Podpora pre najdlhšie / najkratšie kružnice v grafoch

Procedúry a funkcie pre testy kružníc v grafoch

Určenie dĺžky najdlhšej kružnice v grafe:

```
In[1]:=  LongestCycleLength[G_] := Module[{i, c, t},
           If[HamiltonianGraphQ[G], Return[VertexCount[G]],
            i = VertexCount[G] - 1;
            t = True;
            While[t,
             c = FindCycle[G, {i}];
             If[Not[c == {}], t = False, i -= 1]
            ];
            Return[i]
           ]
          ]
```

Test, či najdlhšia kružnica v grafe je jediná:

```
In[2]:=  UniqueLongestCycleQ[G_] := Module[{l}, l = LongestCycleLength[G];
           If[Length[FindCycle[G, {l}, All]] == 1, True, False]
          ]
```

Pomocný test, či počet dvojvalentných vrcholov v grafe je rôzny od 4:

```
In[3]:=  BadGraph[G_] := Module[{p}, p = VertexDegree[G];
           If[Not[Count[p, 2] == 4], True, False]
          ]
```

Analýza rektilineárnych grafov z množín $\tilde{R}(k)$ pre $k = 2, 3, 4$

Import uvedených rektilineárnych grafov:

```
In[4]:=  filename =
          "/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
           "
```

```
Out[4]= /Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
```

```
In[6]:= z2 = Import[filename <> "R_2.g6"];
```

```
In[7]:= z3 = Import[filename <> "R_3.g6"];
```

```
In[8]:= z4 = Import[filename <> "R_4.g6"];
```

```
In[9]:= l2 = Length[z2]
```

```
Out[9]= 10
```

```
In[10]:= l3 = Length[z3]
```

```
Out[10]=
        92
```

```
In[11]:= l4 = Length[z4]
```

```
Out[11]=
        1781
```

Kontrolné testy, či sú dané grafy navzájom neizomorfné, subkubické a majú práve 4 dvojvalentné vrcholy:

```
In[12]:= For[i = 1, i ≤ l2, i++,
         For[j = i + 1, j ≤ l2, j++,
          If[IsomorphicGraphQ[z2〚i〛, z2〚j〛], Print[i, j]]]]
```

```
In[13]:= For[i = 1, i ≤ l3, i++,
         For[j = i + 1, j ≤ l3, j++,
          If[IsomorphicGraphQ[z3〚i〛, z3〚j〛], Print[i, j]]]]
```

```
In[14]:= For[i = 1, i ≤ l4, i++,
         For[j = i + 1, j ≤ l4, j++,
          If[IsomorphicGraphQ[z4〚i〛, z4〚j〛], Print[i, j]]]]
```

```
In[15]:= For[i = 1, i ≤ l2, i++, If[BadGraph[z2〚i〛], Print[z2〚i〛]]]
```

```
In[16]:= For[i = 1, i ≤ l3, i++, If[BadGraph[z3〚i〛], Print[z3〚i〛]]]
```

```
         For[i = 1, i ≤ l4, i++, If[BadGraph[z4〚i〛], Print[z4〚i〛]]]
```

```
In[18]:= For[i = 1, i ≤ l2, i++, If[Not[Max[VertexDegree[z2〚i〛]] ⩵ 3], Print[z2〚i〛]]]
```

```
In[19]:= For[i = 1, i ≤ l3, i++, If[Not[Max[VertexDegree[z3〚i〛]] ⩵ 3], Print[z3〚i〛]]]
```

```
In[20]:= For[i = 1, i ≤ l4, i++, If[Not[Max[VertexDegree[z4〚i〛]] ⩵ 3], Print[z4〚i〛]]]
```

Testy, či sú dané grafy nehamiltonovské, jednoznačne hamiltonovské resp. nehamiltonovské s jedinou najdlhšou kružnicou + export:

```
In[21]:= neham = 0;
        jedham = 0;
        inham = 0;
        jedc = 0;
        nehamLst = {}; jedhamLst = {}; jedncLst = {};
        For[i = 1, i ≤ l2, i++,
         c = Length[FindHamiltonianCycle[z2〚i〛, All]];
         If[c == 0, neham += 1; AppendTo[nehamLst, z2〚i〛];
          If[UniqueLongestCycleQ[z2〚i〛], jedc += 1;
           AppendTo[jedncLst, z2〚i〛]], If[c == 1, jedham += 1;
           AppendTo[jedhamLst, z2〚i〛], inham += 1]]
        ]
        Print["Štatistika pre grafy s dvomi vrcholmi vo vnútri:  ", neham,
         " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
         " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy s dvomi vrcholmi vo vnútri: 4
  nehamiltonovských, 5 jednoznačne hamiltonovských, 1 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

```
In[24]:= Export[filename <> "nehamiltonovske_2.g6", nehamLst]
```
Out[24]=
/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  nehamiltonovske_2.g6

