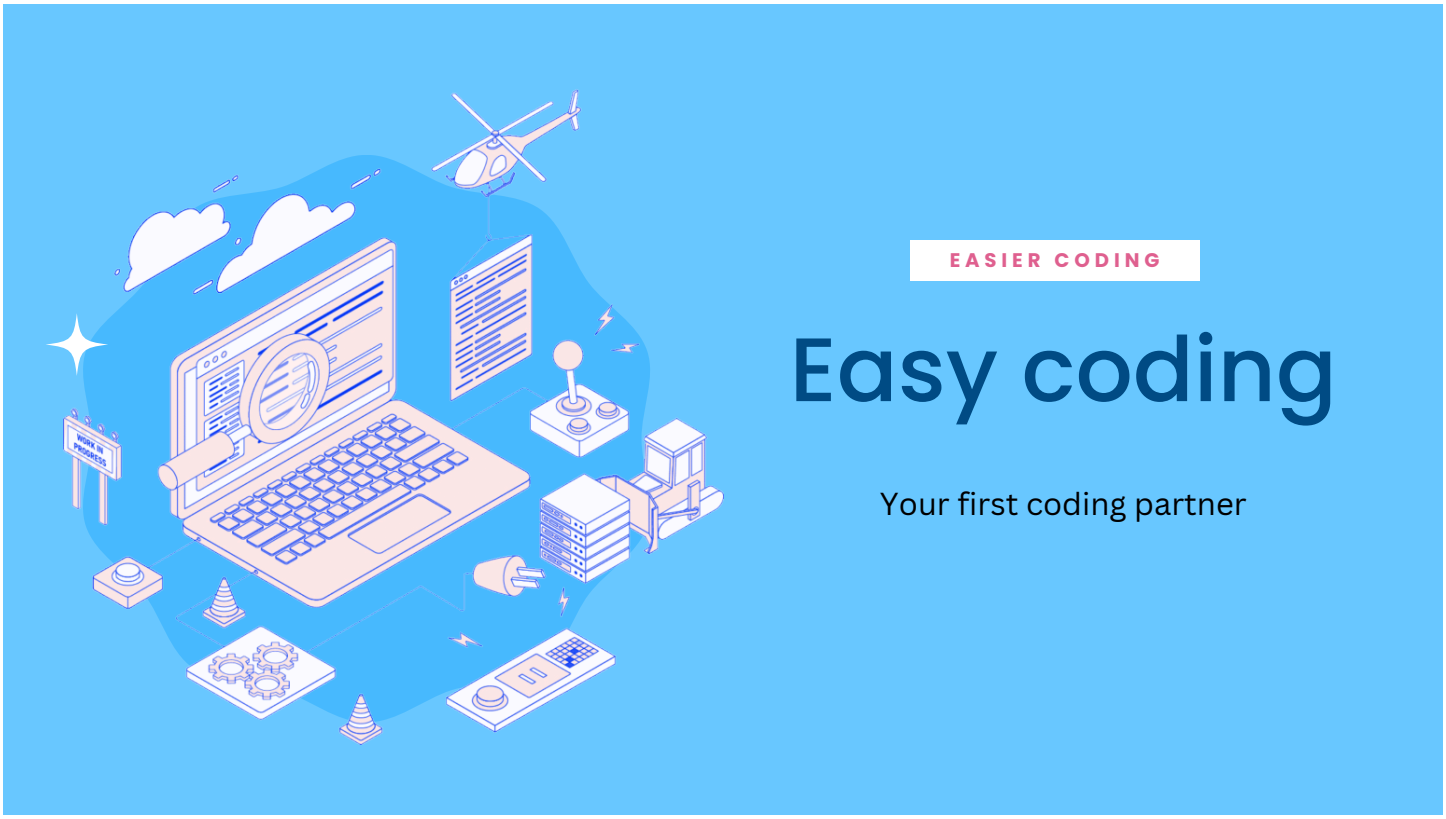
Understanding Java Basics

A Beginner's Guide to Problem Solving with Step-by-Step Solutions

Easier Coding

Java Project Problem Solving Questions for Beginners



Problem Solving Project Questions with Solutions and Explanations

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Question 1: Reverse a String

Problem:
Write a Java program to reverse a given string.

Solution:

```
public class ReverseString {
    public static void main(String[] args) {
        String original = "Hello World";
        String reversed = new StringBuilder(original).reverse().toString();
        System.out.println("Reversed string: " + reversed);
    }
}
```

Explanation:
This solution uses the StringBuilder class, which provides a reverse() method to easily reverse the characters in a string. This is efficient and concise for beginners to understand.

