2021-11-14

1. IF – ELSE IF – ELSE
2. NESTED IF - ELSE
3. FOR LOOP
4. NESTED LOOP
5. EXERCISE 3

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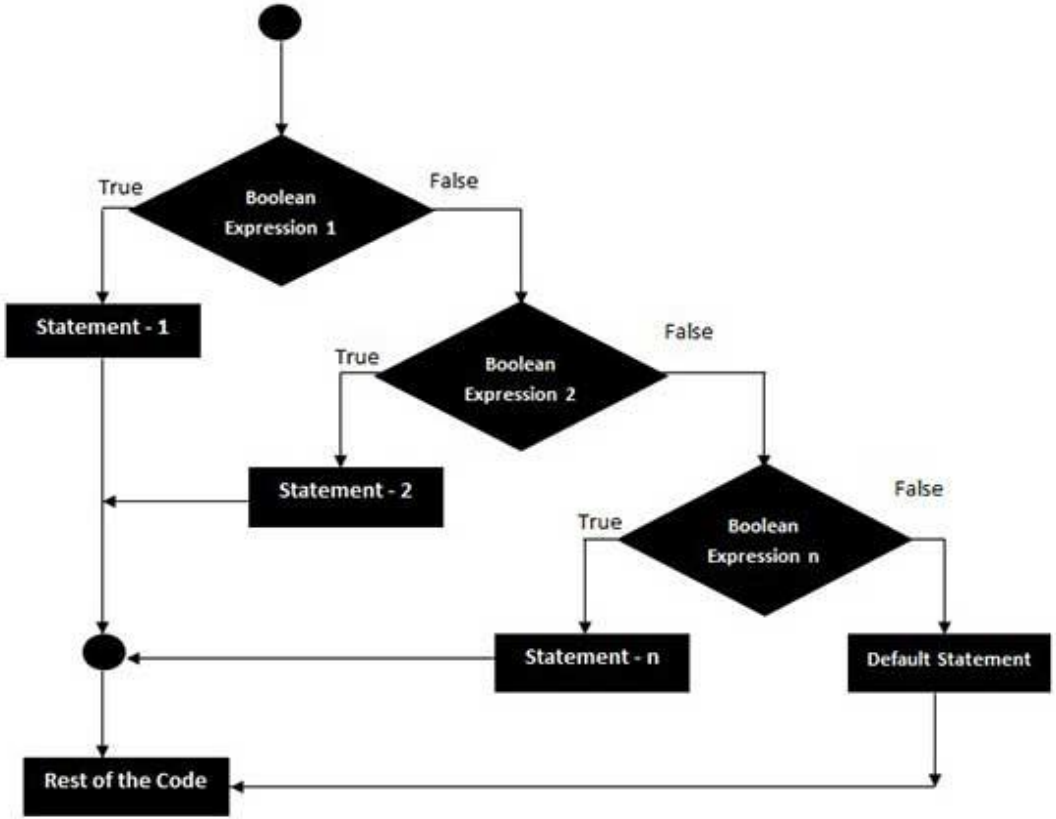
1. IF - ELSE IF - ELSE