```
In[25]:= Export[filename <> "jednoznacne_2.g6", jedhamLst]
```
Out[25]=
/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  jednoznacne_2.g6

```
In[26]:= neham = 0;
        jedham = 0;
        inham = 0;
        jedc = 0;
        nehamLst = {}; jedhamLst = {}; jedncLst = {};
        For[i = 1, i ≤ l3, i++,
         c = Length[FindHamiltonianCycle[z3〚i〛, All]];
         If[c == 0, neham += 1; AppendTo[nehamLst, z3〚i〛];
          If[UniqueLongestCycleQ[z3〚i〛], jedc += 1;
           AppendTo[jedncLst, z3〚i〛]], If[c == 1, jedham += 1;
           AppendTo[jedhamLst, z3〚i〛], inham += 1]]
        ]
        Print["Štatistika pre grafy so 3 vrcholmi vo vnútri:  ", neham,
         " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
         " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy so 3 vrcholmi vo vnútri: 41
  nehamiltonovských, 36 jednoznačne hamiltonovských, 15 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

```
In[29]:= Export[filename <> "nehamiltonovske_3.g6", nehamLst]
```
Out[29]=
```
/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  nehamiltonovske_3.g6
```

```
In[30]:= Export[filename <> "jednoznacne_3.g6", jedhamLst]
```
Out[30]=
```
/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  jednoznacne_3.g6
```

```
In[31]:= neham = 0;
        jedham = 0;
        inham = 0;
        jedc = 0;
        nehamLst = {}; jedhamLst = {}; jedncLst = {};
        For[i = 1, i ≤ l4, i++,
         c = Length[FindHamiltonianCycle[z4[[i]], All]];
         If[c == 0, neham += 1; AppendTo[nehamLst, z4[[i]]];
          If[UniqueLongestCycleQ[z4[[i]]], jedc += 1;
           AppendTo[jedncLst, z4[[i]]]], If[c == 1, jedham += 1;
           AppendTo[jedhamLst, z4[[i]]], inham += 1]]
        ]
        Print["Štatistika pre grafy so 4 vrcholmi vo vnútri:  ", neham,
          " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
          " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

```
Štatistika pre grafy so 4 vrcholmi vo vnútri:  432
  nehamiltonovských, 690 jednoznačne hamiltonovských, 659 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou
```

```
In[34]:= Export[filename <> "nehamiltonovske_4.g6", nehamLst]
```
Out[34]=
```
/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  nehamiltonovske_4.g6
```

```
In[35]:= Export[filename <> "jednoznacne_4.g6", jedhamLst]
```
Out[35]=
```
/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  jednoznacne_4.g6
```

Rozbor obvodu získaných nehamiltonovských resp. jednoznačne hamiltonovských grafov:

```
In[37]:= n2 = Import[filename <> "nehamiltonovske_2.g6"];
```

```
In[38]:= l2 = Length[n2]
```
Out[38]=
```
4
```

```
In[39]:= o2 = {};
        For[i = 1, i ≤ l2, i++, AppendTo[o2, ResourceFunction["Girth"][n2[[i]]]]];
```

```
In[43]:= res2 = Tally[o2]
```

Out[43]=

```
{{5, 1}, {4, 3}}
```

```
In[45]:= Print["Z nehamiltonovských grafov triedy R̃(2) je ", res2⟦2, 2⟧ ,
        " grafov obvodu ", res2⟦2, 1⟧, ", ", res2⟦1, 2⟧, " grafov obvodu ", res2⟦1, 1⟧]
```

Z nehamiltonovských grafov triedy R̃(2) je 3 grafov obvodu 4, 1 grafov obvodu 5

```
In[46]:= j2 = Import[filename <> "jednoznacne_2.g6"];
```

```
In[47]:= l2 = Length[j2]
```

Out[47]=

```
5
```

```
In[48]:= oj2 = {};
        For[i = 1, i ≤ l2, i++, AppendTo[oj2, ResourceFunction["Girth"][j2⟦i⟧]]];
```

```
In[50]:= res2 = Tally[oj2]
```

Out[50]=

```
{{4, 4}, {5, 1}}
```

```
In[51]:= Print["Z jednoznačne hamiltonovských grafov triedy R̃(2) je ", res2⟦1, 2⟧ ,
        " grafov obvodu ", res2⟦1, 1⟧, ", ", res2⟦2, 2⟧, " grafov obvodu ", res2⟦2, 1⟧]
```

Z jednoznačne hamiltonovských grafov triedy R̃(2) je
 4 grafov obvodu 4, 1 grafov obvodu 5

```
In[52]:= n3 = Import[filename <> "nehamiltonovske_3.g6"];
```

```
In[53]:= l3 = Length[n3]
```

Out[53]=

```
41
```

```
In[54]:= o3 = {};
        For[i = 1, i ≤ l3, i++, AppendTo[o3, ResourceFunction["Girth"][n3⟦i⟧]]];
```

