C program to implement an array of fixed dimension. Perform the following operations: insert an element into an array and display the contents of an array.
- (Note: user input is required to enter the size of an array.)

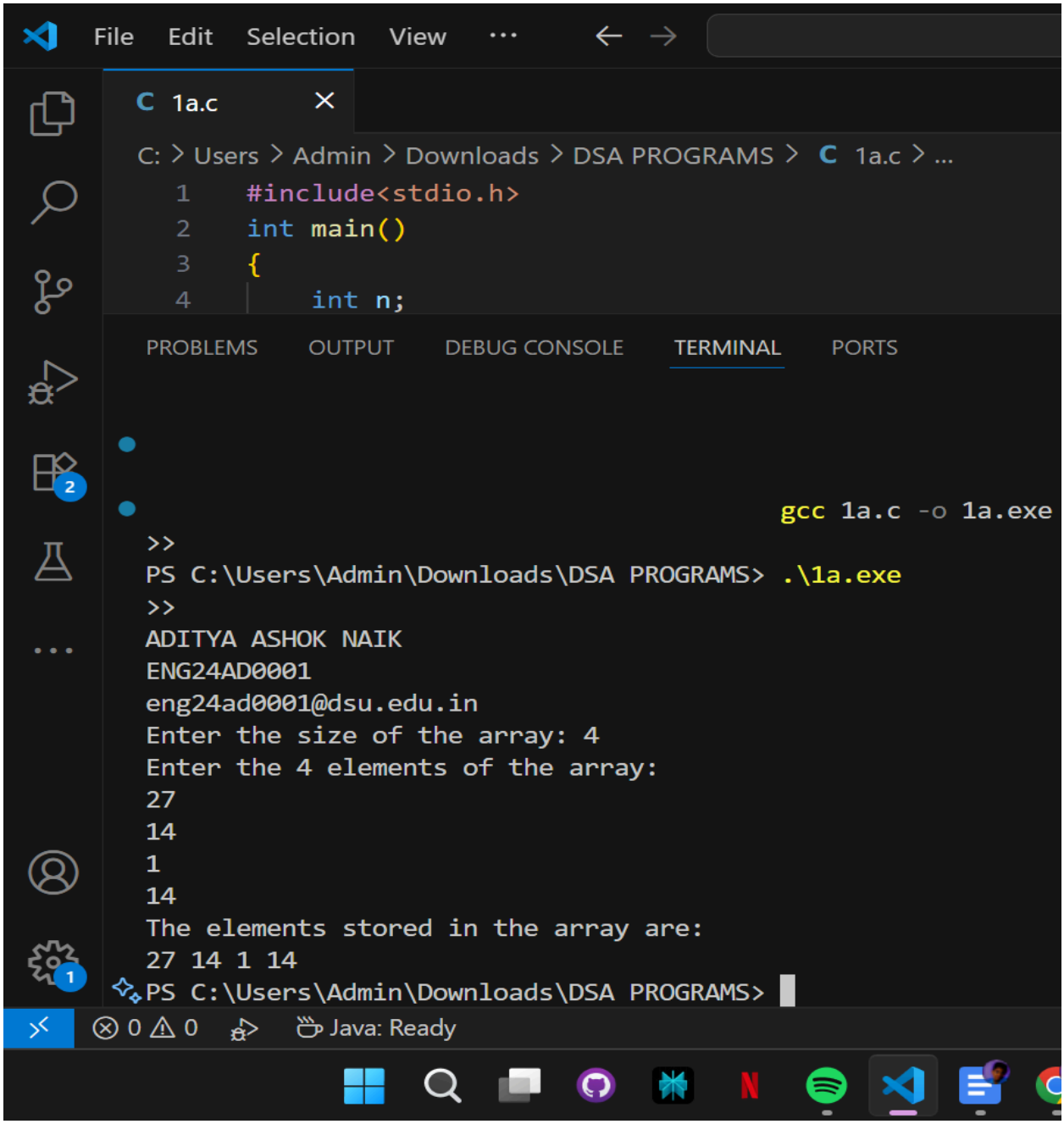
ALGORITHM:

1. START
2. Input the size of the array from the user.
3. Read the elements from the user.
4. Prompt the user to enter the elements of the array with respect to their position in the array.
5. Shift the element from the given position to one step right.
6. Insert the new element at the respective position.
7. Display the contents of the array and execute the program.
8. STOP

SOURCE CODE :


File Edit Selection View Go Run ···
1a.c
C: > Users > Admin > Downloads > DSA PROGRAMS > C 1a.c > ...
#include<stdio.h>
int main()
{
int n;
printf("ADITYA ASHOK NAIK\n");
printf("ENG24AD0001\n");
printf("eng24ad0001@dsu.edu.in\n");
printf("Enter the size of the array: ");
scanf("%d",&n);
int arr[n];
printf("Enter the %d elements of the array: \n",n);
for(int i=0;i<n;i++)
{
scanf("%d",&arr[i]);
}
printf("The elements stored in the array are: \n");
for(int i=0;i<n;i++)
{
printf("%d ",arr[i]);
}
return 0;
}
// This code is contributed by Aditya Ashok Naik.
0 0
Java: Ready

RESULT :



HENCE, this program successfully inserts and simultaneously displays the elements in the array.

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1. B

PROGRAM 1. B : To Evaluate the Number Plate of Vehicles.

(Question Statement)

Write a C program to insert a vehicle registration number into a 1 times 10 (1*10) array to apply the strict conventional rules of the vehicle number plate registration as follows -

- **The first 2 positions of the array must be filled with the state name.**
- **The next two positions are the district code.**
- **Followed by the next 2 positions with serial numbers of characters and the penultimate with the number of the vehicle.**
- **KA-09-MN-3865**
- **The program needs to verify the registration of a vehicle in the same format and print the registration of a vehicle in the same format.**
- **Accept or reject with a proper message**
- **Rules to check-**
    - ***The first 2 positions are the state code.***
    - ***The next 2 positions of the array must be the district code.***
    - ***The next 2 positions are the serial number provided by the RTO.***
    - ***Penultimate r position of an array must be a vehicle number.***

Algorithm :

1. START
2. Declare the 1*10 char array to store the registration number.
3. Input the registration number from the user.
4. Check the following-
    a. First 2 chars should be the uppercase alphabet(State code).
    b. Next 2 characters must be digits - district.
    c. Next 2 characters must be uppercase letters - RTO Serial Code.
    d. Last 2 characters must be digits - vehicle no.

