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BATCH: B2

QUESTION:

The task is to write a **Java program** in which a user will get K trials to guess a randomly generated number. Below are the rules of the game:

- If the guessed number is bigger than the actual number, the program will respond with the message that the guessed number is higher than the actual number.
- If the guessed number is smaller than the actual number, the program will respond with the message that the guessed number is lower than the actual number.
- If the guessed number is equal to the actual number or if the K trials are exhausted, the program will end with a suitable message.

Approach: Below are the steps:

- The approach is to generate a random number using **Math.random() method** in Java.
- Now using a loop, take K input from the user and for each input print whether the number is smaller or larger than the actual number.
- If within K trials the user guessed the number correctly, print that the user won.
- Else print that he was not able to guess and then print the actual number.

Define the Player class with an abstract function named **getGuess()**.

Define a class named **HumanPlayer** derived from **Player**. Implement abstract method in this class as **getGuess()** should prompt the user to enter a number and return the value entered from the keyboard.

Next, define a class named **ComputerPlayer** derived from **Player**. The implementation of **ComputerPlayer::getGuess()** should randomly select a number from 0 to 100.

Finally, construct the main function that invokes **play(Player &player1, Player &player2)** with two instances of a **HumanPlayer** (human vs. human), an instance of a **HumanPlayer** and **ComputerPlayer** (human vs. computer), and two instances of **ComputerPlayer** (computer vs. computer)

CODE:

```
import java.util.*;
import java.lang.*;
abstract class Player{
    abstract int getGuess();
}
class HumanPlayer extends Player{
    Scanner sc =new Scanner(System.in);
```

```

        @Override
        int getGuess() {
            int n=sc.nextInt();
            return n;
        }
    }
}
class ComputerPlayer extends Player{

    @Override
    int getGuess() {
        int rand=1+ (int) (Math.random()*100);
        System.out.println(rand);
        return rand;
    }
}
class Main{
    void play(ComputerPlayer
cp2,ComputerPlayer cp1,int k){
        int f1=0;
        int f2=0;
        int ans = 1+
(int) (Math.random()*100);
        for(int i=0;i<k;i++){
            if(i%2==0) {

System.out.println("ComputerPlayer 1 guess");
                int n1 = cp2.getGuess();
                f1 = check(ans, n1);
                if (f1 == 1) {

System.out.println("ComputerPlayer 1 won");
                    break;
                }
            }
            else {

System.out.println("ComputerPlayer 2 guess");

```

```

        int n2 = cp1.getGuess();
        f2 = check(ans, n2);
        if (f2 == 1) {
System.out.println("ComputerPlayer 2 won");
            break;
        }
    }
    if (i==k-1) {
        if (f1==0 && f2==0) {
            System.out.println("You
both have lost the game!");
            System.out.printf("The
actual number was %d",ans);
        }
    }
}

}

void play(HumanPlayer p1,ComputerPlayer
cp1,int k){
    int f1=0;
    int f2=0;
    int ans = 1+
(int) (Math.random()*100);
    for(int i=0;i<k;i++){
        if(i%2==0) {
            System.out.println("Enter the
number from Human");
            int n1 = p1.getGuess();
            f1 = check(ans, n1);
            if (f1 == 1) {
System.out.println("HumanPlayer 1 won");
                break;
            }
        }
    }
}

```

```

        else {
System.out.println("ComputerPlayer 1 guess");
        int n2 = cp1.getGuess();
        f2 = check(ans, n2);
        if (f2 == 1) {
System.out.println("ComputerPlayer 1 won");
            break;
        }
    }
    if (i==k-1) {
        if (f1==0 && f2==0) {
            System.out.println("You
both have lost the game!");
            System.out.printf("The
actual number was %d",ans);
        }
    }
}

void play(HumanPlayer p1,HumanPlayer
p2,int k){
    int f1=0;
    int f2=0;
    int ans = 1+
(int) (Math.random()*100);
    for(int i=0;i<k;i++){
        if(i%2==0) {
            System.out.println("Enter the
number from Human 1");
            int n1 = p1.getGuess();
            f1 = check(ans, n1);
            if (f1 == 1) {
System.out.println("HumanPlayer 1 won");
                break;
            }
        }
    }
}

```

```

        }
    }
    else {
        System.out.println("Enter the
number from Human 2");
        int n2 = p2.getGuess();
        f2 = check(ans, n2);
        if (f2 == 1) {
System.out.println("HumanPlayer 2 won");
            break;
        }
    }
    if (i==k-1) {
        if (f1==0 && f2==0) {
            System.out.println("You
both have lost the game!");
            System.out.printf("The
actual number was %d",ans);
        }
    }
}

}

int check(int rand,int n){

    if(rand==n){
        System.out.println("You guessed
the correct number");

        return 1;
    }
    if(rand<n){
        System.out.println("The entered
number is higher,enter a lower number");
    }
}