```
In[56]:= res3 = Tally[o3]
```

Out[56]=

```
{{4, 33}, {5, 8}}
```

```
In[58]:= Print["Z nehamiltonovských grafov triedy R̃(3) je ", res3⟦1, 2⟧ ,
        " grafov obvodu ", res3⟦1, 1⟧, ", ", res3⟦2, 2⟧, " grafov obvodu ", res3⟦2, 1⟧]
```

Z nehamiltonovských grafov triedy R̃(3) je 33 grafov obvodu 4, 8 grafov obvodu 5

```
In[59]:= j3 = Import[filename <> "jednoznacne_3.g6"];
```

```
In[60]:= l3 = Length[j3]
```

Out[60]=

```
36
```

```
In[61]:= oj3 = {};
        For[i = 1, i ≤ l3, i++, AppendTo[oj3, ResourceFunction["Girth"][j3⟦i⟧]]];
```

In[63]:= `res3 = Tally[oj3]`

Out[63]=

`{{4, 33}, {5, 3}}`

In[64]:= `Print["Z jednoznačne hamiltonovských grafov triedy R̃(3) je ", res3〚1, 2〛,`
`" grafov obvodu ", res3〚1, 1〛, ", ", res3〚2, 2〛, " grafov obvodu ", res3〚2, 1〛]`

Z jednoznačne hamiltonovských grafov triedy R̃(3) je
33 grafov obvodu 4, 3 grafov obvodu 5

In[65]:= `n4 = Import[filename <> "nehamiltonovske_4.g6"];`

In[66]:= `l4 = Length[n4]`

Out[66]=

432

In[67]:= `o4 = {};`
`For[i = 1, i ≤ l4, i++, AppendTo[o4, ResourceFunction["Girth"][n4〚i〛]]];`

In[69]:= `res4 = Tally[o4]`

Out[69]=

`{{5, 57}, {4, 371}, {6, 4}}`

In[70]:= `Print["Z nehamiltonovských grafov triedy R̃(4) je ", res4〚2, 2〛,`
`" grafov obvodu ", res4〚2, 1〛, ", ", res4〚1, 2〛, " grafov obvodu ",`
`res4〚1, 1〛, ", ", res4〚3, 2〛, " grafov obvodu ", res4〚3, 1〛]`

Z nehamiltonovských grafov triedy R̃(4) je 371
grafov obvodu 4, 57 grafov obvodu 5, 4 grafov obvodu 6

In[71]:= `j4 = Import[filename <> "jednoznacne_4.g6"];`

In[72]:= `l4 = Length[j4]`

Out[72]=

690

In[73]:= `oj4 = {};`
`For[i = 1, i ≤ l4, i++, AppendTo[oj4, ResourceFunction["Girth"][j4〚i〛]]];`

In[75]:= `res4 = Tally[oj4]`

Out[75]=

`{{4, 546}, {5, 133}, {6, 11}}`

In[76]:= `Print["Z jednoznačne hamiltonovských grafov triedy R̃(4) je ", res4〚1, 2〛,`
`" grafov obvodu ", res4〚1, 1〛, ", ", res4〚2, 2〛, " grafov obvodu ",`
`res4〚2, 1〛, ", ", res4〚3, 2〛, " grafov obvodu ", res4〚3, 1〛]`

Z jednoznačne hamiltonovských grafov triedy R̃(4) je
546 grafov obvodu 4, 133 grafov obvodu 5, 11 grafov obvodu 6

Analýza veľkých kolekcií rektilineárnych grafov z množín $\tilde{\mathcal{R}}(k)$ pre $k \geq 6$

Import vygenerovaných rektilineárnych grafov (každá kolekcia obsahuje 10000 neizomorfných grafov):

```
In[77]:= z6 = Import[filename <> "k6corr.g6"];

In[78]:= z7 = Import[filename <> "k7corr.g6"];

In[79]:= z8 = Import[filename <> "k8corr.g6"];

In[80]:= z9 = Import[filename <> "k9corr.g6"];

In[81]:= z10 = Import[filename <> "k10corr.g6"];

In[82]:= z11 = Import[filename <> "k11corr.g6"];

In[83]:= z12 = Import[filename <> "k12corr.g6"];

In[84]:= z13 = Import[filename <> "k13corr.g6"];

In[85]:= z14 = Import[filename <> "k14corr.g6"];

In[86]:= z15 = Import[filename <> "k15corr.g6"];

In[87]:= z16 = Import[filename <> "k16corr.g6"];

In[88]:= z17 = Import[filename <> "k17corr.g6"];

In[89]:= z18 = Import[filename <> "k18corr.g6"];

In[90]:= z19 = Import[filename <> "k19corr.g6"];

In[91]:= z20 = Import[filename <> "k20corr.g6"];
```

Testy, či sú dané grafy nehamiltonovské, jednoznačne hamiltonovské resp. nehamiltonovské s jedinou najdlhšou kružnicou + export:

