Java Fundamentals

Geekster

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Day 1:

Overview:

What and why? *(30 mins)*

- Explain how humans interact using languages, we can interact with computer using it's language.
- Realise the power of knowing the language of computers, brains behind facebook ,google were programmers
- See codes as your conversations with computer
- Alan turing and imitation game movie story
- About java
- Why java ?
    - Multiple uses - Android dev(Github link to a calculator app's java code), Google doc we are using has backend in java, web dev, gaming, most companies teach it at the beginning of training

Our Focus *(15 min)*

- What is data?
- Why we need data structures? Exasmple - stand in queue in school to avoid hassle, pile up notebooks to save space
- What is algorithm?
- Real life algo examples: https://www.invisibly.com/learn-blog/algorithm-examples-everyday-life
- Solving questions and reaching optimal solutions
- Learn the meaning of optimisation and its need.
- Sum of first n term can be found using bruteforce addition or directly formula - identify optimisation

Syntax of java and Variables *(30 min)*

- Basic hello world code (Leetcode IDE) // understand output
- Code begins operating from main function
- Sum of two numbers without using variables
- What is a variable? how to declare it?
- Types of variables (Data types)- int , float, char, bool, string
- Size of data types
- Sum , Subtraction of two numbers

Operators and taking inputs *(45 mins)*

- +,-,*,%,++,-- operators using code.
- Taking input of integers - Just show the syntax and focus on 'what' and skip 'how'.
- WAP to input two integers and print sum.
- WAP Input first name , last name and show full name after concatenating.
- WAP find area of rectangle.
- WAP to check if entered number is even or odd.

Day 2:

Comparison operators (5 mins)

- <,>,==,<=,>=,!=
- Print output to show response is always 0 or 1 i.e true or false
- Basic examples

Logical operators (15 mins)

- &&, ||, !
- Truth tables for each
- Explain difference between and/ or using examples .
- Again print to show output 0/1

Conditions (10 mins)

- What are conditions? Draw flow chart to show how decision making works
- We saw output of a condition is always 0/1. so every condition gives us two paths to proceed .
- Show examples merging comparison and logical operators like Report card (>=60 && <70 grade C etc)
- How will we make a calculator using flow chart ?

If-else (60 mins)

- Basic Syntax
- WAP given length , breadth of rectangle, check if square or not. $$
- WAP to find greater among two integers.
- WAP to check if uppercase or lowercase letter.(Basic idea of ASCII and how each character has an ASCII value) - How to read char
- WAP to input hour(24 hour format) and print good morning(<12) / good afternoon(<=16) / good evening(<=20) / good night.
- Jumble the order of if- else in last ques to show how it gives wrong output, explain importance of order in if ,else if .
- Difference between if-if-if and if-else if-else.
- Discuss report card problem and give practice work.

Nested if (10 mins)
- Syntax
- Instead of if(A && B) we can nest two if(A) -> if(B)
- Will look at it's use later in the course

Online judge (Hackerrank)
- Evaluates our code so that we dont have to manually test all cases.
- Show and submit a question.

Day 3:

What is Loop and why do we need it? *(5 mins)*

- Rabbit analogy, a rabbit is checking for carrot in every box, it takes one jump to see if a carrot is there or not.
- Jumps can be 1 length 2 or 3 etc
- *If it find a carrot, it can stop looking further or continue for more*
- *It can shout yes or no at every box.*

For loop *(1 hour)*

- *Syntax*
- *Compare with rabbit , increment is jump, shout is print etc- break keyword to break out of loop*
- *In following each question, Show how 'i' is incremented in loop and what gets printed and explain what is dry run.*
- *WAP to print 1-n*
- *WAP to print a-z*
- *WAP to print even numbers till n.*
- *WAP to print all multiples of 7 till n*
- *WAP to count multiples of 3, multiples of 5 and both 3,5 in range 1-n.*
- *WAP to check if number is prime or not - optimise from n-1,to n/2. skip sqrt n*
- *WAP to input n, loop for n times and input 2 numbers in each iteration, if iteration is even(0th,2nd,4th..) print sum else print multplication.*

Nested for loop *(30 mins)*

- *Syntax*
- *Rabbit has another friend rabbit analogy.*
- *WAP print 1 2 3 4*
  5 6 7 8
  9 10 11 12
- *WAP to count number of pairs in 1-n with sum even.*
- *WAP to find number of pairs with given sum*