



**ULAB**  
UNIVERSITY OF LIBERAL ARTS  
BANGLADESH

## **Lab Report 5**

Fall 2024

**Course Title: Structured Programming Lab**

**Course Code: CSE 1202 (Fall 2024)**

**Submitted by:**

**Student Name and ID**

Md. Tazminur Rahman Tanim (242014124)

**Department of CSE**

**University of Liberal Arts Bangladesh (ULAB)**

1. Write a program to print the following series up to n terms where n is a user input.  
(1) + (1+2) + (1+2+3) + (1+2+3+4) + (1+2+3+4+5) + .....

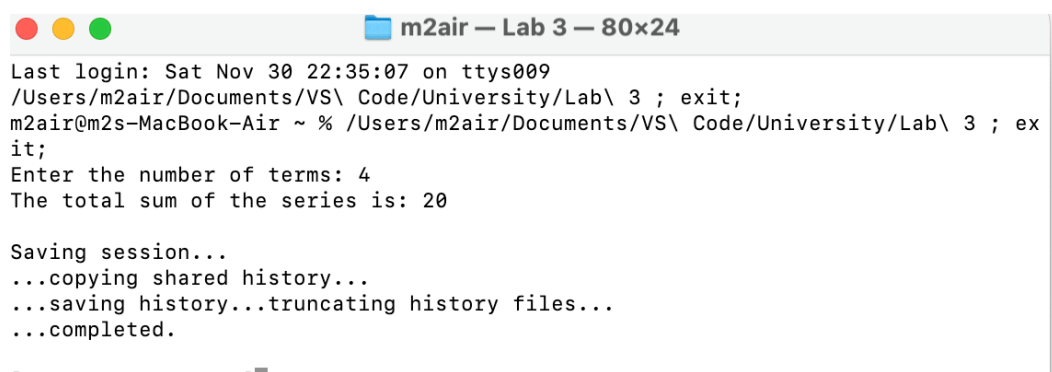
Answer :

**Algorithm:**

1. Take n (number of terms) as input.
2. Use nested loops: Outer loop for iterating through each term, Inner loop for calculating the sum of numbers for each term.
3. Add the partial sums to the total.

Code
<pre>#include &lt;stdio.h&gt;  int main() {     int n, i, j, sum = 0, partial_sum;      printf("Enter the number of terms: ");     scanf("%d", &amp;n);      for (i = 1; i &lt;= n; i++) {         partial_sum = 0;         for (j = 1; j &lt;= i; j++) {             partial_sum += j;         }         sum += partial_sum;     }      printf("The total sum of the series is: %d\n", sum);     return 0; }</pre>

Output Result :



```
m2air — Lab 3 — 80x24
Last login: Sat Nov 30 22:35:07 on ttys009
/Users/m2air/Documents/VS\ Code/University/Lab\ 3 ; exit;
m2air@m2s-MacBook-Air ~ % /Users/m2air/Documents/VS\ Code/University/Lab\ 3 ; ex
it;
Enter the number of terms: 4
The total sum of the series is: 20

Saving session...
...copying shared history...
...saving history...truncating history files...
...completed.

--
```

2. Write separate programs to print the following patterns taking number of rows as user input

(a)	(b)	(c)
* _ _ _ _	a	1
* * _ _ _	ab	2 3
* * * _ _	abc	4 5 6
* * * * _	abcd	7 8 9 10
* * * * *	abcde	

a)

Answer :

**Algorithm:**

1. Input the number of rows (n).
2. Loop through i from 1 to n (for each row): i) Print \* i times. ii) Print \_ (n - i) times.

