Java Assignment 2

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// 1. Arithmetic & Assignment Operators

// Q1: Swap two numbers without third variable and without + or -
class SwapXOR {
   public static void main(String[] args) {
      int a = 5, b = 10;
      a = a ^ b;
      b = a ^ b;
      a = a ^ b;
      System.out.println("a: " + a + ", b: " + b);
   }
}

// Q2: Check even or odd using bitwise operator
class EvenOddBitwise {
   public static void main(String[] args) {
      int n = 7;
      System.out.println((n & 1) == 0 ? "Even" : "Odd");
   }
}

// Q3: Sum of digits using % and /
class SumOfDigits {
   public static void main(String[] args) {
      int num = 1234, sum = 0;
      while (num != 0) {
         sum += num % 10;
         num /= 10;
      }
      System.out.println("Sum: " + sum);
   }
}

// Q4: Check divisibility by 3 without % or /
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class DivisibilityBy3 {
   static boolean isDivisible(int n) {
      while (n > 0) {
         n = n - 3;
      }
      return n == 0;
   }
   public static void main(String[] args) {
      int num = 27;
      System.out.println(isDivisible(num) ? "Divisible by 3" : "Not divisible
by 3");
   }
}

// Q5: Swap numbers using += and -=
class SwapUsingOperators {
   public static void main(String[] args) {
      int a = 5, b = 10;
      a += b;
      b = a - b;
      a -= b;
      System.out.println("a: " + a + ", b: " + b);
   }
}

// 2. Relational & Logical Operators

// Q6: Find largest of 3 numbers using ternary operator
class LargestOfThree {
   public static void main(String[] args) {
      int a = 10, b = 20, c = 15;
      int largest = (a > b) ? (a > c ? a : c) : (b > c ? b : c);
      System.out.println("Largest: " + largest);
   }
}

// Q7: Check leap year using logical operators
class LeapYear {
   public static void main(String[] args) {
      int year = 2024;
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        boolean isLeap = (year % 4 == 0 && year % 100 != 0) || (year % 400
== 0);
        System.out.println(isLeap ? "Leap Year" : "Not a Leap Year");
    }
}

// Q8: Check if at least two of three booleans are true
class TwoTrue {
    public static void main(String[] args) {
        boolean a = true, b = false, c = true;
        System.out.println((a && b) || (b && c) || (a && c));
    }
}

// Q9: Check if a number is in range 20-50 without if-else
class NumberInRange {
    public static void main(String[] args) {
        int num = 30;
        System.out.println(num >= 20 && num <= 50);
    }
}

// Q10: Check if character is vowel or consonant using ternary operator
class VowelConsonant {
    public static void main(String[] args) {
        char ch = 'e';
        String result = ("AEIOUaeiou".indexOf(ch) != -1) ? "Vowel" :
"Consonant";
        System.out.println(result);
    }
}

// 3. Bitwise Operators

// Q11: Check if a number is a power of 2 using bitwise
class PowerOfTwo {
    public static void main(String[] args) {
        int n = 16;
        System.out.println((n & (n - 1)) == 0 && n > 0);
    }
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}

// Q12: Multiply by 8 using bitwise shift
class MultiplyBy8 {
   public static void main(String[] args) {
      int n = 5;
      System.out.println(n << 3);
   }
}

// Q13: Find absolute value using bitwise
class AbsoluteValue {
   public static void main(String[] args) {
      int num = -10;
      int mask = num >> 31;
      int abs = (num + mask) ^ mask;
      System.out.println("Absolute: " + abs);
   }
}

// 4. Ternary Operator Challenges

// Q16: Check positive, negative, or zero using ternary
class NumberCheck {
   public static void main(String[] args) {
      int num = -5;
      System.out.println(num > 0 ? "Positive" : (num < 0 ? "Negative" :
"Zero"));
   }
}

// Q18: Check pass or fail based on percentage
class PassFail {
   public static void main(String[] args) {
      int percentage = 35;
      System.out.println(percentage >= 40 ? "Pass" : "Fail");
   }
}

// 5. Miscellaneous Operator Questions
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// Q21: Increment a number without + or ++
class IncrementWithoutPlus {
    public static void main(String[] args) {
        int num = 5;
        num = -~num;
        System.out.println(num);
    }
}

// Q22: Simple calculator using switch-case
class Calculator {
    public static void main(String[] args) {
        int a = 10, b = 5;
        char op = '+';
        switch (op) {
            case '+': System.out.println(a + b); break;
            case '-': System.out.println(a - b); break;
            case '*': System.out.println(a * b); break;
            case '/': System.out.println(a / b); break;
            default: System.out.println("Invalid Operator");
        }
    }
}

// Q23: Check even or odd using & bitwise operator

class EvenOddBitwiseCheck {
    public static void main(String[] args) {
        int num = 7;
        System.out.println((num & 1) == 0 ? "Even" : "Odd");
    }
}

// Q24: Print all even numbers from 1 to 100 using bitwise &

class PrintEvenNumbers {
    public static void main(String[] args) {
        for (int i = 1; i <= 100; i++) {
            if ((i & 1) == 0) System.out.print(i + " ");
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        }
    }
}

// Q25: Reverse an integer without string conversion

class ReverseNumber {
    public static void main(String[] args) {
        int num = 1234, rev = 0;
        while (num != 0) {
            rev = rev * 10 + num % 10;
            num /= 10;
        }
        System.out.println("Reversed Number: " + rev);
    }
}
```