Rakel María Brynjólfsdóttir rmb3@hi.is
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Dæmatímakennari: Kristófer Montazeri

Tölvunarfræði 1
Heimadæmi 2

Dæmi 1

```
public class Fylki {

  public static void main(String[] args) {

    int[] a = new int[100];

      for (int i = 0; i < 100; i++) {
        a[i] = (int) (Math.random()*999);
      }

    int[] b = new int[50];

      for (int i = 0; i < 50; i++) {
        b[i] = a[2*i] + a[2*i+1];
      }
  }
}
```

Dæmi 2

```
public class Unique{

  public static void main(String[] args) {
   args = new String[]{"4","3","2","1"};
    int[] a = new int[args.length]; //stærð á fylki háð args

    for (int i = 0; i < args.length; i++) {
      a[i] = Integer.parseInt(args[i]);
    }
    //selection sort
    for (int i = 0; i < args.length; i++) {
      int min = i;
      for(int j = i + 1; j < args.length; j++) {
        if(a[j] < a[min]) min = j;
      }
      int temp = a[min];
      a[min] = a[i];
      a[i] = temp;
    }
    //hve mörg ólík stök
```

```
    int stak = a[0];
    int telja = 1;

    for (int i = 1; i < args.length; i++) {
      if(a[i] != stak) {
        telja++;
      }
      stak = a[i];
    }
    //fjöldi staks
    int m = 0;
    int integerToBeCounted = a[0];
    int[] fjöldi = new int[telja];
    for (int i = 0; i < args.length; i++) {
      if(integerToBeCounted == a[i]) fjöldi[m]++;
      else {
        m++;
        integerToBeCounted = a[i];
        fjöldi[m] = 1;
      }
    }
   //gildi staks
    int[] gildi = new int[telja];
    int k = 0;
    int n = 0;

    while(n < fjöldi.length) {
      gildi[n] = a[k];
      k = k + fjöldi[n];
      n++;
    }

    for (int i = 0; i < fjöldi.length;i++ ) {
      if(fjöldi[i] != 1) {
        System.out.println(fjöldi[i] + " eintök af " + gildi[i]);
      }
    }

   int s = 0;
    for (int i = 0; i < fjöldi.length; i++) {
      if (fjöldi[i] == 1) s++;
    }

    if (s == fjöldi.length) System.out.println("Allar mismunandi");

  }
}
```

Dæmi 3

Dæmi 4

```
int b = Interger.parseInt(args[0]);
int c = Interger.parseInt(args[1]);
int d = Interger.parseInt(args[2]);
int e = Interger.parseInt(args[3]);

int[][] a = new int[c][d];
int[][] b = new int[e][f];

if (d != e) System.out.println("Fylki ekki af réttri stærð");

else {

          int[][] c = new int[c][f];
          for (int i = 0; i < c; i++) {

               for (int j = 0; j < c; j++) {
               }
                    for (int k = 0; k < c; k++) {
                    c[i][j] += a[i][k] * b[k][j];
               }
          }
     }
```

Dæmi 5

```
public class Sudoku {

    public static String isSolution(int[][] s){

        // By til 2n vigra ur nxn fylkinu s
        int[][] allt = new int[18][9];
        for (int i = 0; i < s.length; i++) {
            for (int j = 0; j < s.length; j++) {
                allt[i][j] = s[i][j];
                allt[i+9][j] = s[j][i];
            }
        }

        // sortera alla vigranna
        allt = insertionSort(allt);

        // athuga hvort sorterudu vigrarnir gangi upp
        // med tvi ad athuga hvort ad aN-N = 0
        for (int i = 0; i < allt.length; i++ ) {
            for (int j = 0; j < allt[i].length; j++) {
                if(allt[i][j] - j - 1 != 0){
                    return "Ekki lausn";
```

```
                }
            }
        }
        return "Rett lausn";
    }

    // insertion sort
    public static int[][] insertionSort(int[][] a){
        for (int j = 0; j < a.length; j++) {
            for (int i = 1; i < a[j].length; i++) {
                int tmp = a[j][i];
                int k;
                for (k = i-1; k >= 0 && tmp < a[j][k]; k-- ) {
                    a[j][k+1] = a[j][k];
                }
                a[j][k+1] = tmp;
            }
        }
        return a;
    }


    public static void main(String[] args) {
        // Fylki sem er lögleg lausn á Sudoku þraut
        int[][] s = {
            { 5, 3, 4, 6, 7, 8, 9, 1, 2 },
            { 6, 7, 2, 1, 9, 5, 3, 4, 8 },
            { 1, 9, 8, 3, 4, 2, 5, 6, 7 },
            { 8, 5, 9, 7, 6, 1, 4, 2, 3 },
            { 4, 2, 6, 8, 5, 3, 7, 9, 1 },
            { 7, 1, 3, 9, 2, 4, 8, 5, 6 },
            { 9, 6, 1, 5, 3, 7, 2, 8, 4 },
            { 2, 8, 7, 4, 1, 9, 6, 3, 5 },
            { 3, 4, 5, 2, 8, 6, 1, 7, 9 }
        };

        // Kóði til að staðfesta að s sé lögleg og athuga hvort t sé lögleg
       System.out.println(isSolution(s));
    }
}
```