Code
<pre>#include &lt;stdio.h&gt;  int main() {     int n, i, j;      printf("Enter the number of rows: ");     scanf("%d", &amp;n);      for (i = 1; i &lt;= n; i++) {         for (j = 1; j &lt;= i; j++) {             printf("* ");         }         for (j = 1; j &lt;= n - i; j++) {             printf("_ ");         }         printf("\n");     }      return 0; }</pre>

```
Last login: Sat Nov 30 22:37:30 on ttys009
/Users/m2air/Documents/VS\ Code/University/Lab\ 3 ; exit;
m2air@m2s-MacBook-Air ~ % /Users/m2air/Documents/VS\ Code/University/Lab\ 3 ; ex
it;
Enter the number of rows: 5
* _ _ _ _
* * _ _ _
* * * _ _
* * * * _
* * * * *

Saving session...
...copying shared history...
...saving history...truncating history files...
...completed.

[Process completed]
```

b)

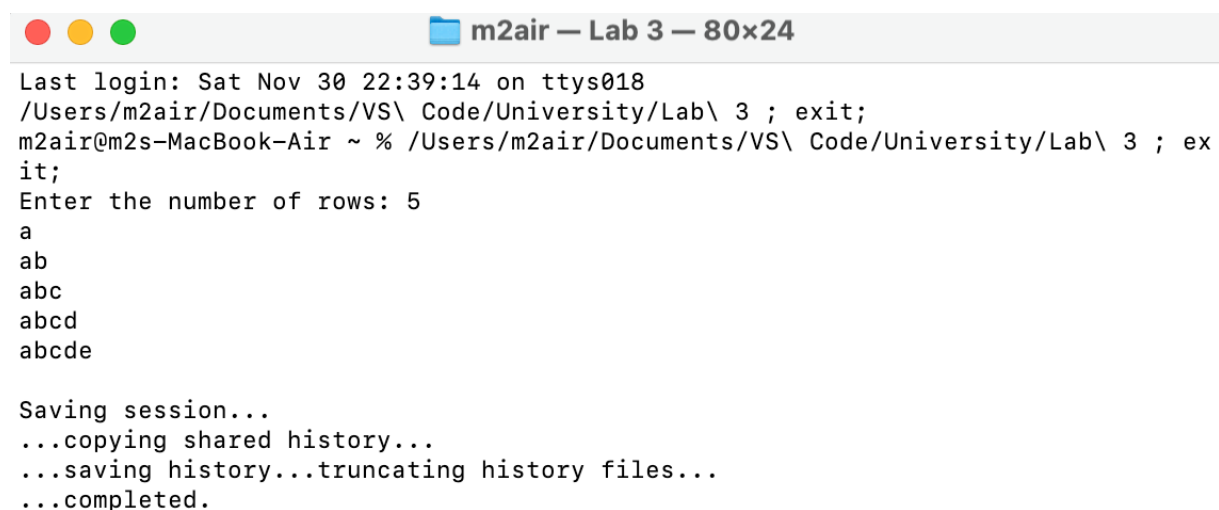
Answer :

**Algorithm:**

1. Input the number of rows (n).
2. Loop through i from 1 to n (for each row): i) Loop through j from 1 to i. ii) Print the characters 'a' + j - 1.

Code
<pre>#include &lt;stdio.h&gt;  int main() {     int n, i, j;      printf("Enter the number of rows: ");     scanf("%d", &amp;n);      for (i = 1; i &lt;= n; i++) {         for (j = 1; j &lt;= i; j++) {             printf("%c", 'a' + j - 1);         }         printf("\n");     }      return 0; }</pre>

Output Result :



```
Last login: Sat Nov 30 22:39:14 on ttys018
/Users/m2air/Documents/VS\ Code/University/Lab\ 3 ; exit;
m2air@m2s-MacBook-Air ~ % /Users/m2air/Documents/VS\ Code/University/Lab\ 3 ; ex
it;
Enter the number of rows: 5
a
ab
abc
abcd
abcde

Saving session...
...copying shared history...
...saving history...truncating history files...
...completed.
```

c)