```
In[92]:= neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z6〚i〛, All]];
 If[c == 0, neham += 1; AppendTo[nehamLst, z6〚i〛];
  If[UniqueLongestCycleQ[z6〚i〛], jedc += 1;
    AppendTo[jedncLst, z6〚i〛]], If[c == 1, jedham += 1;
    AppendTo[jedhamLst, z6〚i〛], inham += 1]]
]
Print["Štatistika pre grafy so 6 vrcholmi vo vnútri:  ", neham,
  " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
  " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]

Štatistika pre grafy so 6 vrcholmi vo vnútri:  1737
  nehamiltonovských, 2682 jednoznačne hamiltonovských, 5581 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou
```

In[95]:= `Export[filename <> "nehamiltonovske_6.g6", nehamLst]`

Out[95]=
```
/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
   nehamiltonovske_6.g6
```

In[96]:= `Export[filename <> "jednoznacne_6.g6", jedhamLst]`

Out[96]=
```
/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
   jednoznacne_6.g6
```

In[97]:=
```
neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z7〚i〛, All]];
 If[c == 0, neham += 1; AppendTo[nehamLst, z7〚i〛];
   If[UniqueLongestCycleQ[z7〚i〛], jedc += 1;
     AppendTo[jedncLst, z7〚i〛]], If[c == 1, jedham += 1;
     AppendTo[jedhamLst, z7〚i〛], inham += 1]]
]
Print["Štatistika pre grafy so 7 vrcholmi vo vnútri:  ", neham,
 " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
 " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

```
Štatistika pre grafy so 7 vrcholmi vo vnútri:  1029
   nehamiltonovských, 1715 jednoznačne hamiltonovských, 7256 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou
```

In[100]:=

`Export[filename <> "nehamiltonovske_7.g6", nehamLst]`

Out[100]=
```
/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
   nehamiltonovske_7.g6
```

In[101]:=

`Export[filename <> "jednoznacne_7.g6", jedhamLst]`

Out[101]=
```
/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
   jednoznacne_7.g6
```

In[102]:=
```
neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z8[[i]], All]];
 If[c == 0, neham += 1; AppendTo[nehamLst, z8[[i]]];
  If[UniqueLongestCycleQ[z8[[i]]], jedc += 1;
   AppendTo[jedncLst, z8[[i]]], If[c == 1, jedham += 1;
   AppendTo[jedhamLst, z8[[i]]], inham += 1]]
]
Print["Štatistika pre grafy so 8 vrcholmi vo vnútri:  ", neham,
 " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
 " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy so 8 vrcholmi vo vnútri: 499
  nehamiltonovských, 947 jednoznačne hamiltonovských, 8554 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

In[105]:=
```
Export[filename <> "nehamiltonovske_8.g6", nehamLst]
```
Out[105]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  nehamiltonovske_8.g6

In[106]:=
```
Export[filename <> "jednoznacne_8.g6", jedhamLst]
```
Out[106]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  jednoznacne_8.g6

In[107]:=

```
neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z9〚i〛, All]];
 If[c == 0, neham += 1; AppendTo[nehamLst, z9〚i〛];
  If[UniqueLongestCycleQ[z9〚i〛], jedc += 1;
   AppendTo[jedncLst, z9〚i〛]], If[c == 1, jedham += 1;
   AppendTo[jedhamLst, z9〚i〛], inham += 1]]
]
Print["Štatistika pre grafy so 9 vrcholmi vo vnútri:  ", neham,
 " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
 " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy so 9 vrcholmi vo vnútri: 255
  nehamiltonovských, 447 jednoznačne hamiltonovských, 9298 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

In[110]:=

```
Export[filename <> "nehamiltonovske_9.g6", nehamLst]
```

Out[110]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  nehamiltonovske_9.g6

In[111]:=

```
Export[filename <> "jednoznacne_9.g6", jedhamLst]
```

Out[111]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  jednoznacne_9.g6

In[112]:=
```
neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z10[[i]], All]];
 If[c == 0, neham += 1; AppendTo[nehamLst, z10[[i]]];
  If[UniqueLongestCycleQ[z10[[i]]], jedc += 1;
   AppendTo[jedncLst, z10[[i]]]], If[c == 1, jedham += 1;
   AppendTo[jedhamLst, z10[[i]]], inham += 1]]
]
Print["Štatistika pre grafy so 10 vrcholmi vo vnútri:  ", neham,
 " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
 " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy so 10 vrcholmi vo vnútri: 111
  nehamiltonovských, 167 jednoznačne hamiltonovských, 9722 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

In[115]:=
```
Export[filename <> "nehamiltonovske_10.g6", nehamLst]
```
Out[115]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  nehamiltonovske_10.g6

In[116]:=
```
Export[filename <> "jednoznacne_10.g6", jedhamLst]
```
Out[116]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  jednoznacne_10.g6

In[117]:=

