

S10

March 22, 2023

1 38C

1.1 1.

```
[2]: def kennitala(string):

    string = list(map(int, ' '.join(str(string)).split()))
    calc = [3,2,7,6,5,4,3,2]

    sum = 0

    for i in range(8):
        sum += string[i]*calc[i]

    randomnumb = sum%11
    if randomnumb==0:
        return string[8] == 0
    if randomnumb == 1:
        return False
    else:
        randomnumb1 = 11-randomnumb
        return randomnumb1 == string[8]

print(kennitala("9999999999"))
print(kennitala("2411932769"))
```

True

True

1.2 2.

```
[119]: import numpy as np

A = np.loadtxt("https://cs.hi.is/python/kennitolur.txt", delimiter=',',
↪ skiprows=1, dtype=str).T

Name = A[0].tolist()
ExamNumber = A[1].tolist()
```

```

IdNumber = A[2].tolist()

print("Name                                Exam number  Identity number")
for i in range(len(Name)):
    print(str(Name[i]).ljust(34), str(ExamNumber[i]).ljust(12), IdNumber[i])

```

Name	Exam number	Identity number
Sigrún Jónsdóttir	0176	2903993279
Kristín Fjóludóttir	0542	1206972699
Birta Lárusdóttir	0970	2605973109
Erla Ýr Guðnadóttir	1419	1210012330
Anton Ingi Þórsson	4854	2308984059
Íris María Birgisdóttir	5469	1603903879
Ívar Sigurðsson	6324	1309932659
Ágúst Guðni Ingason	6558	1601013180
Steinunn Guðlaug Gunnarsdóttir	7923	2006002580
Eydís Þorsteinsdóttir	8003	1703012420
Signý Guðrún Pálsdóttir	8148	2012012410
Elías Ari Heimisson	9058	0704012830
Mark Johnson	9576	0403983099
Víðir Kristjánsson	9595	2304003180
Jónas Valdimarsson	9706	0706012300

1.3 3.

```

[159]: for j,i in enumerate(IdNumber):
        if kennitala(i) == False:
            print("The identity number", i, "is incorrect and is associated with_
↳the name", Name[j])

```

The identity number 0704012830 is incorrect and is associated with the name Elías Ari Heimisson

1.4 4.

```

[121]: import datetime
def checkdate(day,month,year):
    correctDate = None
    try:
        newDate = datetime.datetime(year, month, day)
        correctDate = True
    except ValueError:
        correctDate = False
    return correctDate

months = ['janúar', 'febrúar', 'mars', 'apríl', 'maí', 'júní', 'júlí', 'ágúst',
↳'september', 'október', 'nóvember', 'desember']

```

```

def checkidentity(checklist):
    for k in checklist:
        day = int(str(k)[:2])
        month = int(str(k)[2:4])
        year = int(str(k)[4:6])
        if checkdate(day, month, year):
            if year<23:
                year = str(k)[4:6]
                print(f"{day}. {months[month-1]} 20{year}")
            else:
                year = str(k)[4:6]
                print(f"{day}. {months[month-1]} 19{year}")
        else:
            print("This date of birth is not valid")

checkidentity(IdNumber)
print("My identity number is 241193-2769.", end=" ")
checkidentity([2411932769])

```

```

29. mars 1999
12. júní 1997
26. maí 1997
12. október 2001
23. ágúst 1998
16. mars 1990
13. september 1993
16. janúar 2001
This date of birth is not valid
17. mars 2001
20. desember 2001
7. apríl 2001
4. mars 1998
This date of birth is not valid
7. júní 2001
My identity number is 241193-2769. 24. nóvember 1993

```

2 D.

2.1 1.

```
[126]: NameExam = dict(zip(Name, ExamNumber))
```

2.2 2.

```
[37]: def íslenska(s):
    # notað sem 'key' í sort eða sorted til að raða í íslenska stafrófsröð,
    # t.d. print(sorted(['ár', 'bára', 'bali', 'akur'], key=íslenska))"""
    return [íslenska.k.get(c.lower(),0) for c in s]
íslenska.a = list('aábcdðeéfghiíjklmnoópqrstuúvwxyýzþæö')
íslenska.k = dict(zip(íslenska.a, range(1,len(íslenska.a)+1)))
IcelandicNameExam = sorted(NameExam, key=íslenska)
SortedDict = {i: NameExam[i] for i in IcelandicNameExam}
print("Name                                Exam number")
for i in SortedDict:
    print(i.ljust(34), SortedDict[i])
```

Name	Exam number
Anton Ingi Þórssón	4854
Ágúst Guðni Ingason	6558
Birta Lárusdóttir	970
Elías Ari Heimisson	9058
Erla Ýr Guðnadóttir	1419
Eydís Þorsteinsdóttir	8003
Íris María Birgisdóttir	5469
Ívar Sigurðsson	6324
Jónas Valdimarsson	9706
Kristín Fjóludóttir	542
Mark Johnson	9576
Signý Guðrún Pálsdóttir	8148
Sigrún Jónsdóttir	176
Steinunn Guðlaug Gunnarsdóttir	7923
Víðir Kristjánsson	9595

