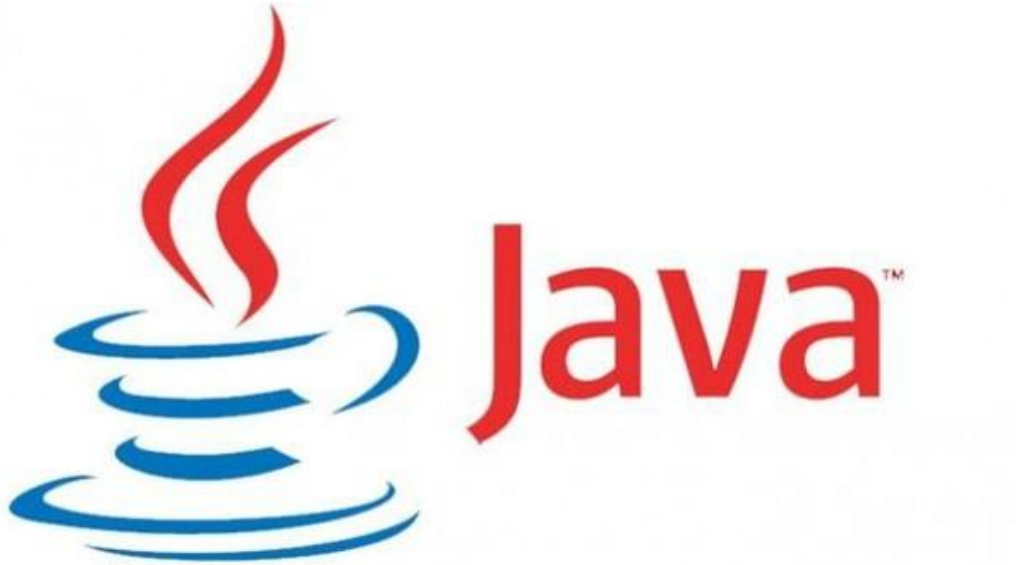
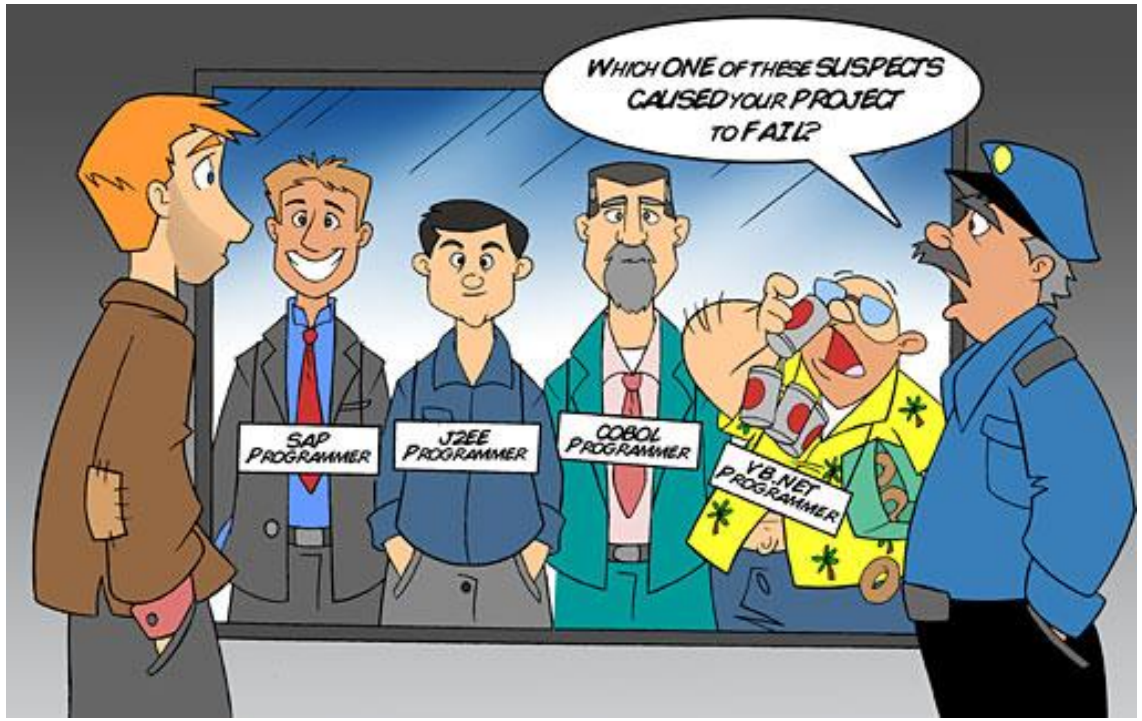


