

```
public static String compute(String word1, String word2) {  
    String result = "";  
    if (word1.length() == word2.length()) {  
        for (int i = 0; i < word1.length(); i++) {  
            result = result + word1.charAt(i) + word2.charAt(i);  
        }  
    }  
    return result;  
}
```

The diagram illustrates the control flow of the provided Java code. Nodes are represented by colored circles, and edges represent the flow of execution. The flow starts at the method signature, proceeds to the initialization of 'result', then to the 'if' condition. If the condition is true, it enters a 'for' loop, where it concatenates characters from 'word1' and 'word2' into 'result'. The loop ends, and the method returns 'result'.