

DSA

Date :- 3rd
September,
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Lecture → 2

Agenda :-

- ① Conditionals
- ② Ø: Grading System
- ③ Loops
- ④ Input

Conditionals [if-else]

```
    _____ d1
    _____ d2
if ( _____ c ) {
    _____ d3
    _____ d4
} else {
    _____ d5
    _____ d6
}
    _____ d7
    _____ d8
```

[Basic Skill #3]

- * First d₁ & d₂ runs
- * if Clause evaluates the condition & if the condition is true then, d₃ & d₄ runs and if the condition is false then, else Part of the code i.e. d₅ & d₆ runs and CPU skips if part of the code.
- * After this finally lines d₇ & d₈ will run.

True	False
d ₁	d ₁
d ₂	d ₂
d ₃	d ₅
d ₄	d ₆
d ₇	d ₇
d ₈	d ₈

Q:- Grading System :-

Given: - You are given as input mark of a student.

* Display appropriate message based on following rules

- for marks above 90, print excellent
- for marks above 80 and less than equal to 90, print good
- for marks above 70 and less than equal to 80, print fair
- for marks above 60 and less than equal to 70, print meets expectations
- for marks less than 60, print below par.

Input :- Input is handled & provided as variable marks

Output :- Appropriate message as per student's marks.

Code :-

```
import java.util.*;  
  
public class Main {  
  
    public static void main(String[] args) {  
  
        // input - don't change this code  
  
        Scanner scn = new Scanner(System.in);  
        int marks = scn.nextInt();  
  
        // don't change above code.  
  
        // code here.  
  
        if (marks > 90) {  
            System.out.println("excellent");  
        } else {  
            if (marks > 80) {  
                System.out.println("good");  
            } else {  
                if (marks > 70) {  
                    System.out.println("fair");  
                } else {  
                    System.out.println("poor");  
                }  
            }  
        }  
    }  
}
```

```
if (marks > 60) {
```

```
    System.out.println("meets expectations");
```

```
} else {
```

```
    System.out.println("below Par");
```

```
}
```

```
}
```

```
}
```

```
}
```

```
}
```

```
}
```

```
}
```

* first condition says if marks $>$ 90 print excellent.

* Now, if marks \leq 90 then, else statement runs where we check if marks are $>$ 80

* If marks $>$ 80 then, we print good if this statement also fails then, else portion of the statement executes where we have another if to check if marks $>$ 70.

* If marks $>$ 70 then, we print fair & if this statement also fails then, its else part will execute i.e.

we will be able to say that marks are less than equal to 70.

④ Here we again check via if statement if marks are > 60 . If the case passes then, we print meets expectation & if the statement fails then, it goes to the else part where we print below par.

\Rightarrow Let's try a simple question and

try to check if the given Marks are even or odd.

[if marks even print even marks &
if odd marks print odd marks.]

Operators :-

$\Rightarrow +$ (addition)

$\Rightarrow \%$ (gives remainder)

$\Rightarrow -$ (subtraction)

Example :- $16 \% 3 = 5$

$\Rightarrow *$ (multiplication)

$$\textcircled{*} 16 \% 3 = 1$$

$\Rightarrow /$ (gives quotient)

* To figure out if a no. is odd or even
"%" is important because even no. when divided by 2 gives 0 & if remainder is '1' then no. is odd.

* $\hat{=}$ means is equal to

Code

```
If (marks % 2 == 0){  
    System.out.println("Even");  
}  
else {
```

```
    System.out.println("Odd");
```

\Rightarrow Check whether a no. is $3K$, $3K+1$ or $3K+2$.

- * we have to check if no. is $3k$ & if that condition fails that certainly means no. will not be divisible by 3.
- * It will either be a $3k+1$ or $3k+2$ no. Then, again we will check if remainder is '1' or not, if the condition passes then, no. is a $3k+1$ no. If PT fails then, else block will execute this means that the no. is neither $3k$ nor $3k+1$ so, hence, it has to be a $3k+2$ no. i.e. leave 2 as remainder while divided by 3.

Code

```
if ( $n \% 3 == 0$ ) { // this block runs only when no.  
    System.out.println("3k");  
}  
else { // this block runs if above fails  
    if ( $n \% 3 == 1$ ) { // this runs if remainder is 1  
        System.out.println("3k+1");  
    }  
    else { // This runs only when both 0 & 1 remainder fails.  
        System.out.println("3k+2");  
    }  
}
```

* /* Code inside will get
Commented
*/

Same Code Style 2

```
if (marks / 3 == 0) {  
    System.out.println("3 K");  
} else if (marks / 3 == 1) {  
    System.out.println("3 K+1");  
} else {  
    System.out.println("3 K+2");  
}
```

* Using this style makes code more
compact.

Repetitions (Loops)

[Basic Skill #4]



while loop :-

L₁

L₂

while (condition) {

L₃

L₄

}

L₅

- * first L₁ & L₂ runs then, while loop checks the condition, if condition true then, it executes line L₃ & L₄, again checks lets say if condition then, loop L₅ executes.

lets write a Simple Program

① Counting 1 to 5.

int i=1; -①

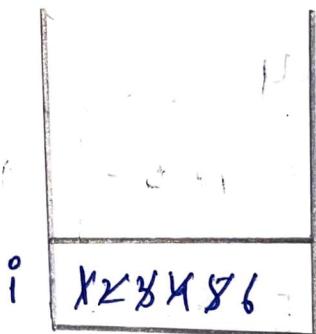
while (i<=5){ -②

System.out.println(i); -③

} i++; -④

System.out.println("done"); -⑤

Dry Run



Output

1
2
3
4
5

done.

* When line ① runs,
CPU makes a variable in
memory & calls it 'i' with
value = 1.

* Line ② runs then, as $i \leq 5$ so, true
hence, 1 is printed & $i++ \Rightarrow 2$

then, checks again prints

Again till $i = 6$

* Then, line ② executes as $6 > 5$ so,

comes out of the loop & prints done.

Input # [Basic Skill #5]

- * Taking something from the keyboard & putting the value in RAM

* Scanner Scn = new Scanner (System.in);

⇒ It is a variable which is used to read from the keyboard and type of that variable is Scanner.

int i = Scn.nextInt();

⇒ Basically what this does is, it takes any integer from the keyboard & it pulls and the value is assigned to the variable 'i'.

Example: lets accept a no. from user & print it.

Scanner Scn = new Scanner (System.in); -①

int num = Scn.nextInt(); -②

System.out.println("you entered " + num); -③

lets say input = 100

num	100
Scn	-

- * When line① runs, it creates a scanner
- * line② runs, it extracts the number & puts in num.
- * line③ runs we print the no. ⇒ you entered 100.

Homework

Q:- Print Counting to a given no. & in a
way that it prints:- 1 is odd

2 is even

3 is odd

Solution:-

```
Scanner Scn = new Scanner(System.in);
```

```
int num = Scn.nextInt();
```

```
int a = 1;
```

```
while (a <= num) {
```

```
    if (a % 2 == 0) {
```

```
        System.out.println(a + " is even");
```

```
} else {
```

```
    System.out.println(a + " is odd");
```

```
}
```

```
a++;
```