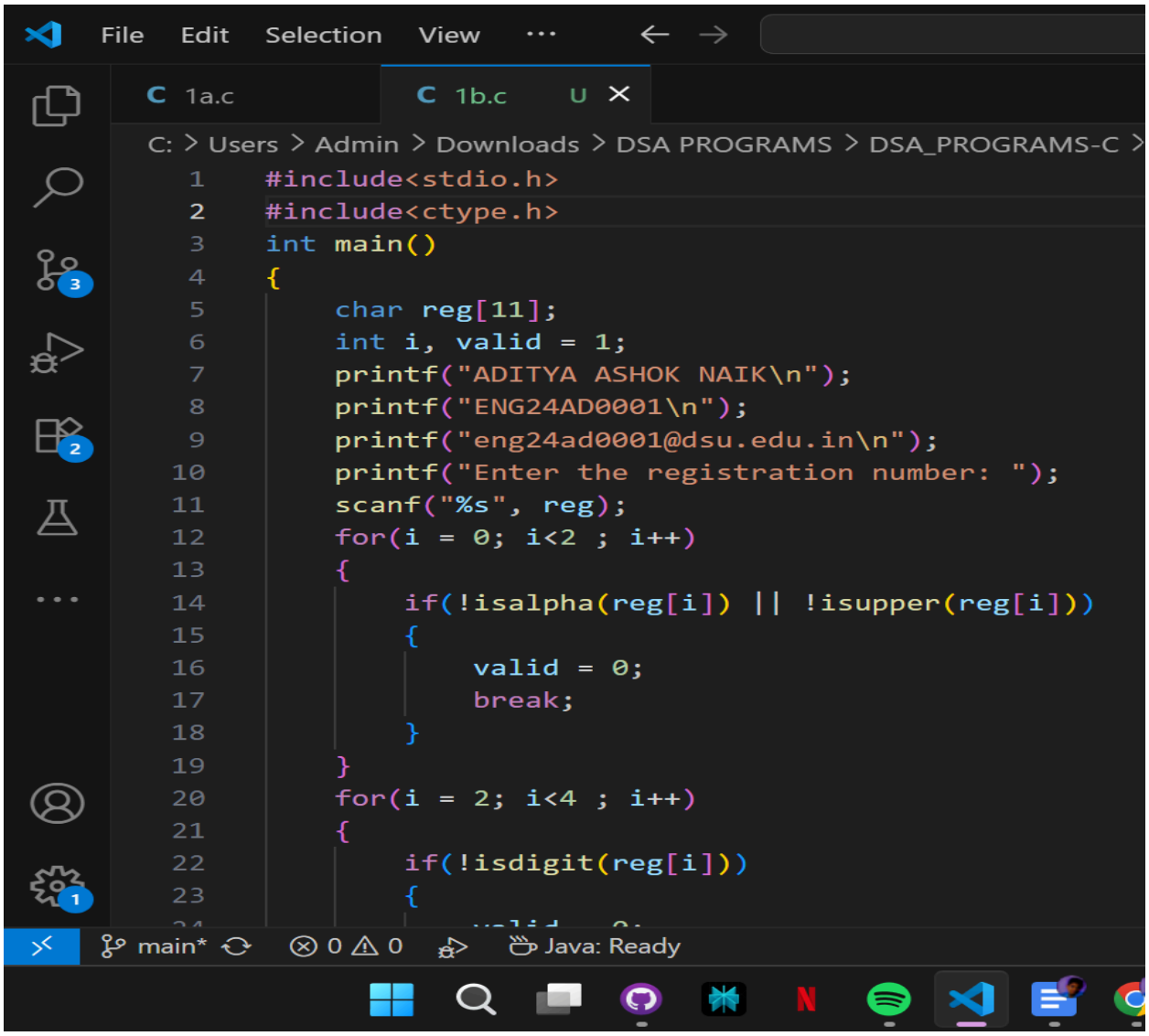
5. If all conditions are met, print “Accept”.
6. Else print “Reject”, and revoke.
7. STOP