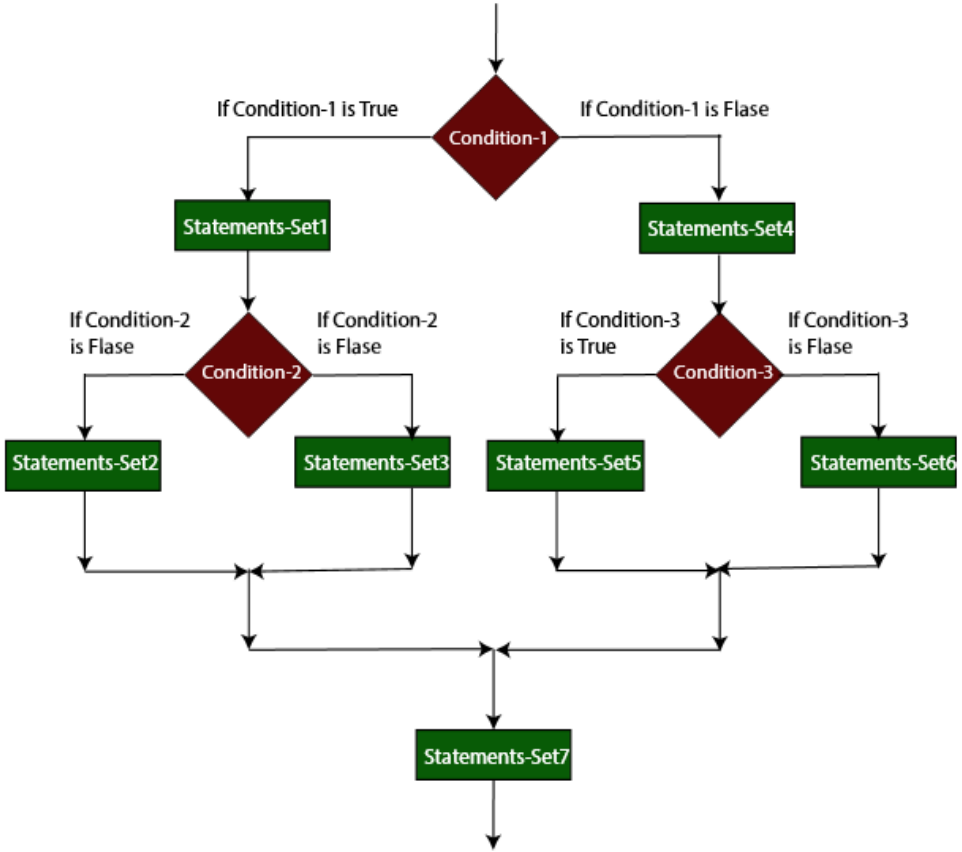
1. IF - ELSE IF - ELSE




```c
#include <stdio.h>

int main()
{
    // format of if - else if - else
    if (condition 1)
    {
        // do something
    }
    else if (condition 2)
    {
        // do something
    }
    else if ...
    else
    {
        // do something
    }
}
```

https://www.tutorialspoint.com/vbscript/vbscript_if_elseif_else_statement.htm

2. NESTED IF - ELSE




```c
#include<stdio.h>