```
neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z11〚i〛, All]];
 If[c == 0, neham += 1; AppendTo[nehamLst, z11〚i〛];
  If[UniqueLongestCycleQ[z11〚i〛], jedc += 1;
   AppendTo[jedncLst, z11〚i〛]], If[c == 1, jedham += 1;
   AppendTo[jedhamLst, z11〚i〛], inham += 1]]
]
Print["Štatistika pre grafy so 11 vrcholmi vo vnútri:  ", neham,
 " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
 " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy so 11 vrcholmi vo vnútri: 50
  nehamiltonovských, 64 jednoznačne hamiltonovských, 9886 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

In[120]:=

```
Export[filename <> "nehamiltonovske_11.g6", nehamLst]
```

Out[120]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  nehamiltonovske_11.g6

In[121]:=

```
Export[filename <> "jednoznacne_11.g6", jedhamLst]
```

Out[121]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  jednoznacne_11.g6

In[122]:=

```
neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z12〚i〛, All]];
 If[c == 0, neham += 1; AppendTo[nehamLst, z12〚i〛];
  If[UniqueLongestCycleQ[z12〚i〛], jedc += 1;
    AppendTo[jedncLst, z12〚i〛]], If[c == 1, jedham += 1;
    AppendTo[jedhamLst, z12〚i〛], inham += 1]]
]
Print["Štatistika pre grafy so 12 vrcholmi vo vnútri:  ", neham,
 " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
 " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy so 12 vrcholmi vo vnútri: 19
  nehamiltonovských, 13 jednoznačne hamiltonovských, 9968 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

In[125]:=

```
Export[filename <> "nehamiltonovske_12.g6", nehamLst]
```

Out[125]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  nehamiltonovske_12.g6

In[126]:=

```
Export[filename <> "jednoznacne_12.g6", jedhamLst]
```

Out[126]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  jednoznacne_12.g6

In[127]:=
```
neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z13〚i〛, All]];
 If[c == 0, neham += 1; AppendTo[nehamLst, z13〚i〛];
  If[UniqueLongestCycleQ[z13〚i〛], jedc += 1;
   AppendTo[jedncLst, z13〚i〛]], If[c == 1, jedham += 1;
   AppendTo[jedhamLst, z13〚i〛], inham += 1]]
]
Print["Štatistika pre grafy so 13 vrcholmi vo vnútri:  ", neham,
 " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
 " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy so 13 vrcholmi vo vnútri: 4
  nehamiltonovských, 7 jednoznačne hamiltonovských, 9989 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

In[130]:=
```
Export[filename <> "nehamiltonovske_13.g6", nehamLst]
```
Out[130]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  nehamiltonovske_13.g6

In[131]:=
```
Export[filename <> "jednoznacne_13.g6", jedhamLst]
```
Out[131]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  jednoznacne_13.g6

In[132]:=

```
neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z14〚i〛, All]];
 If[c == 0, neham += 1; AppendTo[nehamLst, z14〚i〛];
  If[UniqueLongestCycleQ[z14〚i〛], jedc += 1;
    AppendTo[jedncLst, z14〚i〛]], If[c == 1, jedham += 1;
    AppendTo[jedhamLst, z14〚i〛], inham += 1]]
]
Print["Štatistika pre grafy so 14 vrcholmi vo vnútri:  ", neham,
 " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
 " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy so 14 vrcholmi vo vnútri: 3
  nehamiltonovských, 1 jednoznačne hamiltonovských, 9996 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

In[135]:=

```
Export[filename <> "nehamiltonovske_14.g6", nehamLst]
```

Out[135]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  nehamiltonovske_14.g6

In[136]:=

```
Export[filename <> "jednoznacne_14.g6", jedhamLst]
```

Out[136]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  jednoznacne_14.g6

In[137]:=
```
neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z15〚i〛, All]];
 If[c ⩵ 0, neham += 1; AppendTo[nehamLst, z15〚i〛];
  If[UniqueLongestCycleQ[z15〚i〛], jedc += 1;
   AppendTo[jedncLst, z15〚i〛]], If[c ⩵ 1, jedham += 1;
   AppendTo[jedhamLst, z15〚i〛], inham += 1]]
]
Print["Štatistika pre grafy so 15 vrcholmi vo vnútri:  ", neham,
 " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
 " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy so 15 vrcholmi vo vnútri: 0
   nehamiltonovských, 0 jednoznačne hamiltonovských, 10 000 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