JAVA & BlueJ

- **Vetores**



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1. Criando um vetor

InitArray1.java

```java
public class InitArray1
{
   public static void main( String args[] )
   {
      int array[] = new int[5];

      System.out.printf( "%s%8s\n", "Indice", "Valor" );

      for ( int counter = 0; counter < array.length; counter++ )
         System.out.printf( "%6d%8d\n", counter, array[ counter ] );
   }
}
```

```
Indice   Valor
     0       0
     1       0
     2       0
     3       0
     4       0
```

2. Criando vetor com valores

InitArray2.java

```java
public class InitArray2
{
   public static void main( String args[] )
   {
      int array[] = { 32, 27, 64, 18, 95, 14, 90, 70, 60, 37 };

      System.out.printf( "%s%8s\n", "Indice", "Valor" );

      for ( int counter = 0; counter < array.length; counter++ )
         System.out.printf( "%6d%8d\n", counter, array[ counter ] );
   }
}
```

```
Indice   Valor
     0      32
     1      27
     2      64
     3      18
     4      95
     5      14
     6      90
     7      70
     8      60
     9      37
```

3. Preenchendo vetor com cálculos

InitArray3.java

```java
public class InitArray3
{
   public static void main( String args[] )
   {
      int array[] = new int[5];

      for ( int counter = 0; counter < array.length; counter++ )
         array[counter] = 2 + 2 * counter;

      System.out.printf( "%s%8s\n", "Indice", "Valor" );

      for ( int counter = 0; counter < array.length; counter++ )
         System.out.printf( "%6d%8d\n", counter, array[ counter ] );
   }
}
```

```
Indice   Valor
     0       2
     1       4
     2       6
     3       8
     4      10
```

4. Somando elementos do vetor

SumArray.java

```java
public class SumArray
{
   public static void main( String args[] )
   {
      int array[] = { 32, 27, 64, 18, 95, 14, 90, 70, 60, 37 };
      int total = 0;

      for ( int counter = 0; counter < array.length; counter++ )
         total += array[counter];

      System.out.printf( "Total of array elements: %d\n", total );
   }
}
```

```
Total of array elements: 507
```

5. Foreach

ForEach.java

```java
public class ForEach
{
   public static void main( String args[] )
   {
      int array[] = { 32, 27, 64, 18, 95, 14, 90, 70, 60, 37 };
      int total = 0;

      for ( int element : array )
         total += element;

      System.out.printf( "Total of array elements: %d\n", total );
   }
}
```

```
Total of array elements: 507
```

6. Gráfico de “barras”

BarChart.java

```java
public class BarChart
{
   public static void main( String args[] )
   {
      int array[] = {0, 0, 0, 0, 0, 0, 1, 2, 4, 2, 1};

      System.out.println("Grade distribution:");

      for (var counter = 0; counter < array.length; ++counter)
      {
         if (counter == 10)
         {
            System.out.print("  100: ");
         }
         else
         {
            System.out.printf("%d-%d: ", counter * 10, counter * 10 + 9);
         }

         // display bar of asterisks
         for (var stars = 0; stars < array[counter]; ++stars)
         {
            System.out.print("*");
         }

         System.out.println();
      }
   }
}
```

```
Grade distribution:
 0- 9:
10-19:
20-29:
30-39:
40-49:
50-59:
60-69: *
70-79: **
80-89: ****
90-99: **
  100: *
```