int main()
{
    // format of nested if - else
    if (condition1)
    {
        if (condition2)
        {
            // do somthing
        }
        else
        {
            // do somthing
        }
    }

    else if (condition 3)
    {
        // do somthing
    }

    else if ...

    else
    {
        // do somehitng
    }
}
```

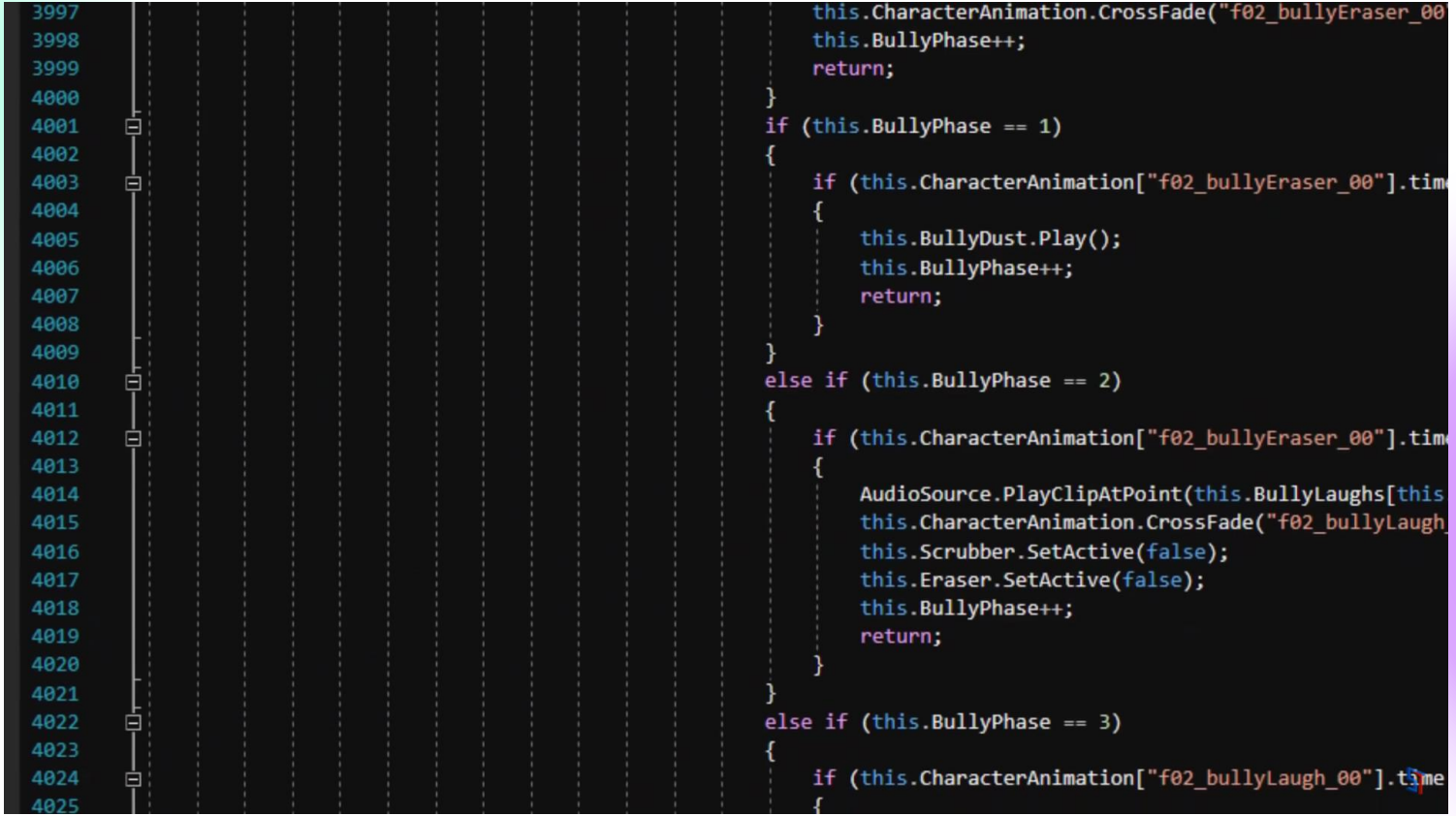
https://www.tutorialscampus.com/sap-abap/nested-if-statement.htm