In[140]:=
```
neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z16〚i〛, All]];
 If[c ⩵ 0, neham += 1; AppendTo[nehamLst, z16〚i〛];
  If[UniqueLongestCycleQ[z16〚i〛], jedc += 1;
   AppendTo[jedncLst, z16〚i〛]], If[c ⩵ 1, jedham += 1;
   AppendTo[jedhamLst, z16〚i〛], inham += 1]]
]
Print["Štatistika pre grafy so 16 vrcholmi vo vnútri:  ", neham,
 " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
 " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy so 16 vrcholmi vo vnútri: 0
   nehamiltonovských, 0 jednoznačne hamiltonovských, 10 000 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

In[143]:=
```
neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z17〚i〛, All]];
 If[c == 0, neham += 1; AppendTo[nehamLst, z17〚i〛];
  If[UniqueLongestCycleQ[z17〚i〛], jedc += 1;
   AppendTo[jedncLst, z17〚i〛]], If[c == 1, jedham += 1;
   AppendTo[jedhamLst, z17〚i〛], inham += 1]]
]
Print["Štatistika pre grafy so 17 vrcholmi vo vnútri:  ", neham,
 " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
 " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy so 17 vrcholmi vo vnútri: 1
  nehamiltonovských, 0 jednoznačne hamiltonovských, 9999 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

In[146]:=
```
Export[filename <> "nehamiltonovske_17.g6", nehamLst]
```

Out[146]=

/Users/tommymadaras/Library/CloudStorage/OneDrive-UPJŠ/Výuka/bachelor/malik/
  nehamiltonovske_17.g6

In[147]:=
```
neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z18〚i〛, All]];
 If[c == 0, neham += 1; AppendTo[nehamLst, z18〚i〛];
  If[UniqueLongestCycleQ[z18〚i〛], jedc += 1;
   AppendTo[jedncLst, z18〚i〛]], If[c == 1, jedham += 1;
   AppendTo[jedhamLst, z18〚i〛], inham += 1]]
]
Print["Štatistika pre grafy so 18 vrcholmi vo vnútri:  ", neham,
 " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
 " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy so 18 vrcholmi vo vnútri: 0
  nehamiltonovských, 0 jednoznačne hamiltonovských, 10 000 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

In[150]:=
```
neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z19〚i〛, All]];
 If[c == 0, neham += 1; AppendTo[nehamLst, z19〚i〛];
  If[UniqueLongestCycleQ[z19〚i〛], jedc += 1;
   AppendTo[jedncLst, z19〚i〛]], If[c == 1, jedham += 1;
   AppendTo[jedhamLst, z19〚i〛], inham += 1]]
]
Print["Štatistika pre grafy so 19 vrcholmi vo vnútri:  ", neham,
 " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
 " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy so 19 vrcholmi vo vnútri: 0
  nehamiltonovských, 0 jednoznačne hamiltonovských, 10 000 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

In[153]:=
```
neham = 0;
jedham = 0;
inham = 0;
jedc = 0;
nehamLst = {}; jedhamLst = {}; jedncLst = {};
For[i = 1, i ≤ 10 000, i++,
 c = Length[FindHamiltonianCycle[z20〚i〛, All]];
 If[c == 0, neham += 1; AppendTo[nehamLst, z20〚i〛];
  If[UniqueLongestCycleQ[z20〚i〛], jedc += 1;
   AppendTo[jedncLst, z20〚i〛]], If[c == 1, jedham += 1;
   AppendTo[jedhamLst, z20〚i〛], inham += 1]]
]
Print["Štatistika pre grafy so 20 vrcholmi vo vnútri:  ", neham,
 " nehamiltonovských, ", jedham, " jednoznačne hamiltonovských, ", inham,
 " iných.\n", "Z nehamiltonovských: ", jedc, " s jedinou najdlhšou kružnicou"]
```

Štatistika pre grafy so 20 vrcholmi vo vnútri: 0
  nehamiltonovských, 0 jednoznačne hamiltonovských, 10 000 iných.
Z nehamiltonovských: 0 s jedinou najdlhšou kružnicou

Rozbor obvodu získaných nehamiltonovských resp. jednoznačne hamiltonovských grafov:

In[156]:=
```
n6 = Import[filename <> "nehamiltonovske_6.g6"];
```

In[157]:=
```
l6 = Length[n6]
```

Out[157]=

1737

```
In[158]:=
o6 = {};
For[i = 1, i ≤ l6, i++, AppendTo[o6, ResourceFunction["Girth"][n6〚i〛]]];

In[160]:=
res6 = Tally[o6]

Out[160]=
{{4, 1614}, {5, 118}, {6, 5}}

In[161]:=
Print["Z kolekcie nehamiltonovských grafov triedy R̃(6) je ", res6〚1, 2〛,
 " grafov obvodu ", res6〚1, 1〛, ", ", res6〚2, 2〛, " grafov obvodu ",
 res6〚2, 1〛, ", ", res6〚3, 2〛, " grafov obvodu ", res6〚3, 1〛]

Z kolekcie nehamiltonovských grafov triedy R̃(6) je
 1614 grafov obvodu 4, 118 grafov obvodu 5, 5 grafov obvodu 6

In[162]:=
j6 = Import[filename <> "jednoznacne_6.g6"];

In[163]:=
l6 = Length[j6]

Out[163]=
2682

In[164]:=
oj6 = {};
For[i = 1, i ≤ l6, i++, AppendTo[oj6, ResourceFunction["Girth"][j6〚i〛]]];

In[166]:=
res6 = Tally[oj6]

Out[166]=
{{4, 2446}, {5, 235}, {6, 1}}

In[167]:=
Print["Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(6) je ",
 res6〚1, 2〛, " grafov obvodu ", res6〚1, 1〛, ", ", res6〚2, 2〛,
 " grafov obvodu ", res6〚2, 1〛, ", ", res6〚3, 2〛, " grafov obvodu ", res6〚3, 1〛]

Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(6) je
 2446 grafov obvodu 4, 235 grafov obvodu 5, 1 grafov obvodu 6

In[168]:=
n7 = Import[filename <> "nehamiltonovske_7.g6"];

In[169]:=
l7 = Length[n7]

Out[169]=
1029

In[170]:=
o7 = {};
For[i = 1, i ≤ l7, i++, AppendTo[o7, ResourceFunction["Girth"][n7〚i〛]]];

In[172]:=
res7 = Tally[o7]

Out[172]=
{{4, 972}, {5, 55}, {6, 2}}
```