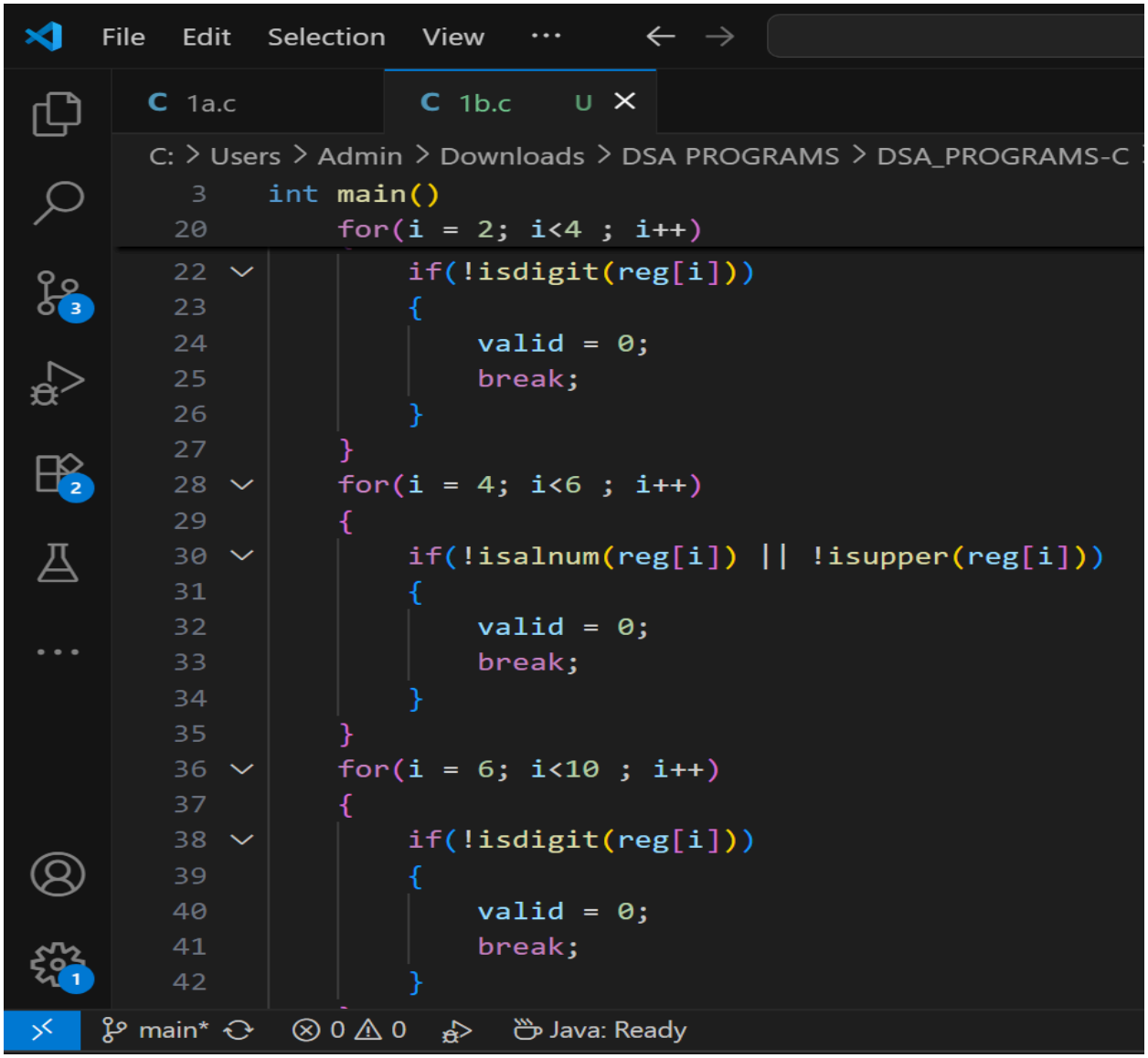
SAMPLE OUTPUT -

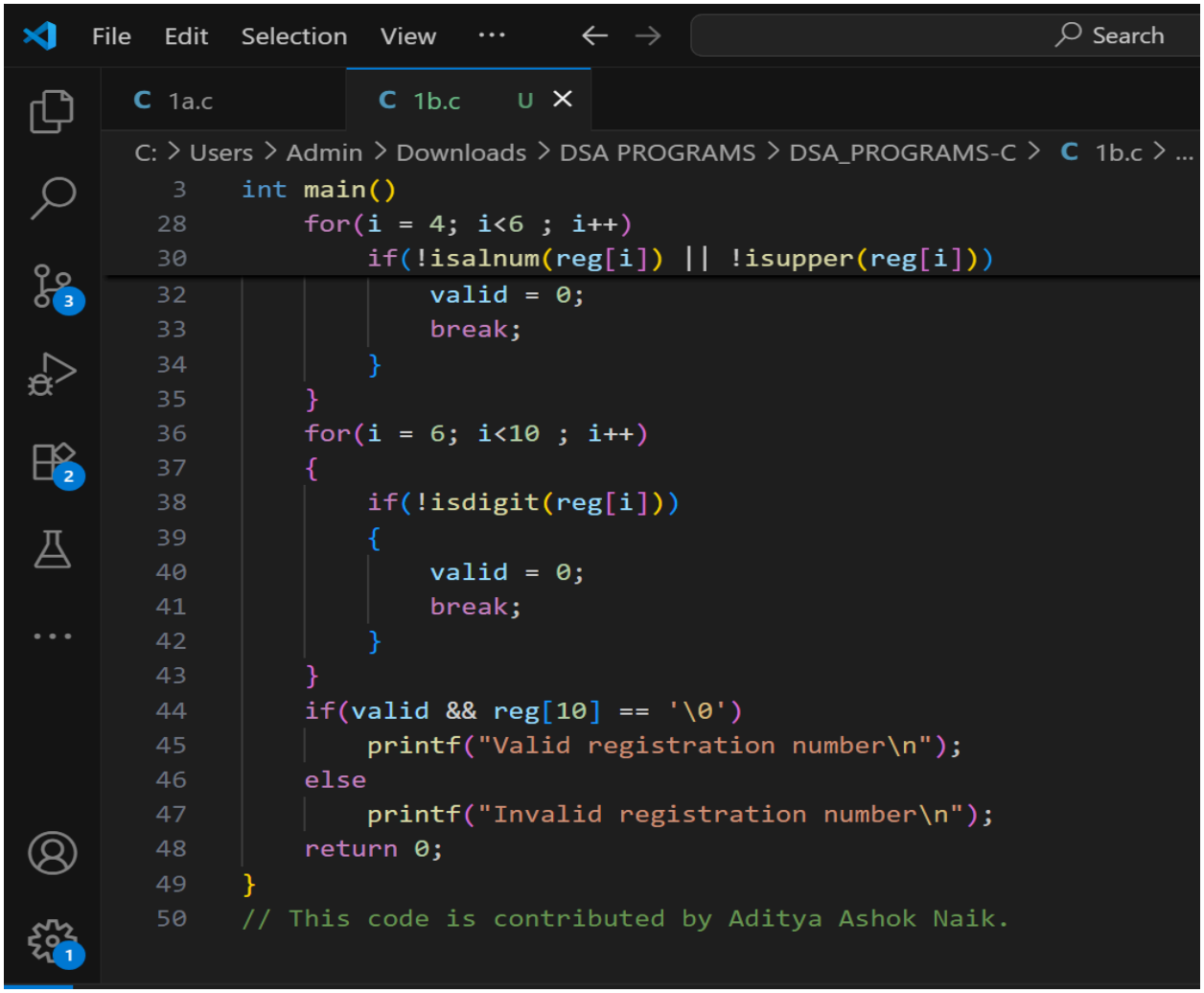
Enter a vehicle number - KA09MN3865
ACCEPT- vehicle registration is valid.