Question 2: Check for Palindrome

Problem:
Write a Java program to check if a given string is a palindrome.

Solution:

```
public class PalindromeCheck {
    public static void main(String[] args) {
        String input = "madam";
        String reversed = new StringBuilder(input).reverse().toString();
        if (input.equals(reversed)) {
            System.out.println("The string is a palindrome.");
        } else {
            System.out.println("The string is not a palindrome.");
        }
    }
}
```

Explanation:
A palindrome reads the same forwards and backwards. This program reverses the string and checks if the reversed string is equal to the original.

Question 3: Find the Factorial

Problem:
Write a Java program to calculate the factorial of a number.

Solution:

```
public class Factorial {
   public static void main(String[] args) {
      int number = 5; // Example number
      int factorial = 1;
      for (int i = 1; i <= number; i++) {
         factorial *= i;
      }
      System.out.println("Factorial of " + number + " is " + factorial);
   }
}
```

Explanation:
This program uses a for loop to multiply numbers from 1 to the given number, resulting in the factorial.

Question 4: Fibonacci Sequence

Problem:
Write a Java program to display the first n numbers of the Fibonacci sequence.

Solution:

```
public class Fibonacci {
   public static void main(String[] args) {
      int n = 10; // Example number of terms
      int first = 0, second = 1;
      System.out.print("Fibonacci series: " + first + ", " + second);

      for (int i = 2; i < n; i++) {
         int next = first + second;
         System.out.print(", " + next);
         first = second;
```

```
            second = next;
        }
    }
}
```

Explanation:
The Fibonacci sequence starts with 0 and 1, and each subsequent number is the sum of the previous two. This program iterates to display the sequence.

Question 5: Check Prime Number

Problem:
Write a Java program to check if a number is a prime number.

Solution:

```
public class PrimeCheck {
    public static void main(String[] args) {
        int number = 29; // Example number
        boolean isPrime = true;
        for (int i = 2; i <= number / 2; i++) {
            if (number % i == 0) {
                isPrime = false;
                break;
            }
        }
        if (isPrime) {
            System.out.println(number + " is a prime number.");
        } else {
            System.out.println(number + " is not a prime number.");
        }
    }
}
```

Explanation:
A prime number is only divisible by 1 and itself. This program checks divisibility from 2 up to half of the number to determine if it's prime.

Question 6: Find Largest Element in Array

Problem:
Write a Java program to find the largest element in an array.

Solution:

```
public class LargestElement {
   public static void main(String[] args) {
      int[] numbers = {3, 5, 7, 2, 8};
      int max = numbers[0];
      for (int num : numbers) {
         if (num > max) {
            max = num;
         }
      }
      System.out.println("Largest element is: " + max);
   }
}
```

Explanation:
The program iterates through the array, updating the max variable whenever a larger number is found.

Question 7: Count Vowels in a String

Problem:
Write a Java program to count the number of vowels in a given string.

Solution:

```
public class VowelCounter {
   public static void main(String[] args) {
      String input = "Hello World";
      int vowelCount = 0;
      for (char c : input.toLowerCase().toCharArray()) {
         if (c == 'a' || c == 'e' || c == 'i' || c == 'o' || c == 'u') {
            vowelCount++;
         }
      }
      System.out.println("Number of vowels: " + vowelCount);
   }
}
```

Explanation:
This program converts the string to lowercase, iterates through each character, and counts the vowels by checking against known vowel characters.

Question 8: Sum of Array Elements

Problem:
Write a Java program to calculate the sum of elements in an array.

Solution:

```
public class ArraySum {
  public static void main(String[] args) {
    int[] numbers = {1, 2, 3, 4, 5};
    int sum = 0;
    for (int num : numbers) {
      sum += num;
    }
    System.out.println("Sum of array elements: " + sum);
  }
}
```

Explanation:
The program iterates through the array, adding each element to the sum variable to get the total sum of the array elements.

Question 9: Swap Two Variables

Problem:
Write a Java program to swap two variables without using a third variable.

Solution:

```
public class SwapVariables {
  public static void main(String[] args) {
    int a = 5;
    int b = 10;

    System.out.println("Before swap: a = " + a + ", b = " + b);

    a = a + b;
    b = a - b;
    a = a - b;

    System.out.println("After swap: a = " + a + ", b = " + b);
  }
}
```

Explanation:
This solution uses arithmetic operations to swap the values of two variables without using a temporary variable. This is an efficient and clever method for beginners to learn.