In[174]:=
```
Print["Z kolekcie nehamiltonovských grafov triedy R̃(7) je ", res7〚1, 2〛 ,
  " grafov obvodu ", res7〚1, 1〛, ", ", res7〚2, 2〛, " grafov obvodu ",
  res7〚2, 1〛, ", ", res7〚3, 2〛, " grafov obvodu ", res7〚3, 1〛]
```
```
Z kolekcie nehamiltonovských grafov triedy R̃(7) je
 972 grafov obvodu 4, 55 grafov obvodu 5, 2 grafov obvodu 6
```

In[175]:=
```
j7 = Import[filename <> "jednoznacne_7.g6"];
```

In[176]:=
```
l7 = Length[j7]
```
Out[176]=
```
1715
```

In[177]:=
```
oj7 = {};
For[i = 1, i ≤ l7, i++, AppendTo[oj7, ResourceFunction["Girth"][j7〚i〛]]];
```

In[179]:=
```
res7 = Tally[oj7]
```
Out[179]=
```
{{4, 1581}, {5, 131}, {6, 3}}
```

In[181]:=
```
Print["Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(7) je ",
  res7〚1, 2〛 , " grafov obvodu ", res7〚1, 1〛, ", ", res7〚2, 2〛,
  " grafov obvodu ", res7〚2, 1〛, ", ", res7〚3, 2〛, " grafov obvodu ", res7〚3, 1〛]
```
```
Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(7) je
 1581 grafov obvodu 4, 131 grafov obvodu 5, 3 grafov obvodu 6
```

In[182]:=
```
n8 = Import[filename <> "nehamiltonovske_8.g6"];
```

In[183]:=
```
l8 = Length[n8]
```
Out[183]=
```
499
```

In[184]:=
```
o8 = {};
For[i = 1, i ≤ l8, i++, AppendTo[o8, ResourceFunction["Girth"][n8〚i〛]]];
```

In[186]:=
```
res8 = Tally[o8]
```
Out[186]=
```
{{4, 480}, {5, 19}}
```

In[187]:=
```
Print["Z kolekcie nehamiltonovských grafov triedy R̃(8) je ", res8〚1, 2〛 ,
  " grafov obvodu ", res8〚1, 1〛, ", ", res8〚2, 2〛, " grafov obvodu ", res8〚2, 1〛]
```
```
Z kolekcie nehamiltonovských grafov triedy R̃(8) je
 480 grafov obvodu 4, 19 grafov obvodu 5
```

In[188]:=
```
j8 = Import[filename <> "jednoznacne_8.g6"];
```

In[189]:=
```
l8 = Length[j8]
```
Out[189]=
```
947
```

In[190]:=
```
oj8 = {};
For[i = 1, i ≤ l8, i++, AppendTo[oj8, ResourceFunction["Girth"][j8〚i〛]]];
```

In[192]:=
```
res8 = Tally[oj8]
```
Out[192]=
```
{{4, 886}, {5, 60}, {6, 1}}
```

In[193]:=
```
Print["Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(8) je ",
 res8〚1, 2〛 , " grafov obvodu ", res8〚1, 1〛, ", ", res8〚2, 2〛,
 " grafov obvodu ", res8〚2, 1〛, ", ", res8〚3, 2〛, " grafov obvodu ", res8〚3, 1〛]
```
```
Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(8) je
 886 grafov obvodu 4, 60 grafov obvodu 5, 1 grafov obvodu 6
```

In[194]:=
```
n9 = Import[filename <> "nehamiltonovske_9.g6"];
```

In[195]:=
```
l9 = Length[n9]
```
Out[195]=
```
255
```

In[196]:=
```
o9 = {};
For[i = 1, i ≤ l9, i++, AppendTo[o9, ResourceFunction["Girth"][n9〚i〛]]];
```