Enter a vehicle number - KAABMN3865
REJECT

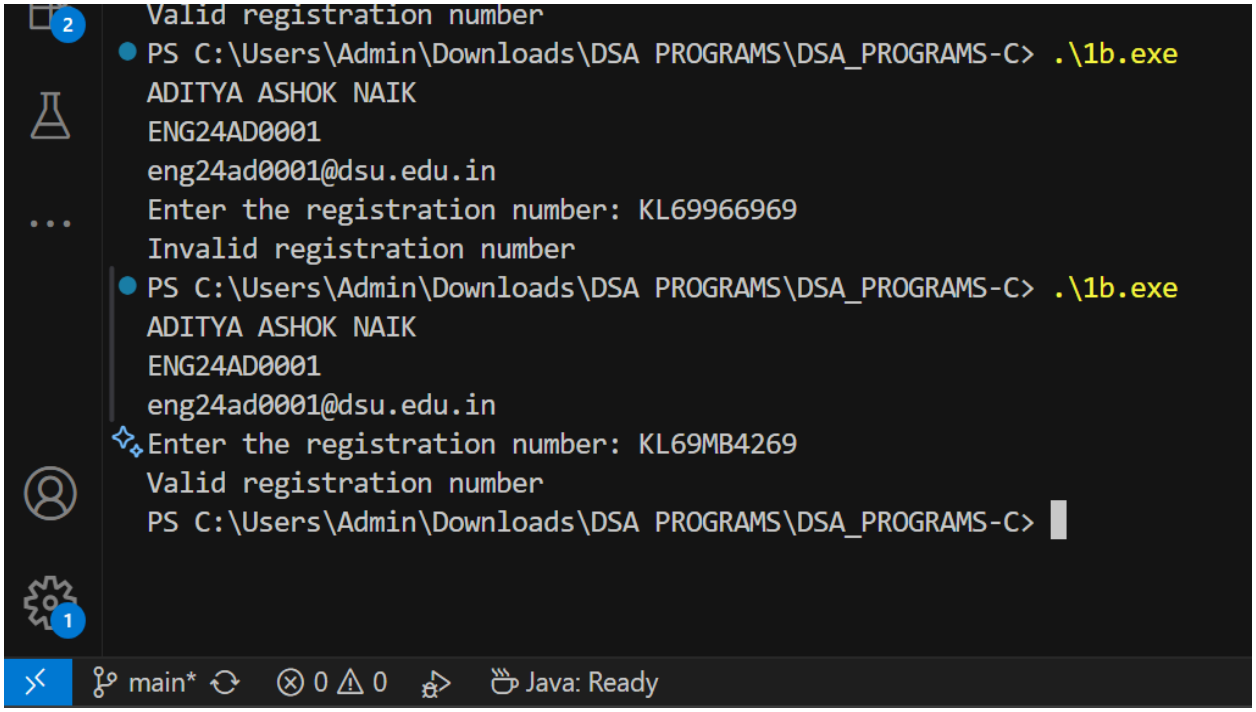
SOURCE CODE -

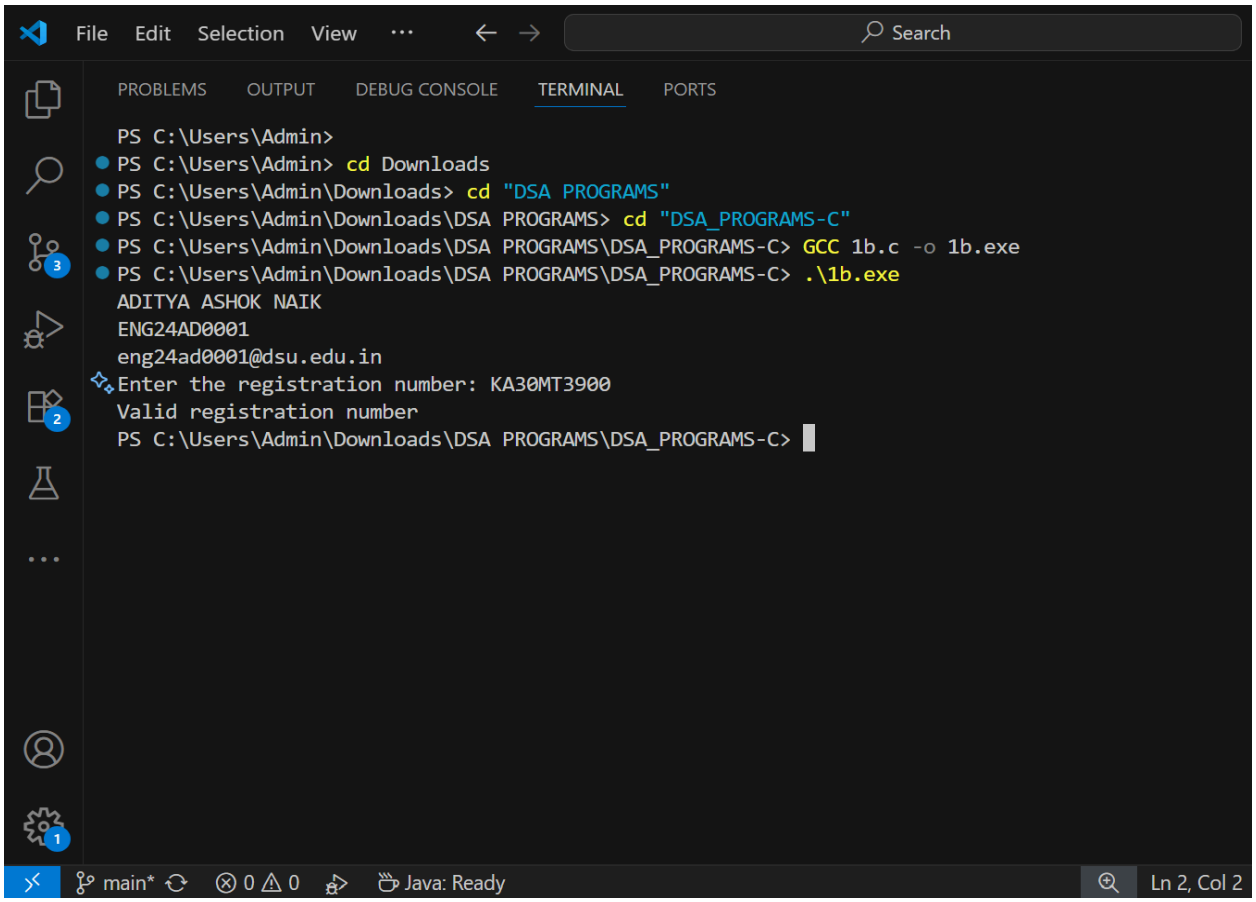

File
Edit
Selection
View
1a.c
1b.c
U
C: > Users > Admin > Downloads > DSA PROGRAMS > DSA_PROGRAMS-C >
#include<stdio.h>
#include<ctype.h>
int main()
{
char reg[11];
int i, valid = 1;
printf("ADITYA ASHOK NAIK\n");
printf("ENG24AD0001\n");
printf("eng24ad0001@dsu.edu.in\n");
printf("Enter the registration number: ");
scanf("%s", reg);
for(i = 0; i<2 ; i++)
{
if(!isalpha(reg[i]) || !isupper(reg[i]))
{
valid = 0;
break;
}
}
for(i = 2; i<4 ; i++)
{
if(!isdigit(reg[i]))
{
main*
0 0
Java: Ready


File
Edit
Selection
View
1a.c
1b.c
U
C: > Users > Admin > Downloads > DSA PROGRAMS > DSA_PROGRAMS-C
3 int main()
20 for(i = 2; i<4 ; i++)
22 if(!isdigit(reg[i]))
23 {
24 valid = 0;
25 break;
26 }
27 }
28 for(i = 4; i<6 ; i++)
29 {
30 if(!isalnum(reg[i]) || !isupper(reg[i]))
31 {
32 valid = 0;
33 break;
34 }
35 }
36 for(i = 6; i<10 ; i++)
37 {
38 if(!isdigit(reg[i]))
39 {
40 valid = 0;
41 break;
42 }
main*
0 0
Java: Ready


File
Edit
Selection
View
Search
1a.c
1b.c
U
C: > Users > Admin > Downloads > DSA PROGRAMS > DSA_PROGRAMS-C > 1b.c > ...
3 int main()
28 for(i = 4; i<6 ; i++)
30 if(!isalnum(reg[i]) || !isupper(reg[i]))
32 valid = 0;
33 break;
34 }
35 }
36 for(i = 6; i<10 ; i++)
37 {
38 if(!isdigit(reg[i]))
39 {
