// Day 27: Advanced Patterns and Logic - All 10 programs in one file

#include <stdio.h>

// 1. Print the pattern:

// A

// B B

// C C C

// D D D D

void pattern1() {

printf("\nPattern 1:\n");

for (char ch = 'A'; ch <= 'D'; ch++) {

for (int i = 0; i < ch - 'A' + 1; i++) {

printf("%c ", ch);

}

printf("\n");

}

}

// 2. Print ASCII value triangle

void pattern2() {

printf("\nPattern 2 (ASCII value triangle):\n");

int val = 65; // starting with 'A'

for (int i = 1; i <= 4; i++) {

for (int j = 1; j <= i; j++) {

printf("%d ", val++);

}

printf("\n");

}

}

// 3. Print pattern of sum of numbers in each row

void pattern3() {

printf("\nPattern 3 (Sum of numbers in each row):\n");

for (int i = 1; i <= 4; i++) {

int sum = 0;

for (int j = 1; j <= i; j++) {

printf("%d ", j);

sum += j;

}

printf("= %d\n", sum);

}

}

// 4. Print a triangle of alternating 0 and 1

void pattern4() {

printf("\nPattern 4 (Triangle of alternating 0 and 1):\n");

for (int i = 1; i <= 5; i++) {

int val = i % 2 == 0 ? 1 : 0;

for (int j = 1; j <= i; j++) {

printf("%d ", val);

val = 1 - val;

}

printf("\n");

}

}

// 5. Print a pyramid of lowercase alphabets

void pattern5() {

printf("\nPattern 5 (Pyramid of lowercase alphabets):\n");

char ch = 'a';

for (int i = 1; i <= 4; i++) {

for (int s = 4 - i; s > 0; s--) printf(" ");

for (int j = 1; j <= i; j++) {

printf("%c ", ch++);

if (ch > 'z') ch = 'a';

}

printf("\n");

}

}

// 6. Print a triangle where each row contains square of its position

void pattern6() {

printf("\nPattern 6 (Triangle with square of row numbers):\n");

for (int i = 1; i <= 5; i++) {

for (int j = 1; j <= i; j++) {

printf("%d ", i \* i);

}

printf("\n");

}

}

// 7. Print pattern:

// 1

// 0 1

// 1 0 1

// 0 1 0 1

void pattern7() {

printf("\nPattern 7:\n");

int rows = 4;

for (int i = 1; i <= rows; i++) {

int val = (i % 2 == 0) ? 0 : 1;

for (int j = 1; j <= i; j++) {

printf("%d ", val);

val = 1 - val;

}

printf("\n");

}

}

// 8. Print a triangle where each line shows multiplication of that line number

void pattern8() {

printf("\nPattern 8 (Multiplication triangle):\n");

for (int i = 1; i <= 5; i++) {

for (int j = 1; j <= i; j++) {

printf("%d ", i \* j);

}

printf("\n");

}

}

// 9. Print a triangle with row sums at the end

void pattern9() {

printf("\nPattern 9 (Triangle with row sums):\n");

for (int i = 1; i <= 5; i++) {

int sum = 0;

for (int j = 1; j <= i; j++) {

printf("%d ", j);

sum += j;

}

printf("= %d\n", sum);

}

}

// 10. Print a number staircase like:

// 1

// 2 3

// 4 5 6

// 7 8 9 10

void pattern10() {

printf("\nPattern 10 (Number Staircase):\n");

int num = 1;

for (int i = 1; i <= 4; i++) {

for (int j = 1; j <= i; j++) {

printf("%d ", num++);

}

printf("\n");

}

}