7. Probabilidade com vetores

RollDie.java

```java
import java.util.Random;

public class RollDie
{
   public static void main( String args[] )
   {
      Random randomNumbers = new Random();
      int frequency[] = new int[ 7 ];

      for ( int roll = 1; roll <= 60000000; roll++ )
         ++frequency[ 1 + randomNumbers.nextInt( 6 ) ];

      System.out.printf( "%s%11s\n", "Face", "Frequencia" );

      for ( int face = 1; face < frequency.length; face++ )
         System.out.printf( "%4d%11d\n", face, frequency[ face ] );
   }
}
```

```
Face Frequencia
   1   10002568
   2   10001182
   3    9998567
   4    9999807
   5    9998884
   6    9998992
```

8. Passando vetores ou valores

```
Efeito de passar por referencia todo vetor:
Os valores na ordem original sao:
   1   2   3   4   5

Os valores do vetor modificado sao:
   2   4   6   8   10

Efeito de passar o valor de um elemento do vetor:
array[3] antes de modifyElement: 8
Valor do elemento em modifyElement: 16
array[3] depois de modifyElement: 8
```

PassArray.java

```java
public class PassArray
{
   public static void main( String args[] )
   {
      int array[] = { 1, 2, 3, 4, 5 };

      System.out.println(
         "Efeito de passar por referencia todo vetor:\n" +
         "Os valores na ordem original sao:" );

      for ( int value : array )
         System.out.printf( "   %d", value );

      modifyArray( array );
      System.out.println( "\n\nOs valores do vetor modificado sao:" );

      for ( int value : array )
         System.out.printf( "   %d", value );

      System.out.printf(
         "\n\nEfeito de passar o valor de um elemento do vetor:\n" +
         "array[3] antes de modifyElement: %d\n", array[ 3 ] );

      modifyElement( array[ 3 ] );
      System.out.printf(
         "array[3] depois de modifyElement: %d\n", array[ 3 ] );
   }

   public static void modifyArray( int array2[] )
   {
      for ( int counter = 0; counter < array2.length; counter++ )
         array2[ counter ] *= 2;
   }

   public static void modifyElement( int element )
   {
      element *= 2;
      System.out.printf(
         "Valor do elemento em modifyElement: %d\n", element );
   }
}
```

9. Vetores para armazenar

GradeBook.java

```java
public class GradeBook
{
   private String courseName;
   private int grades[][];

   public GradeBook( String name, int gradesArray[][])
   {
      courseName = name;
      grades = gradesArray;
   }

   public void setCourseName( String name )
   {
      courseName = name;
   }

   public String getCourseName()
   {
      return courseName;
   }

   public void displayMessage()
   {
      System.out.printf( "Bemvindo ao curso\n%s!\n\n",
         getCourseName() );
   }

   public void processGrades()
   {
      outputGrades();

      System.out.printf( "\n%s %d\n%s %d\n\n",
         "Menor nota no curso e", getMinimum(),
         "Maior nota no curso e", getMaximum() );

      outputBarChart();
   }

   public int getMinimum()
   {
      int lowGrade = grades[ 0 ][ 0 ];

      for ( int studentGrades[] : grades )
      {
         for ( int grade : studentGrades )
         {
            if ( grade < lowGrade )
               lowGrade = grade;
         }
      }

      return lowGrade;
   }
```

9. Vetores para armazenar

```
55    public int getMaximum()
56    {
57       int highGrade = grades[ 0 ][ 0 ];
58
59       for ( int studentGrades[] : grades )
60       {
61          for ( int grade : studentGrades )
62          {
63             if ( grade > highGrade )
64                highGrade = grade;
65          }
66       }
67
68       return highGrade;
69    }
70
71    public double getAverage( int setOfGrades[] )
72    {
73       int total = 0;
74
75       for ( int grade : setOfGrades )
76          total += grade;
77
78
79       return (double) total / setOfGrades.length;
80    }
```

```
82    public void outputBarChart()
83    {
84       System.out.println( "Distribuicao da notas da turma:" );
85
86       int frequency[] = new int[ 11 ];
87
88       for ( int studentGrades[] : grades )
89       {
90          for ( int grade : studentGrades )
91             ++frequency[ grade / 10 ];
92       }
93
94       for ( int count = 0; count < frequency.length; count++ )
95       {
96          if ( count == 10 )
97             System.out.printf( "%5d: ", 100 );
98          else
99             System.out.printf( "%02d-%02d: ",
100                count * 10, count * 10 + 9  );
101
102          for ( int stars = 0; stars < frequency[ count ]; stars++ )
103             System.out.print( "*" );
104
105          System.out.println();
106       }
107    }
```