40 valid = 0;
41 break;
42 }
43 }
44 if(valid && reg[10] == '\0')
45 printf("Valid registration number\n");
46 else
47 printf("Invalid registration number\n");
48 return 0;
49 }
50 // This code is contributed by Aditya Ashok Naik.

RESULT -


Valid registration number
PS C:\Users\Admin\Downloads\DSA PROGRAMS\DSA_PROGRAMS-C> .\1b.exe
ADITYA ASHOK NAIK
ENG24AD0001
eng24ad0001@dsu.edu.in
Enter the registration number: KL69966969
Invalid registration number
PS C:\Users\Admin\Downloads\DSA PROGRAMS\DSA_PROGRAMS-C> .\1b.exe
ADITYA ASHOK NAIK
ENG24AD0001
eng24ad0001@dsu.edu.in
Enter the registration number: KL69MB4269
Valid registration number
PS C:\Users\Admin\Downloads\DSA PROGRAMS\DSA_PROGRAMS-C>
main*
0 0
Java: Ready


File
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Search
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
PS C:\Users\Admin>
PS C:\Users\Admin> cd Downloads
PS C:\Users\Admin\Downloads> cd "DSA PROGRAMS"
PS C:\Users\Admin\Downloads\DSA PROGRAMS> cd "DSA_PROGRAMS-C"
PS C:\Users\Admin\Downloads\DSA PROGRAMS\DSA_PROGRAMS-C> GCC 1b.c -o 1b.exe
PS C:\Users\Admin\Downloads\DSA PROGRAMS\DSA_PROGRAMS-C> .\1b.exe
ADITYA ASHOK NAIK
ENG24AD0001
eng24ad0001@dsu.edu.in
Enter the registration number: KA30MT3900
Valid registration number
PS C:\Users\Admin\Downloads\DSA PROGRAMS\DSA_PROGRAMS-C>
main*
0 0
Java: Ready
Ln 2, Col 2

