C++ Assignments | Pattern Printing - 2 | Week 3

1. Print the following pattern

   Input: n = 5

   Output:

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

Solution:

```
#include <bits/stdc++.h>

int main() {

    int n;
    cin >> n;

    for(int i = 0; i < n; ++i) {
        for(int j = 0; j < n-i-1; ++j) {
            cout << "  ";
        }
        for(int j = 0; j < 2 * i + 1; ++j) {
            cout << j+1 << " ";
        }
        cout << endl;
    }

    return 0;
}
```

2. Print the following pattern

   Input: n = 4

   Output:

   ```
       A
   ```

A B C

A B C D E

A B C D E F G

Solution:

```
#include <bits/stdc++.h>

int main() {

    int n;
    cin >> n;

    for(int i = 0; i < n; ++i) {
        for(int j = 0; j < n-i-1; ++j) {
            cout << "  ";
        }
        for(int j = 0; j < 2 * i + 1; ++j) {
            cout << (char)('A' + j) << " ";
        }
        cout << endl;
    }

    return 0;
}
```

3. Print the following pattern

   Input: n = 4

   Output:

   A

   B A B

   C B A B C

   D C B A B C D

Solution:

```
#include <bits/stdc++.h>

int main() {

    int n;
    cin >> n;

    for(int i = 1; i <= n; ++i) {
        for(int j = 1; j <= n - i; ++j) {
            cout << "  ";
        }
        for(int j = i-1; j >= 0; --j) {
            cout << (char)('A'+j) << " ";
        }
        for(int j = 1; j < i; ++j) {
            cout << (char)('A'+j) << " ";
        }
        cout << endl;
    }

    return 0;
}
```

4. Print the following pattern

   Input: n = 4

   Output:

   A B C D E F G
   A B C E F G
   A B F G
   A G

Solution:

```
#include <bits/stdc++.h>

int main() {

    int n;
    cin >> n;

    for(int i = 0; i < 2 * n - 1; ++i) {
        cout << (char)('A' + i) << " ";
    }
    cout << endl;

    for(int i = 1; i < n; ++i) {
        for(int j = 0; j < n - i; ++j) {
            cout << (char)('A'+j) << " ";
        }
        for(int j = 0; j < 2*i-1; ++j) {
            cout << "  ";
        }
        for(int j = 0; j < n - i; ++j) {
            cout << (char)('A'+n+i+j-1) << " ";
        }
        cout << endl;
```

5. Print the following pattern

   Input: n = 4

   Output:

   1 2 3 4 3 2 1

   1 2 3 3 2 1

   1 2 2 1

   1 1

   Solution:

```
#include <bits/stdc++.h>

int main() {

    int n;
    cin >> n;

    for(int i = 0; i < n; ++i) {
        cout << i+1 << " ";
    }
    for(int i = n-1; i >= 1; --i) {
        cout << i << " ";
    }
    cout << endl;

    for(int i = 1; i < n; ++i) {
        for(int j = 0; j < n - i; ++j) {
            cout << j+1 << " ";
        }
        for(int j = 0; j < 2*i-1; ++j) {
            cout << "  ";
        }
        for(int j = n-i; j >= 1; --j) {
```

6. Print the following pattern

   Input : **n = 5**

   Output:

```
*                   *
   *              *
      *        *
         *  *
            *
```

Solution:

```
#include <bits/stdc++.h>

int main() {
    int n;
    cin >> n;

    // Printing entire pattern except the bottommost star
    for(int i = 0; i < n-1; ++i) {
        for(int j = 0; j < i; ++j) {
            cout << " ";
        }
        cout << "*";
        int m = 2 * (n - i - 1);
        for(int j = 0; j < m-1; ++j) {
            cout << " ";
        }
        cout << "*" << endl;
    }

    //Printing last star
    for(int i = 0; i < n-1; ++i) {
        cout << " ";
    }
```

7. Print the following pattern

```
Sample Input : m = 4, n = 6
```

```
Sample Output :
      *
    *   *
  *       *
*           *
  *       *
    *   *
      *
```

Solution:

```
#include <bits/stdc++.h>

int main() {

    int n;
    cin >> n;

    // Printing the topmost star: 0th row
    for(int i = 0; i < n; ++i)
        cout << " ";
    cout << "*" << endl;

    // Printing the rest of the upper triangle: [1…n] rows
    for(int i = 1; i <= n; ++i) {
        // Printing initial spaces
        for(int j = 0; j < n - i; ++j) {
            cout << " ";
        }
        cout << "*";
        int m = 2 * i - 1;
        // Printing middle spaces
        for(int j = 0; j < m; ++j) {
            cout << " ";
```

8. Print the following pattern

`Sample Input : n = 4`

`Output :`

```
   1
  2 2
 3   3
4     4
```

Solution:

```
#include <bits/stdc++.h>
int main() {

    int n;
    cin >> n;

    for(int i = 0; i < n; ++i) {
        cout << " ";
    }
    cout << 1 << endl;
    for(int i = 1; i <= n; ++i) {
        for(int j = 0; j < n - i; j++) {
            cout << " ";
        }
        cout << i;
        for(int j = 0; j < 2 * i - 1; ++j) {
            cout << " ";
        }
        cout << i << endl;
    }

    return 0;
}
```

9. Print the following pattern

`Sample Input : n = 5`

`Output :`

```
    *
   ***
  * * *
 *  *  *
*   *   *
**********
*   *   *
 *  *  *
  * * *
   ***
    *
```

Solution:

```
#include <bits/stdc++.h>
int main() {

    int n;
    cin >> n;

    for(int i = 0; i < n; ++i) {
        for(int j = 0; j <= i; ++j) {
            cout << "* ";
        }
        for(int j = 0; j < 2 * (n - i - 1); ++j) {
            cout << "  ";
        }
        for(int j = 0; j <= i; ++j) {
            cout << "* ";
        }
        cout << endl;
    }

    for(int i = n-1; i >= 0; --i) {
        for(int j = 0; j <= i; ++j) {
            cout << "* ";
        }
```

10. Print the following pattern

    `Input : n = 4`

    `Output :`

```
*      *
**    **
*** ***
*******
*******
*** ***
**    **
*      *
```

Solution:

```
#include <bits/stdc++.h>
int main() {
    int n;
    cin >> n;

    // Printing 0th row
    for(int i = 0; i < 2 * n - 1; ++i) {
        cout <<"* ";
    }
    cout << endl;

    // Printing upper pattern
    for(int i = 1; i < n; ++i) {
        for(int j = 0; j < n - i; ++j) {
            cout << "* ";
        }
        for(int j = 0; j < 2 * i - 1; ++j) {
            cout << "  ";
        }
        for(int j = 0; j < n - i; ++j) {
            cout << "* ";
        }
        cout << endl;
```

11. Print the following pattern

`Input: n = 4`

Output:

```
*******
*** ***
**   **
*     *
**   **
*** ***
*******
```

Solution:

```
#include <bits/stdc++.h>
int main() {

    int n;
    cin >> n;
    for(int i = 0; i < 2 * n - 1; ++i) {
        for(int j = 0; j < 2 * n - 1; ++j) {
            if(i == n-1 || j == n-1 || i+j == n-1 || j-i == n-1 || i - j == n-1 || i
+ j == 3 * (n-1)) {
                cout << "* ";
            } else {
                cout << "  ";
            }
        }
        cout << endl;
    }

    return 0;
}
```

Note:- Please try to invest time doing the assignments which are necessary to build a strong foundation. Do not directly Copy Paste using Google or ChatGPT. Please use your brain😀.