2. NESTED IF - ELSE

```c
#include <stdio.h>

int main()
{
    int num1 = 10;
    int num2 = 15;

    if (num1 >= num2)
    {
        if (num1 == num2)
        {
            printf("Result: %d < %d", num1, num2);
        }
        else
        {
            printf("Result: %d = %d", num1, num2);
        }
    }
    else
    {
        printf("Result: %d > %d", num1, num2);
    }
}
```

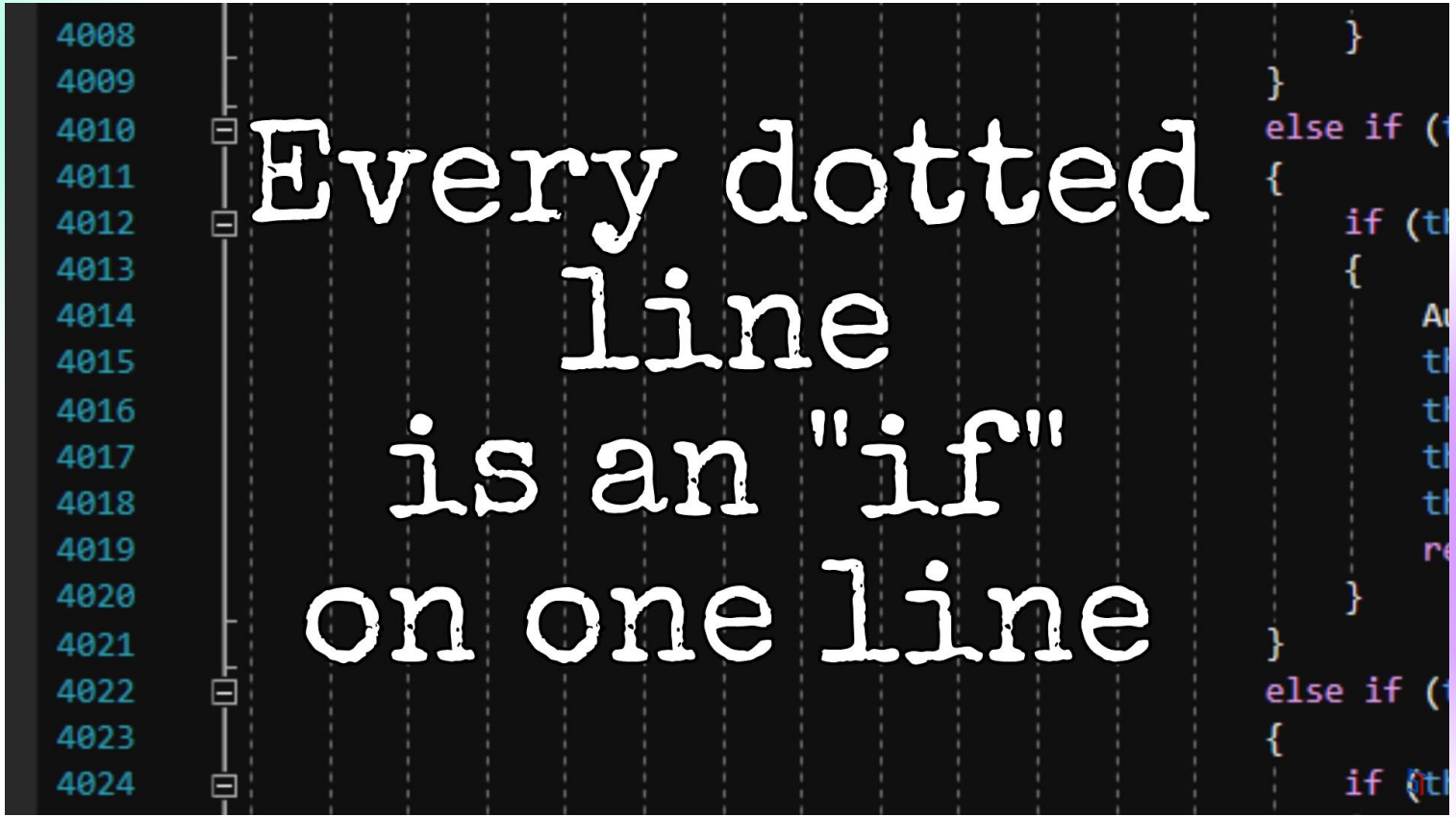
```
Result: 10 > 15
```

2. NESTED IF - ELSE



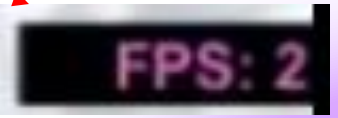
```
3997                this.CharacterAnimation.CrossFade("f02_bullyEraser_00
3998                this.BullyPhase++;
3999                return;
4000            }
4001            if (this.BullyPhase == 1)
4002            {
4003                if (this.CharacterAnimation["f02_bullyEraser_00"].tim
4004                {
4005                    this.BullyDust.Play();
4006                    this.BullyPhase++;
4007                    return;
4008                }
4009            }
4010            else if (this.BullyPhase == 2)
4011            {
4012                if (this.CharacterAnimation["f02_bullyEraser_00"].tim
4013                {
4014                    AudioSource.PlayClipAtPoint(this.BullyLaughs[this
4015                    this.CharacterAnimation.CrossFade("f02_bullyLaugh_
4016                    this.Scrubber.SetActive(false);
4017                    this.Eraser.SetActive(false);
4018                    this.BullyPhase++;
4019                    return;
4020                }
4021            }
4022            else if (this.BullyPhase == 3)
4023            {
4024                if (this.CharacterAnimation["f02_bullyLaugh_00"].time
4025                {
```