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2. A

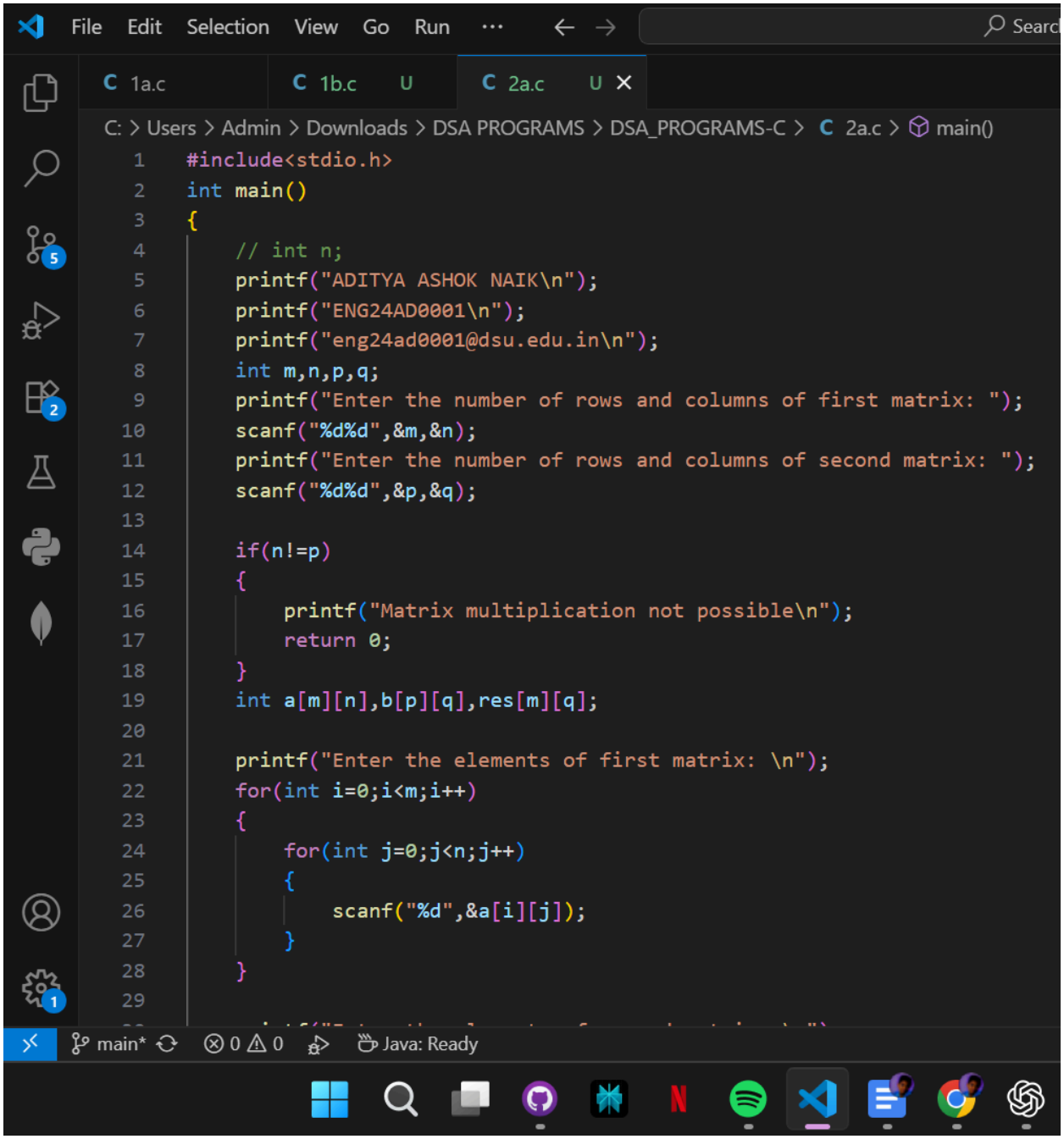
PROGRAM 2. A- Program that multiplies 2 matrices, ensuring that the number of columns in the 1st matrix is equal to the number of rows in the second matrix. Display the Resulting matrix.

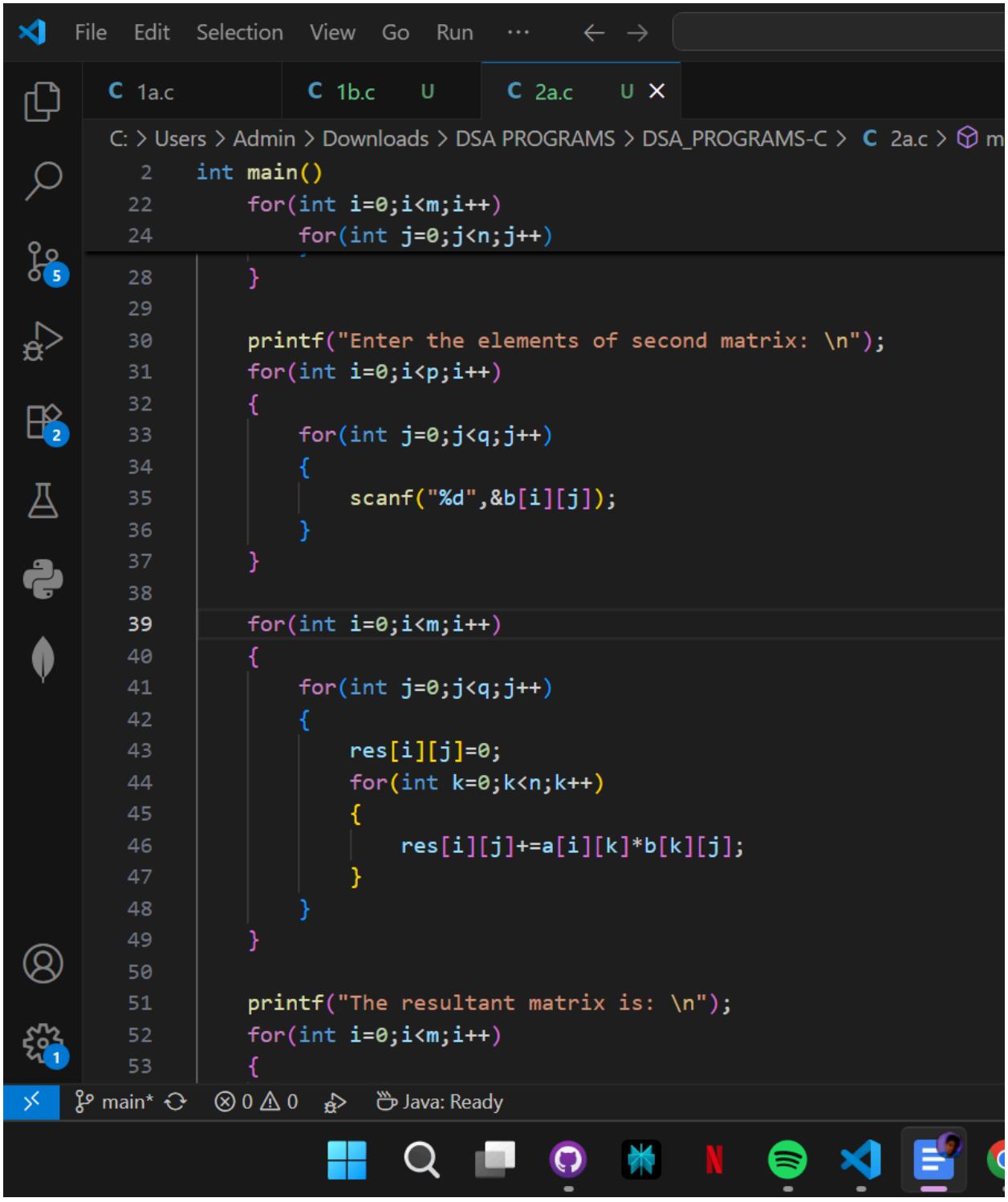
(Prompt the user to enter the size of the array.)