2.3 3.

```
[42]: P = [2,3,5,7,11,13,17,19,23,29,31,37,41,43,47,53,59,61,67,71,73,79,83,89,97]

nrp = {}
for i in range(len(P)):
    nrp[P[i]] = i+1

def prime_lookup(num, nrp):
    if num > 99:
        return f"{num} er of stór"
    elif num in nrp:
        return f"{num} er {nrp[num]}. prímtalan"
    else:
        return f"{num} er ekki prímtala"

print(prime_lookup(13, nrp))
```

```
print(prime_lookup(16, nrp))
print(prime_lookup(103, nrp))
```

13 er 6. prímtalan
16 er ekki prímtala
103 er of stór

3 VV3. Fall Rosenbrocks

3.1 1.

```
[206]: def rosen(x,y):
        return (1-x)**2+100*(y-x**2)**2

print(round(rosen(-1.2,1),1))
```

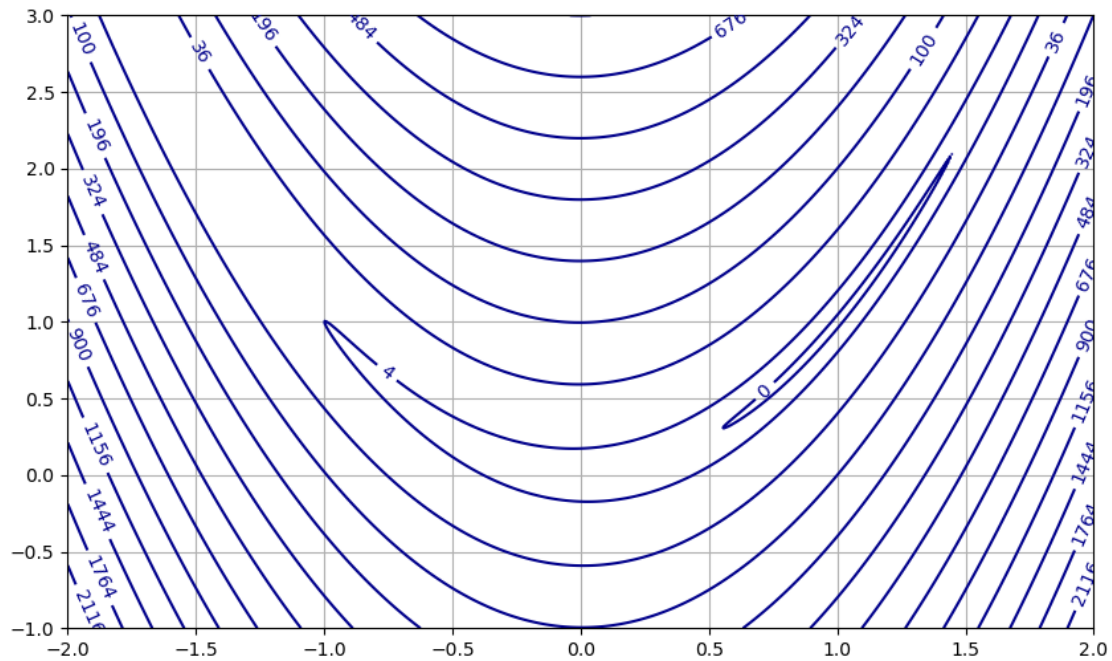
24.2

3.2 2.

```
[199]: import matplotlib.pyplot as plt

plt.figure(figsize=(10,6))
xlist = np.linspace(-2.0, 2.0, 500)
ylist = np.linspace(-1.0, 3.0, 500)
z = np.array([[rosen(xi,yj) for xi in xlist] for yj in ylist])
levels = np.append([0.2], np.arange(2,50,4)**2)
c =plt.contour(xlist,ylist, z, levels=levels, colors='darkblue')

plt.clabel(c, fmt="%.0f")
plt.grid(True)
plt.show()
```



4 VV6. Hlutapróf 2 vorið 2021

4.1 1.

```
[169]: def derivative(x, y):
        df_dx = 2*x*y + 2*y**2 - 3*y
        df_dy = x**2 + 4*x*y - 3*x
        return (df_dx, df_dy)

        derivative(1,1)
```

[169]: (1, 2)

4.2 2.

```
[202]: print(np.dot(np.array(derivative(1,1)), np.array([-1,-1])))
        print("Ég er fæddur 24. Nóv 1993 og ætla að nota 2,4 og 9,3.")
        print(np.dot(np.array(derivative(2,4)), np.array([9,3])))
```

-3

Ég er fæddur 24. Nóv 1993 og ætla að nota 2,4 og 9,3.

414

4.3 3.

```
[205]: def calc(x,y):  
        return x**2*y+2*x*y**2-3*x*y+4  
  
plt.figure(figsize=(10,6))  
xlist = np.linspace(0, 3.0, 500)  
ylist = np.linspace(0, 2.0, 500)  
z = np.array([[calc(xi,yj) for xi in xlist] for yj in ylist])  
# levels = np.append([0.2], np.arange(2,50,4)**2)  
c = plt.contour(xlist,ylist, z, 12, colors='darkblue')  
  
plt.clabel(c, fmt="%.0f")  
plt.grid(True)  
plt.show()
```