```

```

        return 0;
    }
    System.out.println("The entered
number is lower,enter a higher number");
    return 0;
}
}
public class NumberGuesser {
    public static void main(String[] args) {
        Scanner sc=new Scanner(System.in);
        System.out.println("Enter the total
number of guesses you want:");
        int gno= sc.nextInt();
        System.out.println("With whom do you
want to play the matches:");
        System.out.println("1)Computer vs
Computer\n2)Computer vs Human\n3)Human vs
Human\n4)Solo Game\n");
        int pc=sc.nextInt();
        Main m= new Main();
        switch (pc) {
            case 1:
            {
                ComputerPlayer cp1= new
ComputerPlayer();
                ComputerPlayer cp2= new
ComputerPlayer();
                m.play(cp2,cp1,gno);

                break;
            }
            case 2:{
                ComputerPlayer cp1= new
ComputerPlayer();
                HumanPlayer p1= new
HumanPlayer();
                m.play(p1,cp1,gno);
            }
        }
    }
}

```

```

        break;
    }
    case 3:
    {
        HumanPlayer p1= new
HumanPlayer();
        HumanPlayer p2= new
HumanPlayer();
        m.play(p1,p2,gno);
        break;
    }
    case 4:
    {
        HumanPlayer hp= new
HumanPlayer();
        int flag=0;
        int rando=1+
(int) (Math.random()*100);
        for(int i=0;i<gno;i++){
            System.out.println("Enter
your guess:");
            int nt= hp.getGuess();
            flag= m.check(rando,nt);
            if(flag==1){
                System.out.println("You have won!");
                break;
            }
            if(i==gno-1){
                if(flag==0){
                    System.out.println("You have lost the
game!");
                }
            }
        }
        break;
    }
}
break;

```

```
        }  
        default:  
        {  
            System.out.println("Wrong  
choice!");  
            break;  
        }  
    }  
}  
}
```

Output:

Computer vs Computer


```
"C:\Program Files\Java\jdk-18.0.1\bin\java.exe" "-jav
Enter the total number of guesses you want:
6
With whom do you want to play the matches:
1)Computer vs Computer
2)Computer vs Human
3)Human vs Human
4)Solo Game

1
ComputerPlayer 1 guess
94
The entered number is higher,enter a lower number
ComputerPlayer 2 guess
38
The entered number is lower,enter a higher number
ComputerPlayer 1 guess
88
The entered number is higher,enter a lower number
ComputerPlayer 2 guess
35
The entered number is lower,enter a higher number
ComputerPlayer 1 guess
12
The entered number is lower,enter a higher number
ComputerPlayer 2 guess
88
The entered number is higher,enter a lower number
You both have lost the game!
The actual number was 69
Process finished with exit code 0
```

Human vs Computer

```
"C:\Program Files\Java\jdk-18.0.1\bin\java.exe" "-jav
Enter the total number of guesses you want:
6
With whom do you want to play the matches:
1)Computer vs Computer
2)Computer vs Human
3)Human vs Human
4)Solo Game

2
Enter the number from Human
34
The entered number is higher,enter a lower number
ComputerPlayer 1 guess
9
The entered number is higher,enter a lower number
Enter the number from Human
8
The entered number is higher,enter a lower number
ComputerPlayer 1 guess
12
The entered number is higher,enter a lower number
Enter the number from Human
5
The entered number is lower,enter a higher number
ComputerPlayer 1 guess
46
The entered number is higher,enter a lower number
You both have lost the game!
The actual number was 6
Process finished with exit code 0
```

Human vs Human

```
"C:\Program Files\Java\jdk-18.0.1\bin\java.exe" "-j
Enter the total number of guesses you want:
6
With whom do you want to play the matches:
1)Computer vs Computer
2)Computer vs Human
3)Human vs Human
4)Solo Game

3
Enter the number from Human 1
23
The entered number is lower,enter a higher number
Enter the number from Human 2
27
You guessed the correct number
HumanPlayer 2 won

Process finished with exit code 0
```

Solo game

```
"C:\Program Files\Java\jdk-18.0.1\bin\java.exe" "-j
Enter the total number of guesses you want:
6
With whom do you want to play the matches:
1)Computer vs Computer
2)Computer vs Human
3)Human vs Human
4)Solo Game

4
Enter your guess:
45
The entered number is lower,enter a higher number
Enter your guess:
55
The entered number is lower,enter a higher number
Enter your guess:
69
The entered number is higher,enter a lower number
Enter your guess:
59
The entered number is higher,enter a lower number
Enter your guess:
57
You guessed the correct number
You have won!
```