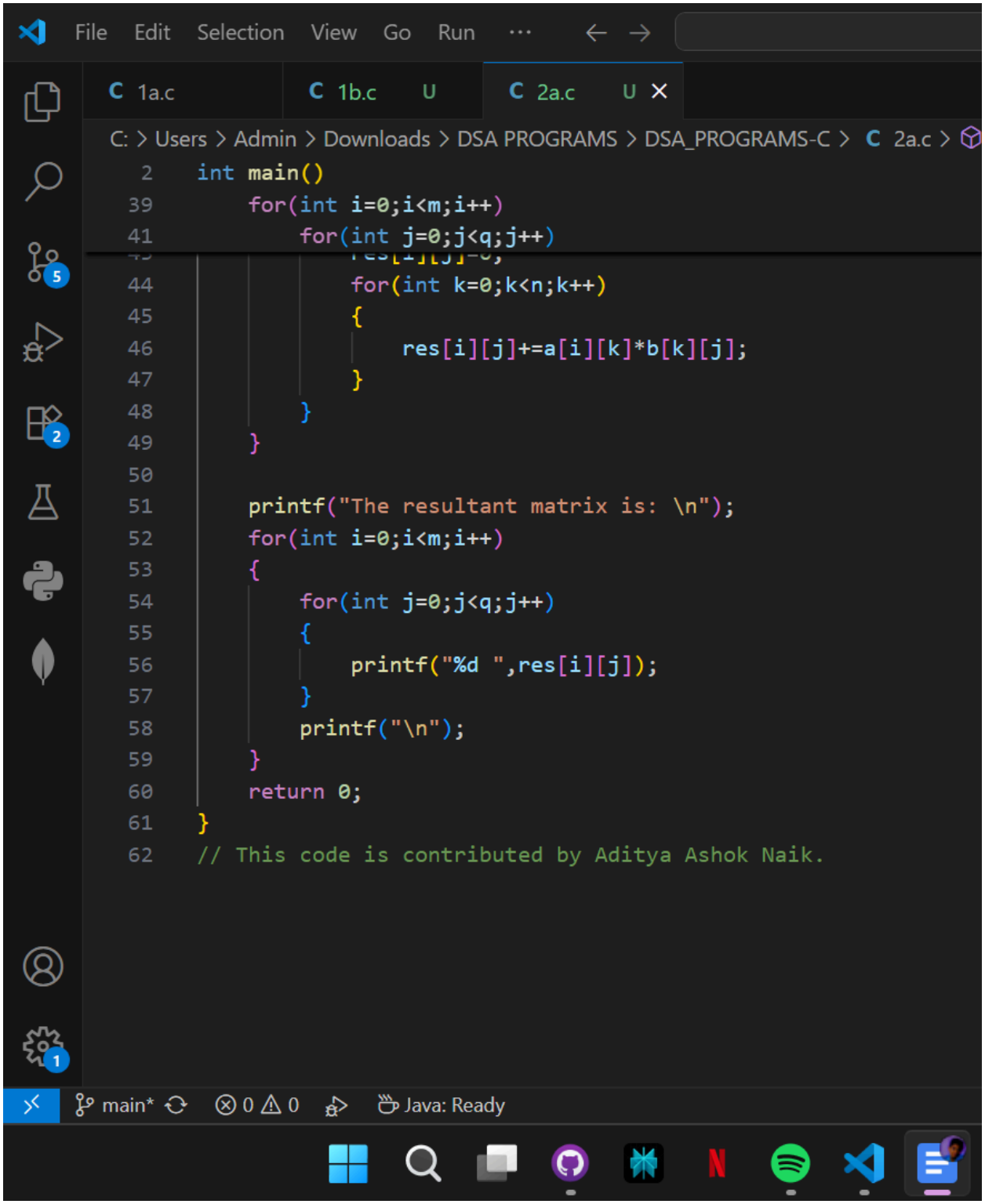
Algorithm -

1. START
2. Input the sizes of the 2 arrays-
    a. Enter the number of rows(r1) and columns(c1) for the 1st matrix.
    b. Enter the number of rows(r2) and columns(c2) for the 2nd matrix.
3. Check condition-
    a. If c1!=r2, Display that matrix multiplication is not possible.
4. Read the elements of the 1st matrix(A[r1][c1])
5. Read the elements of the 2nd matrix(B[r2][c2])
6. Initialize the result matrix with all zeroes.
7. Multiplication of matrices using nested loops.
        i. For each row i from 0 to r1-1
        ii. For each column j from 0 to c2-1
    b. c[i][j]= c[i][j] + (A[i][k] * B[k][j])
8. Display the resultant matrix
9. STOP