2. NESTED IF - ELSE



https://www.youtube.com/watch?v=7qz5GefNwh4

2. NESTED IF - ELSE



https://www.youtube.com/watch?v=7qz5GefNwh4

2. NESTED IF - ELSE

DO NOT ABUSE NESTED IF - ELSE

3. FOR LOOP

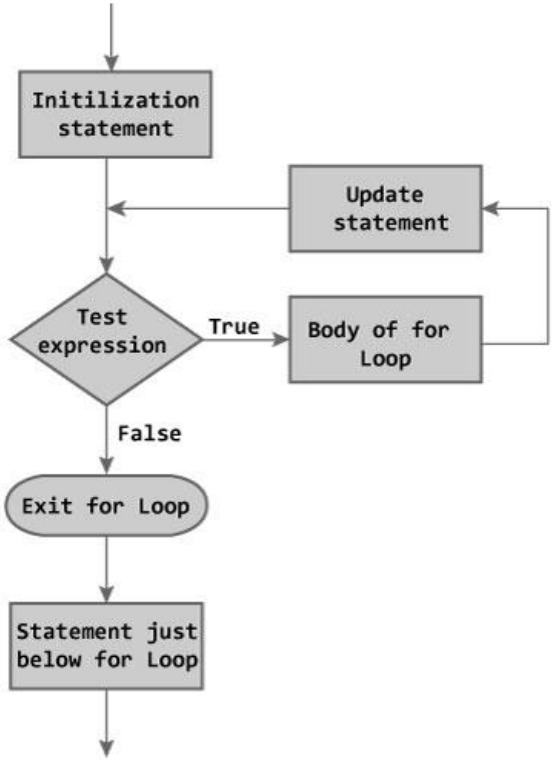
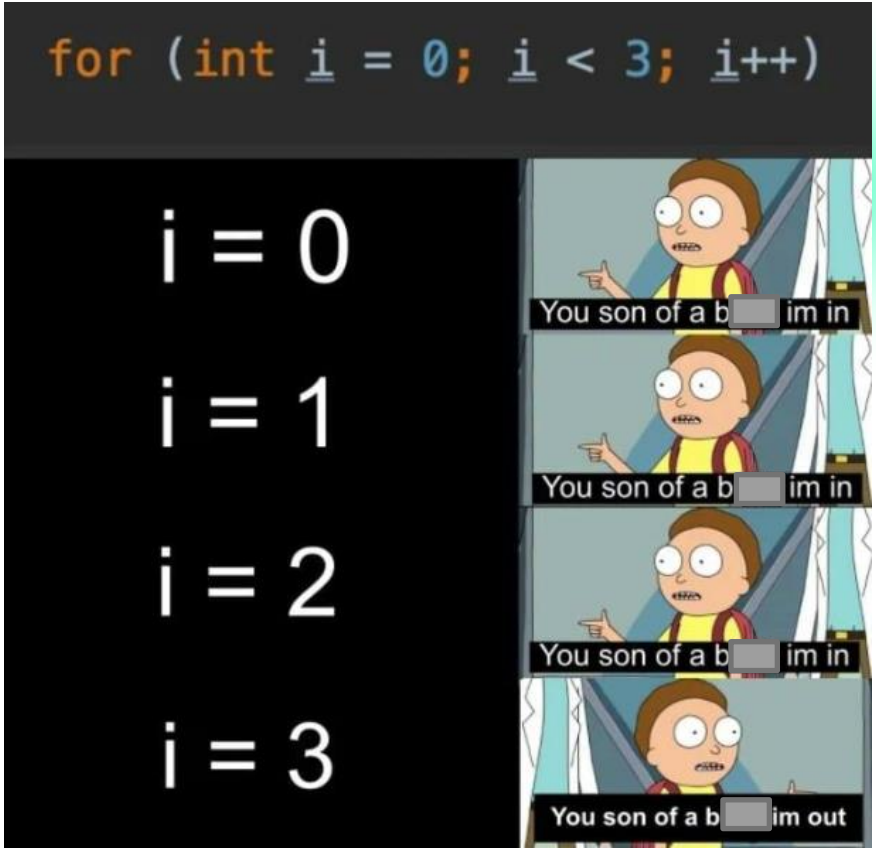


Figure: Flowchart of for Loop

```c
#include <stdio.h>

int main()
{
    // format of for loop
    for (Initilization; Condition; Update)
    {
        // do something
    }
}
```

https://sites.google.com/site/clanguageforlearn/loop-in-c/for-loop

3. FOR LOOP



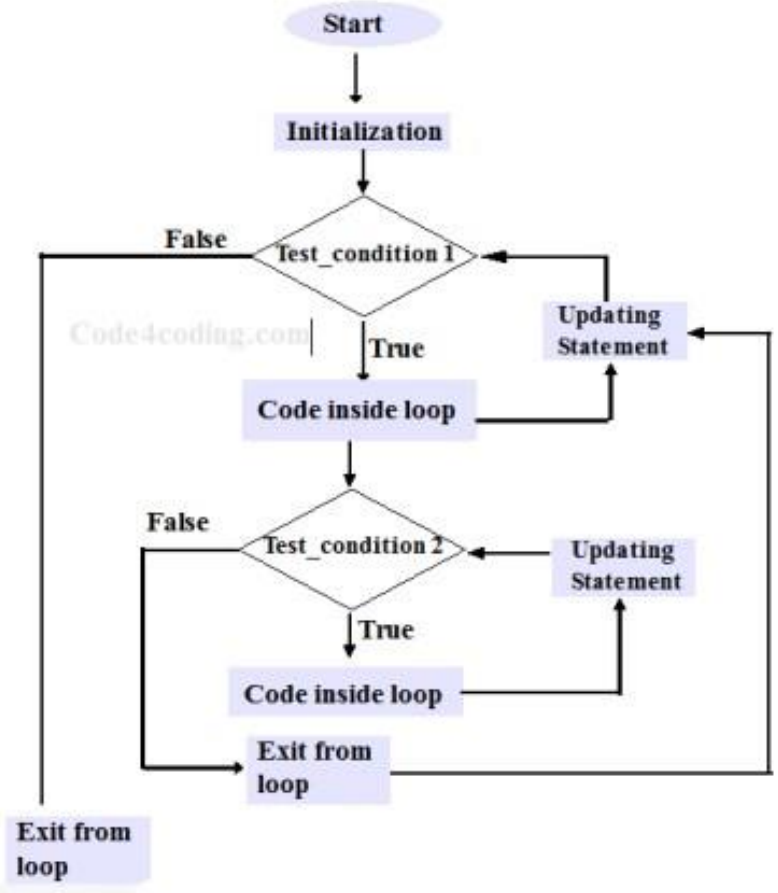
https://www.reddit.com/r/memes/comments/ehls89/understanding_the_for_loop/

