Practical 9: Alon-Matias-Szegedy Algorithm

Codes:

```
import java.io.*;
import java.util.*;

class AMSA {
  public static int findCharCount(String stream, char XE, int random, int n) {
    int countoccurance = 0;
    for (int i = random; i < n; i++) {
      if (stream.charAt(i) == XE) {
        countoccurance++;
      }
    }
    return countoccurance;
  }

  public static int estimateValue(int XV1, int n) {
    int ExpValue;
    ExpValue = n * (2 * XV1 - 1);
    return ExpValue;
  }

  public static void main(String args[]) {
    int n = 15;
    String stream = "abcbdacdabdcaab";
    int random1 = 3, random2 = 8, random3 = 13;
    char XE1, XE2, XE3;
    int XV1, XV2, XV3;
    int ExpValuXE1, ExpValuXE2, ExpValuXE3;
    int apprSecondMomentValue;

    // Select three random characters from the stream
    XE1 = stream.charAt(random1 - 1);
    XE2 = stream.charAt(random2 - 1);
    XE3 = stream.charAt(random3 - 1);

    // Count the number of occurrences of each character in the stream
    XV1 = findCharCount(stream, XE1, random1 - 1, n);
    XV2 = findCharCount(stream, XE2, random2 - 1, n);
    XV3 = findCharCount(stream, XE3, random3 - 1, n);

    // Print the counts of the selected characters
    System.out.println(XE1 + "=" + XV1 + " " + XE2 + "=" + XV2 + " " + XE3 +
"=" + XV3);

    // Estimate the expected value for each selected character
```

```
    ExpValuXE1 = estimateValue(XV1, n);
    ExpValuXE2 = estimateValue(XV2, n);
    ExpValuXE3 = estimateValue(XV3, n);

    // Print the expected values for each selected character
    System.out.println("Expected value for" + XE1 + " is::" + ExpValuXE1);
    System.out.println("Expected value for" + XE2 + " is::" + ExpValuXE2);
    System.out.println("Expected value for" + XE3 + " is::" + ExpValuXE3);

    // Compute the approximate second moment value using Alon-Matias-Szegedy
algorithm
    apprSecondMomentValue = (ExpValuXE1 + ExpValuXE2 + ExpValuXE3) / 3;
    System.out.println("approximate second moment value using alon-matis-
szegedy is::" + apprSecondMomentValue);
  }
}
```

OUTPUT

```
c=3 d=2 a=2
Expected value forc is::75
Expected value ford is::45
Expected value fora is::45
approximate second moment value using alon-matis-szegedy is::55
```