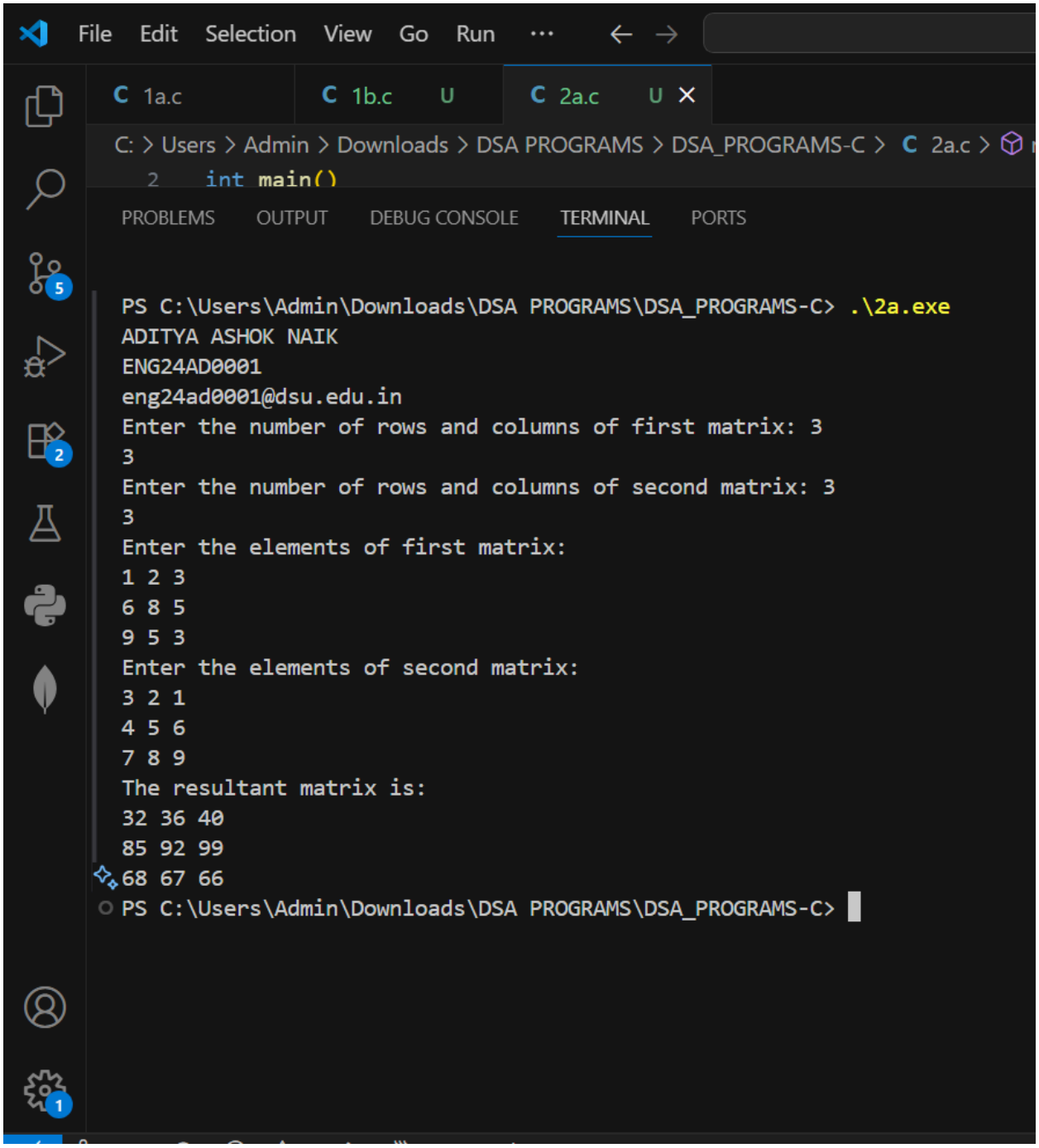
SOURCE CODE -


File Edit Selection View Go Run
1a.c
1b.c U
2a.c U
C: > Users > Admin > Downloads > DSA PROGRAMS > DSA_PROGRAMS-C > 2a.c > main()
#include<stdio.h>
int main()
{
// int n;
printf("ADITYA ASHOK NAIK\n");
printf("ENG24AD0001\n");
printf("eng24ad0001@dsu.edu.in\n");
int m,n,p,q;
printf("Enter the number of rows and columns of first matrix: ");
scanf("%d%d",&m,&n);
printf("Enter the number of rows and columns of second matrix: ");
scanf("%d%d",&p,&q);
if(n!=p)
{
printf("Matrix multiplication not possible\n");
return 0;
}
int a[m][n],b[p][q],res[m][q];
printf("Enter the elements of first matrix: \n");
for(int i=0;i<m;i++)
{
for(int j=0;j<n;j++)
{
scanf("%d",&a[i][j]);
}
}
main*
0 0
Java: Ready


File Edit Selection View Go Run ···
1a.c
1b.c U
2a.c U
C: > Users > Admin > Downloads > DSA PROGRAMS > DSA_PROGRAMS-C > 2a.c > m
int main()
for(int i=0;i<m;i++)
for(int j=0;j<n;j++)
}
printf("Enter the elements of second matrix: \n");
for(int i=0;i<p;i++)
{
for(int j=0;j<q;j++)
{
scanf("%d",&b[i][j]);
}
}
for(int i=0;i<m;i++)
{
for(int j=0;j<q;j++)
{
res[i][j]=0;
for(int k=0;k<n;k++)
{
res[i][j]+=a[i][k]*b[k][j];
}
}
}
printf("The resultant matrix is: \n");
for(int i=0;i<m;i++)
{
main*
0 0
Java: Ready


File Edit Selection View Go Run ···
1a.c
1b.c U
2a.c U
C: > Users > Admin > Downloads > DSA PROGRAMS > DSA_PROGRAMS-C > 2a.c >
int main()
for(int i=0;i<m;i++)
for(int j=0;j<q;j++)
for(int k=0;k<n;k++)
{
res[i][j]+=a[i][k]*b[k][j];
}
}
}
printf("The resultant matrix is: \n");
for(int i=0;i<m;i++)
{
for(int j=0;j<q;j++)
{
printf("%d ",res[i][j]);
}
printf("\n");
}
return 0;
}
// This code is contributed by Aditya Ashok Naik.
main* 0 0 Java: Ready

RESULT-


File Edit Selection View Go Run
1a.c
1b.c U
2a.c U
C: > Users > Admin > Downloads > DSA PROGRAMS > DSA_PROGRAMS-C > 2a.c
2 int main()
PROBLEMS OUTPUT DEBUG CONSOLE TERMINAL PORTS
PS C:\Users\Admin\Downloads\DSA PROGRAMS\DSA_PROGRAMS-C> .\2a.exe
ADITYA ASHOK NAIK
ENG24AD0001
eng24ad0001@dsu.edu.in
Enter the number of rows and columns of first matrix: 3
3
Enter the number of rows and columns of second matrix: 3
3
Enter the elements of first matrix:
1 2 3
6 8 5
9 5 3
Enter the elements of second matrix:
3 2 1
4 5 6
7 8 9
The resultant matrix is:
32 36 40
85 92 99
68 67 66
PS C:\Users\Admin\Downloads\DSA PROGRAMS\DSA_PROGRAMS-C>