3. FOR LOOP

```c
#include <stdio.h>

int main()
{
    int year = 1000;

    printf("Years that are divisible by 4, 100 and 400: \n");

    // find the number that divisible by 4, 100 and 400
    for (year; year < 1400; year++)
    {
        if ((year % 4 == 0) && (year % 100 == 0) && (year % 400 == 0))
        {
            printf("%d\t", year);
        }
    }
}
```

```
Years that are divisible by 4, 100 and 400:
1200
```

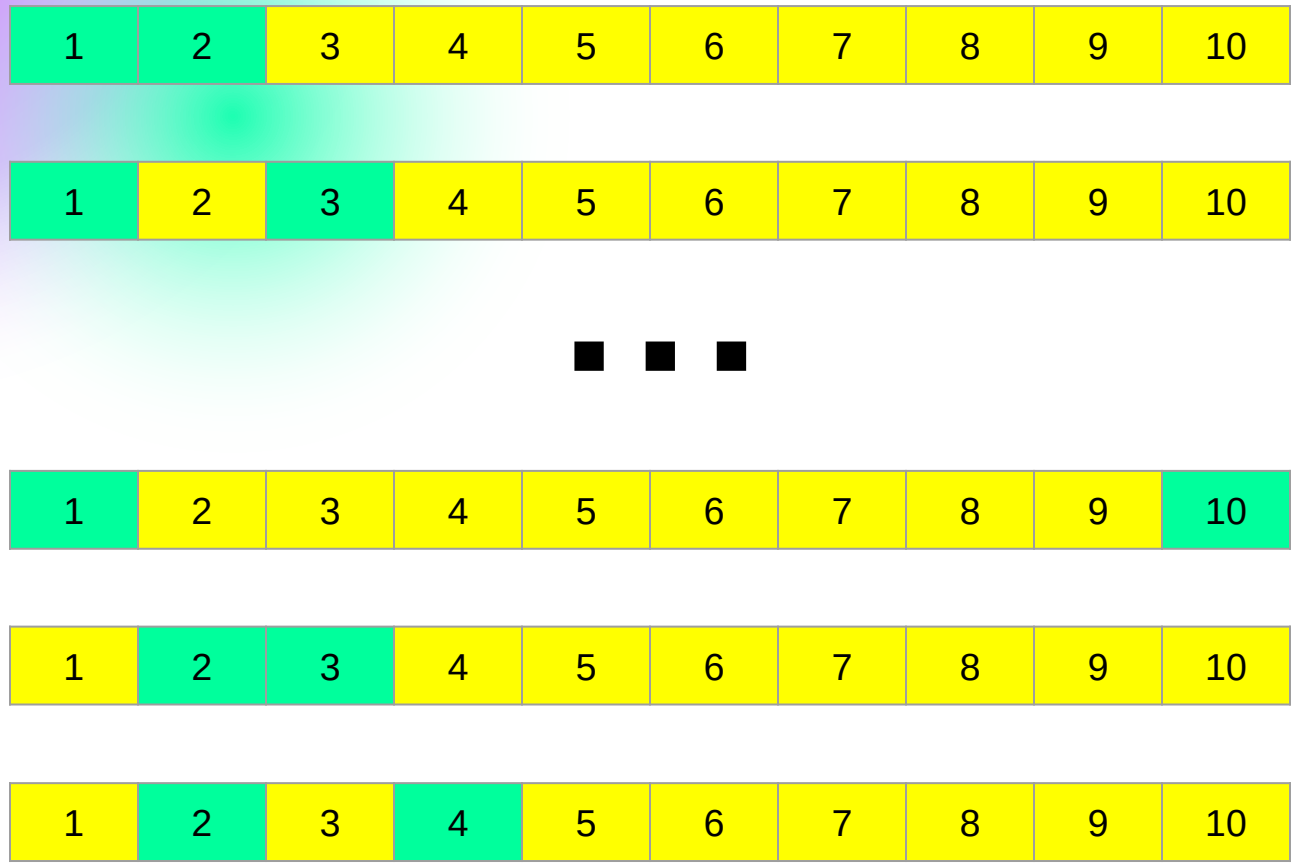
4. NESTED FOR LOOP




```c
#include <stdio.h>

int main()
{
    // format of nested for loop
    for (Initilization1; Condion1; Update1)
    {
        for (Initilization2; Condion2; Update2)
        {
            // do somthing
        }
    }
}
```