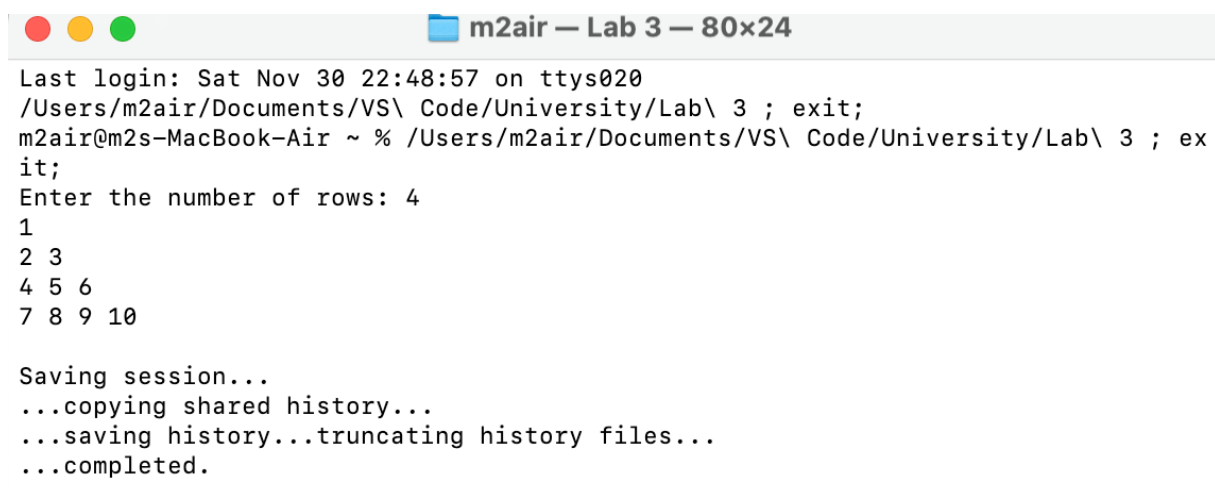
Answer :

**Algorithm:**

1. Input the number of rows (n).
2. Initialize a variable num = 1.
3. Loop through i from 1 to n (for each row):  
    Loop through j from 1 to i: Print the current value of num, Increment num.

Code
<pre>#include &lt;stdio.h&gt;  int main() {     int n, i, j, num = 1;      printf("Enter the number of rows: ");     scanf("%d", &amp;n);      for (i = 1; i &lt;= n; i++) {         for (j = 1; j &lt;= i; j++) {             printf("%d ", num);             num++;         }         printf("\n");     }      return 0; }</pre>

Output Result :



```
m2air - Lab 3 - 80x24
Last login: Sat Nov 30 22:48:57 on ttys020
/Users/m2air/Documents/VS\ Code/University/Lab\ 3 ; exit;
m2air@m2s-MacBook-Air ~ % /Users/m2air/Documents/VS\ Code/University/Lab\ 3 ; ex
it;
Enter the number of rows: 4
1
2 3
4 5 6
7 8 9 10

Saving session...
...copying shared history...
...saving history...truncating history files...
...completed.
```

3. Write separate programs to print the following patterns taking number of rows as user input

a)

```

*****
*****
*****
*****

```

b)

			1			
		1	2	3		
	1	2	3	4	5	
1	2	3	4	5	6	7

a)

Answer:

### Algorithm:

1. Input the number of rows (n).
2. Loop through i from n down to 1 (for each row):
  - Print \* i times.

Code
<pre>#include &lt;stdio.h&gt;  int main() {     int n, i, j;      printf("Enter the number of rows: ");     scanf("%d", &amp;n);      for (i = n; i &gt;= 1; i--) {         for (j = 1; j &lt;= i; j++) {             printf("*");         }         printf("\n");     }      return 0; }</pre>

Output Result :

```
m2air — Lab 3 — 80x24
Last login: Sat Nov 30 22:49:06 on ttys020
/Users/m2air/Documents/VS\ Code/University/Lab\ 3 ; exit;
m2air@m2s-MacBook-Air ~ % /Users/m2air/Documents/VS\ Code/University/Lab\ 3 ; ex
it;
Enter the number of rows: 4
****
***
**
*

Saving session...
...copying shared history...
...saving history...truncating history files...
...completed.

[Process completed]
```

b)