9. Vetores para armazenar

```
109     public void outputGrades()
110     {
111        System.out.println( "As notas sao:\n" );
112        System.out.print( "             " );
113
114        for ( int test = 0; test < grades[ 0 ].length; test++ )
115           System.out.printf( "Prova %d ", test + 1 );
116
117        System.out.println( "   Media" );
118
119        for ( int student = 0; student < grades.length; student++ )
120        {
121           System.out.printf( "Estudante %2d", student + 1 );
122
123           for ( int test : grades[ student ] )
124              System.out.printf( "%8d", test );
125
126           double average = getAverage( grades[ student ] );
127           System.out.printf( "%9.2f\n", average );
128        }
129     }
130  }
```

9. Vetores para armazenar

GradeBookTest.java

```java
public class GradeBookTest
{
   public static void main( String args[] )
   {
      int gradesArray[][] = { { 87, 96, 70 },
                              { 68, 87, 90 },
                              { 94, 100, 90 },
                              { 100, 81, 82 },
                              { 83, 65, 85 },
                              { 78, 87, 65 },
                              { 85, 75, 83 },
                              { 91, 94, 100 },
                              { 76, 72, 84 },
                              { 87, 93, 73 } };

      GradeBook myGradeBook = new GradeBook(
         "Programacao Java", gradesArray);
      myGradeBook.displayMessage();
      myGradeBook.processGrades();
   }
}
```

```
Programacao Java!

As notas sao:

            Prova 1 Prova 2 Prova 3    Media
Estudante  1      87      96      70    84,33
Estudante  2      68      87      90    81,67
Estudante  3      94     100      90    94,67
Estudante  4     100      81      82    87,67
Estudante  5      83      65      85    77,67
Estudante  6      78      87      65    76,67
Estudante  7      85      75      83    81,00
Estudante  8      91      94     100    95,00
Estudante  9      76      72      84    77,33
Estudante 10      87      93      73    84,33

Menor nota no curso e 65
Maior nota no curso e 100

Distribuicao da notas da turma:
00-09:
10-19:
20-29:
30-39:
40-49:
50-59:
60-69: ***
70-79: ******
80-89: ***********
90-99: *******
  100: ***
```

10. Parâmetros variáveis

VarargsTest.java

```java
public class VarargsTest
{
   public static double average(double... numbers)
   {
      double total = 0.0;

      // calcula total utilizando a instru??o for aprimorada
      for ( double d : numbers )
         total += d;

      return total / numbers.length;
   }

   public static void main( String args[] )
   {
      double d1 = 10.0;
      double d2 = 20.0;
      double d3 = 30.0;
      double d4 = 40.0;

      System.out.printf( "d1 = %.1f\nd2 = %.1f\nd3 = %.1f\nd4 = %.1f\n\n",
         d1, d2, d3, d4 );

      System.out.printf( "Media de d1 e d2          = %.1f\n",
         average( d1, d2 ));
      System.out.printf( "Media de d1, d2 e d3      = %.1f\n",
         average( d1, d2, d3 ));
      System.out.printf( "Media de d1, d2, d3 e d4 = %.1f\n",
         average( d1, d2, d3, d4 ));
   }
}
```

```
d1 = 10,0
d2 = 20,0
d3 = 30,0
d4 = 40,0

Media de d1 e d2          = 15,0
Media de d1, d2 e d3      = 20,0
Media de d1, d2, d3 e d4 = 25,0
```