4. NESTED FOR LOOP

Two Sum: Find 2 numbers whose sum is equal to the desired number



4. NESTED FOR LOOP

```c
#include <stdio.h>

int main()
{
    int array[] = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10};
    int size = sizeof(array) / sizeof(array[0]);
    int i = 0;
    int j = 0;
    int target;
    int sum;

    printf("Enter the target value\n>> ");
    scanf("%d", &target);

    for(i; i < size; i++)
    {
        for(j = i+1; j < size; j++)
        {
            sum = array[i] + array[j];
            if(sum == target)
            {
                printf("%d + %d = %d\n", array[i], array[j], target);
            }
        }
    }
}
```

```
Enter the target value
>> 10
1 + 9 = 10
2 + 8 = 10
3 + 7 = 10
4 + 6 = 10
```

5. EXERCISE 3

$$sinh(x) \approx \sum_{n=0}^{\infty} \frac{x^{(2n+1)}}{(2n+1)!} = x + \frac{x^3}{3!} + \frac{x^5}{5!} + \frac{x^7}{7!} + \frac{x^9}{9!} + \cdots$$

5. EXERCISE 3

```c
#include <stdio.h>
#include <math.h>

double factorial(int n)
{
    if (n >= 1)
        return n*factorial(n-1);
    else
        return 1;
}

double compute_sinh(double x, int n)
{
   if (n >= 0)
        return pow(x, 2*n+1) / factorial(2*n+1) + compute_sinh(x, n-1);
    else
        return 0;
}

int main()
{
    printf("sinh(pi/2) = %f\n", compute_sinh(M_PI/2, 20));
}
```

```
sinh(pi/2) = 2.301299
```

5. EXERCISE 3

```c
#include <stdio.h>
#include <math.h>

double factorial(int n)
{
    int i;
    double fac = 1;

    for (i = 1; i <= n; i++)
    {
        fac *= i;
    }

    return fac;
}

double compute_sinh(double n)
{
    int i;
    double sum;

    for (i = 0; i < 20; i++)
    {
        sum += pow(n, 2*i+1) / factorial(2*i+1);
    }

    return sum;
}

int main()
{
    printf("sinh(pi/2) = %f\n", compute_sinh(M_PI/2));
}
```

```
sinh(pi/2) = 2.301299
```

5. EXERCISE 3

$$cosh(x) \approx \sum_{n=0}^{\infty} \frac{x^{2n}}{(2n)!} = 1 + \frac{x^2}{2!} + \frac{x^4}{4!} + \frac{x^6}{6!} + \frac{x^8}{8!} + \frac{x^{10}}{10!} + \cdots$$

5. EXERCISE 3

```c
#include <stdio.h>
#include <math.h>

double factorial(int n)
{
    if (n >= 1)
        return n*factorial(n-1);
    else
        return 1;
}

double compute_cosh(double x, int n)
{
   if (n >= 0)
        return pow(x, 2*n) / factorial(2*n) + compute_cosh(x, n-1);
    else
        return 0;
}

int main()
{
    printf("cosh(pi/2) = %f\n", compute_cosh(M_PI/2, 20));
}
```

```
cosh(pi/2) = 2.509178
```

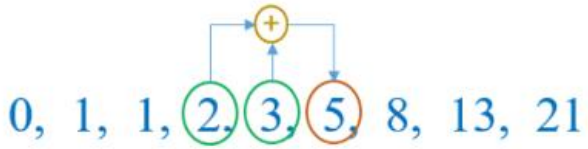
5. EXERCISE 3

```c
#include <stdio.h>
#include <math.h>

double factorial(int n)
{
    int i;
    double fac = 1;

    for (i = 1; i <= n; i++)
    {
        fac *= i;
    }

    return fac;
}

double compute_sinh(double n)
{
    int i;
    double sum;

    for (i = 0; i < 20; i++)
    {
        sum += pow(n, 2*i) / factorial(2*i);
    }

    return sum;
}

int main()
{
    printf("cosh(pi/2) = %f\n", compute_sinh(M_PI/2));
}
```