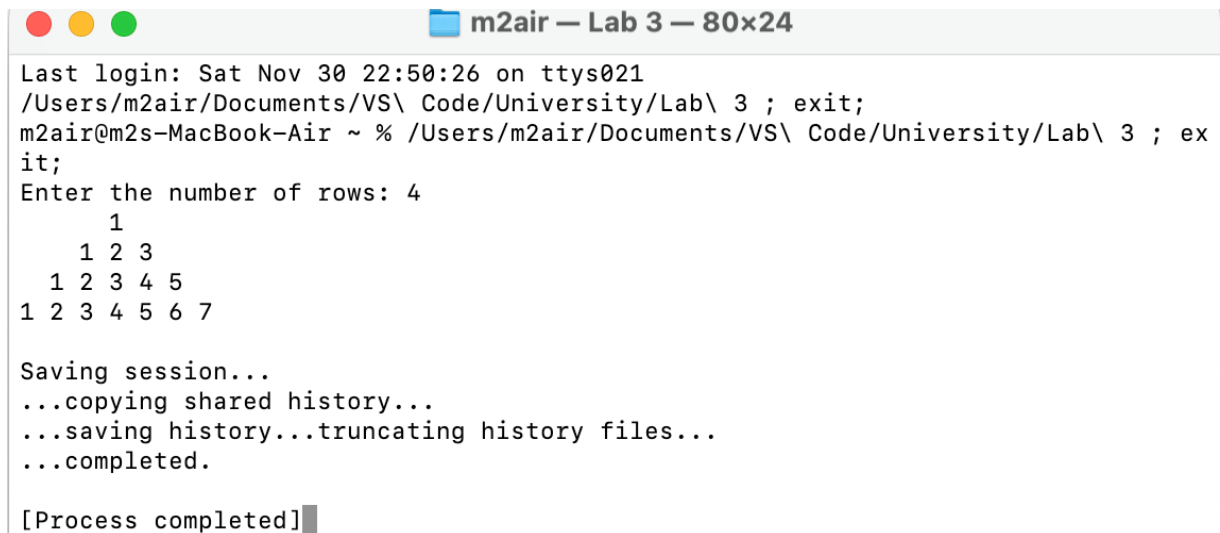
Answer:

**Algorithm:**

1. Input the number of rows (n).
2. Loop through i from 1 to n (for each row)
3. Print (n-i) spaces to align the pattern.

Code
<pre>#include &lt;stdio.h&gt;  int main() {     int n, i, j, spaces;      printf("Enter the number of rows: ");     scanf("%d", &amp;n);      for (i = 1; i &lt;= n; i++) {         for (spaces = 1; spaces &lt;= n - i; spaces++) {             printf(" "); // Two spaces for alignment         }         for (j = 1; j &lt;= 2 * i - 1; j++) {             printf("%d ", j);         }         printf("\n");     }      return 0; }</pre>

## Output Result :



```
m2air — Lab 3 — 80x24
Last login: Sat Nov 30 22:50:26 on ttys021
/Users/m2air/Documents/VS\ Code/University/Lab\ 3 ; exit;
m2air@m2s-MacBook-Air ~ % /Users/m2air/Documents/VS\ Code/University/Lab\ 3 ; ex
it;
Enter the number of rows: 4
    1
  1 2 3
1 2 3 4 5
1 2 3 4 5 6 7

Saving session...
...copying shared history...
...saving history...truncating history files...
...completed.

[Process completed]
```

## Discussion :

From this lab assignment, I learned how to use nested loops to solve complex programming problems like generating series and patterns. I improved my skills in breaking problems into smaller steps, such as calculating partial sums for series and aligning patterns with spaces. Additionally, I practiced implementing algorithms to print various outputs based on user input, enhancing my understanding of loop structures and logical flow in programming. These exercises reinforced my ability to design structured and efficient solutions in C programming.