

Lecture 10

Nested Loops



QUIZ

قَالَ رَبِّ اشْرَحْ لِي صَدْرِي ۝
﴿٢٥﴾

[فَالَّذِي نَسِيَ كَهُولَ دَعَى رَبَّهُ أَشْرَحَ لَهُ مَنْ يَرَى لِي صَدْرِي مِيرَا سِينَهُ]

وَيَسِّرْ لِي آمْرِي ۝
﴿٢٦﴾

[وَيَسِّرْ لَهُ آسَانَ كَهُولَ دَعَى لَيْهُ مَنْ يَرَى لِي آمْرِي مِيرَا كَامَ]

وَاحْلُلْ عُقْدَةً مِنْ لَسَانِي ۝
﴿٢٧﴾

[وَاحْلُلْ لَهُ كَهُولَ دَعَى عُقْدَةً گَرَهُ مِنْ سَيِّدِي سَيِّدِي زَبَانَ]

يَفْقَهُوا قَوْلِي ۝
﴿٢٨﴾

[يَفْقَهُوا وَهُوَ سَمْجَه سَكِينَ [قَوْلِي مِيرِي بَاتَ]

4 QUESTIONS / FEEDBACK / CONCERNS



INFORMATION
TECHNOLOGY
UNIVERSITY

SE SECA SLIDE OF FAME

5



NO ONE
WEEK - 1



Muhammad Daniyal
Hammad (BSSE23046)
WEEK - 2



YOUR NAME
WEEK - 3



YOUR NAME
WEEK - 4



YOUR NAME
WEEK - 5



YOUR NAME
WEEK - 6



YOUR NAME
WEEK - 7



YOUR NAME
WEEK - 8



YOUR NAME
WEEK - 9



YOUR NAME
WEEK - 10



YOUR NAME
MIDTERM



YOUR NAME
WEEK - 11



YOUR NAME
WEEK - 12



YOUR NAME
WEEK - 13



YOUR NAME
WEEK - 14



YOUR NAME
WEEK - 15

SE SEC B SLIDE OF FAME

6



Muhammad Mukarram
BSSE23029
WEEK - 1



Muhammad Abdullah
(BSSE23087)
WEEK - 2



YOUR NAME
WEEK - 3



YOUR NAME
WEEK - 4



YOUR NAME
WEEK - 5



YOUR NAME
WEEK - 6



YOUR NAME
WEEK - 7



YOUR NAME
WEEK - 8



YOUR NAME
WEEK - 9



YOUR NAME
WEEK - 10



YOUR NAME
MIDTERM



YOUR NAME
WEEK - 11



YOUR NAME
WEEK - 12



YOUR NAME
WEEK - 13



YOUR NAME
WEEK - 14



YOUR NAME
WEEK - 15

RECAP

GitHub

Tools (Cygwin, IDE, GitHub)

Flowcharts

Algorithms

Approach towards a word problem

Pseudocode

Flowcharts Advantages & Disadvantages

Numbers Systems (Decimal, Binary, Octal & Hexadecimal)

Ten's Complement

Twos Complement

main function

Stream in and stream out operators

if else

Functions

Data Types

Arithmetic Operators

Relational Operators

Loops (While, for , do while)

Switch cases

Function Overloading

RECAP

Scope of variables

Function Prototype and Definition

Default Value in parameters of functions

Parameters by value vs Parameters by Reference

GROUP DISCUSSIONS



Nested Loops

Nested For Loop

CODE SYNTAX

```
for ( initialization; condition; increment ) {  
    // statement(s) of outer loop  
  
    for ( initialization; condition; increment ) {  
        // statement(s) of inside loop  
    }  
  
    // statement(s) of outer loop  
}
```

Nested While Loop

CODE SYNTAX

```
while(condition) {  
    // statement(s) of outer loop  
  
    while(condition) {  
        // statement(s) of inside loop  
    }  
  
    // statement(s) of outer loop  
}
```

Nested Do-While Loop

CODE SYNTAX

```
do{  
    // statement(s) of outer loop  
    do{  
        // statement(s) of inside loop  
    }while(condition);  
  
    // statement(s) of outer loop  
}while(condition);
```

There is no rule that a loop must be nested inside its own type. In fact, there can be any type of loop nested inside any type and to any level.

Mix Nested Loop

CODE SYNTAX

```
do{  
    while(condition) {  
        for ( initialization; condition; increment ) {  
            // statement(s) of inside for loop  
        }  
        // statement(s) of inside while loop  
    }  
    // statement(s) of outer do-while loop  
}while(condition);
```

Problem

Print a calendar such that we take number of weeks from user

Week: 1

Day:1

Day:2

Day:3

Day:4

Day:5

Day:6

Day:7

Week: 2

Day:1

Day:2

Day:3

Day:4

Day:5

Day:6

Day:7

Week: 3

...

Problem

Print a calendar such that we take number of weeks from user

Week: 1

Day:2

Day:4

Day:6

Week: 2

Day:2

Day:4

Day:6

Week: 3

...

Problem

Print a calendar such that we take number of weeks from user

Week: 1

Day:2

Day:4

Day:6

Week: 2

Week: 3

Day:2

Day:4

Day:6

Week: 4

Week: 5

Day:2

Day:4

Day:6

...

Prime Factors

"Prime Factorization" is finding which prime numbers multiply together to make the original number.

$$12 = 2 \times 2 \times 3$$

Prime Factors

Can we divide 147 exactly by 2?

$$147 \div 2 = 73\frac{1}{2}$$

No it can't. The answer should be a whole number, and $73\frac{1}{2}$ is not.

Let's try the next prime number, 3:

$$147 \div 3 = 49$$

That worked, now we try factoring 49.

The next prime, 5, does not work. But 7 does, so we get:

$$49 \div 7 = 7$$

And that is as far as we need to go, because all the factors are prime numbers.

$$\mathbf{147 = 3 \times 7 \times 7}$$

Square

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

Triangle

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

Output

....1

...22

..333

.4444

55555