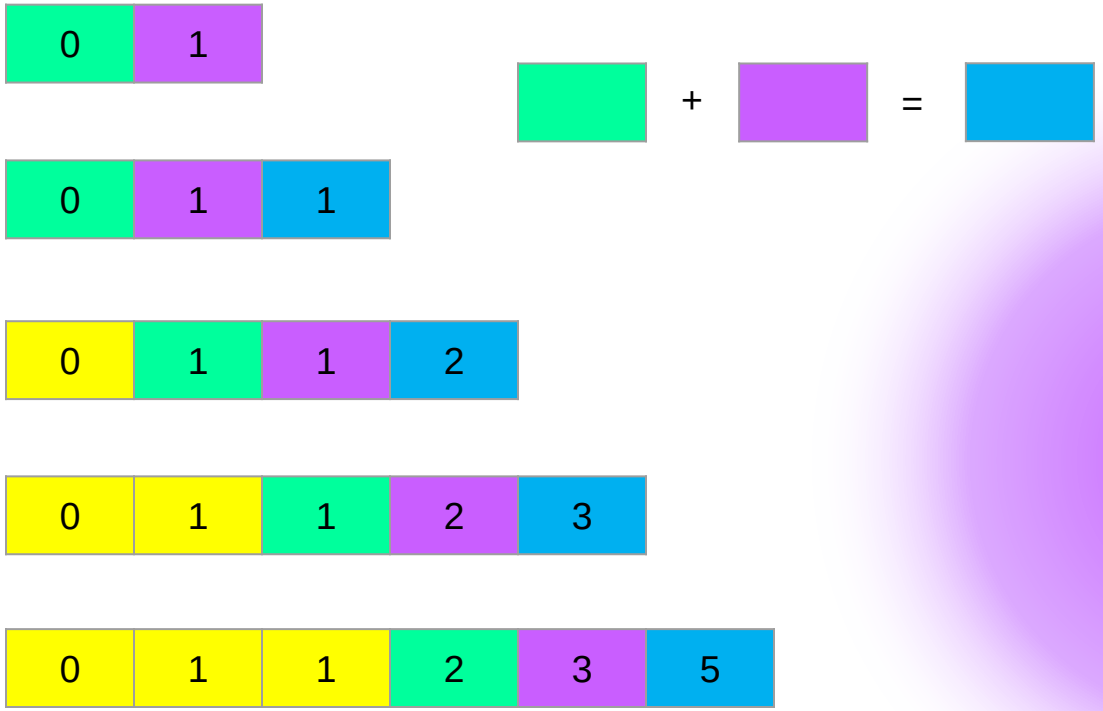
```
cosh(pi/2) = 2.509178
```

5. EXERCISE 3

Fibonacci Sequence



Length = 9



5. EXERCISE 3

```c
#include<stdio.h>

void fibonacci(int length)
{
    int i;
    int first = 0;
    int second = 1;
    int next;

    printf("\nThe Fibonacci series:\n");
    for ( i = 0 ; i < length ; i++ )
    {
        if ( i <= 1 ){
            next = i;
        }
        else{
            next = first + second;
            first = second;
            second = next;
        }
        printf("%d\t",next);
    }
}

int main()
{
    int length;

    printf("Enter the length of sequence:\n>> ");
    scanf("%d", &length);

    fibonacci(length);
}
```

```
Enter the length of sequence:
>> 9

The Fibonacci series:
0       1       1       2       3       5       8       13      21
```

5. EXERCISE 3

```c
#include<stdio.h>

int fibonacci(int n)
{
    if (n == 0){
        return 0;
    }
    else if (n == 1){
        return 1;
    }
    else{
        return fibonacci(n-1) + fibonacci(n-2);
    }
}

int main()
{
    int i;

    int length;

    printf("Enter the length of sequence:\n>> ");
    scanf("%d", &length);

    printf("\nThe Fibonacci series:\n");

    for (i = 0; i < length; i++){
        printf("%d\t", fibonacci(i));
    }
}
```

```
Enter the length of sequence:
>> 9

The Fibonacci series:
0       1       1       2       3       5       8       13      21
```