In[198]:=
```
res9 = Tally[o9]
```
Out[198]=
```
{{4, 240}, {5, 15}}
```

In[199]:=
```
Print["Z kolekcie nehamiltonovských grafov triedy R̃(9) je", res9〚1, 2〛 ,
 " grafov obvodu ", res9〚1, 1〛, ", ", res9〚2, 2〛, " grafov obvodu ", res9〚2, 1〛]
```
```
Z kolekcie nehamiltonovských grafov triedy R̃(9) je
 240 grafov obvodu 4, 15 grafov obvodu 5
```

In[200]:=
```
j9 = Import[filename <> "jednoznacne_9.g6"];
```

In[201]:=
```
l9 = Length[j9]
```
Out[201]=
```
447
```

In[202]:=
```
oj9 = {};
For[i = 1, i ≤ l9, i++, AppendTo[oj9, ResourceFunction["Girth"][j9〚i〛]]];
```

In[204]:=
```
res9 = Tally[oj9]
```

Out[204]=
```
{{4, 423}, {5, 24}}
```

In[205]:=
```
Print["Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(9) je ",
 res9〚1, 2〛, " grafov obvodu ", res9〚1, 1〛,
 ", ", res9〚2, 2〛, " grafov obvodu ", res9〚2, 1〛]
```

Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(9) je
 423 grafov obvodu 4, 24 grafov obvodu 5

In[206]:=
```
n10 = Import[filename <> "nehamiltonovske_10.g6"];
```

In[207]:=
```
l10 = Length[n10]
```

Out[207]=
```
111
```

In[208]:=
```
o10 = {};
For[i = 1, i ≤ l10, i++, AppendTo[o10, ResourceFunction["Girth"][n10〚i〛]]];
```

In[210]:=
```
res10 = Tally[o10]
```

Out[210]=
```
{{4, 110}, {5, 1}}
```

In[211]:=
```
Print["Z kolekcie nehamiltonovských grafov triedy R̃(10) je ",
 res10〚1, 2〛, " grafov obvodu ", res10〚1, 1〛,
 ", ", res10〚2, 2〛, " grafov obvodu ", res10〚2, 1〛]
```

Z kolekcie nehamiltonovských grafov triedy R̃(10) je
 110 grafov obvodu 4, 1 grafov obvodu 5

In[212]:=
```
j10 = Import[filename <> "jednoznacne_10.g6"];
```

In[213]:=
```
l10 = Length[j10]
```

Out[213]=
```
167
```

In[214]:=
```
oj10 = {};
For[i = 1, i ≤ l10, i++, AppendTo[oj10, ResourceFunction["Girth"][j10〚i〛]]];
```

In[216]:=
```
res10 = Tally[oj10]
```

Out[216]=
```
{{4, 158}, {5, 9}}
```

In[217]:=
```
Print["Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(10) je ",
 res10〚1, 2〛 , " grafov obvodu ", res10〚1, 1〛,
 ", ", res10〚2, 2〛, " grafov obvodu ", res10〚2, 1〛]
```

Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(10) je
 158 grafov obvodu 4, 9 grafov obvodu 5

In[218]:=
```
n11 = Import[filename <> "nehamiltonovske_11.g6"];
```

In[219]:=
```
l11 = Length[n11]
```
Out[219]=
```
50
```

In[220]:=
```
o11 = {};
For[i = 1, i ≤ l11, i++, AppendTo[o11, ResourceFunction["Girth"][n11〚i〛]]];
```

In[222]:=
```
res11 = Tally[o11]
```
Out[222]=
```
{{4, 50}}
```

In[223]:=
```
Print["Z kolekcie nehamiltonovských grafov triedy R̃(11) je ",
 res11〚1, 2〛 , " grafov obvodu ", res11〚1, 1〛, "(t.j. všetky)"]
```

Z kolekcie nehamiltonovských grafov triedy R̃(11) je 50 grafov obvodu 4(t.j. všetky)

In[224]:=
```
j11 = Import[filename <> "jednoznacne_11.g6"];
```

In[225]:=
```
l11 = Length[j11]
```
Out[225]=
```
64
```

In[226]:=
```
oj11 = {};
For[i = 1, i ≤ l11, i++, AppendTo[oj11, ResourceFunction["Girth"][j11〚i〛]]];
```

In[228]:=
```
res11 = Tally[oj11]
```
Out[228]=
```
{{4, 62}, {5, 2}}
```

In[229]:=
```
Print["Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(11) je ",
 res11〚1, 2〛 , " grafov obvodu ", res11〚1, 1〛,
 ", ", res11〚2, 2〛, " grafov obvodu ", res11〚2, 1〛]
```

Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(11) je
 62 grafov obvodu 4, 2 grafov obvodu 5

In[230]:=
```
n12 = Import[filename <> "nehamiltonovske_12.g6"];
```

In[231]:=
```
l12 = Length[n12]
```
Out[231]=
```
19
```

In[232]:=
```
o12 = {};
For[i = 1, i ≤ l12, i++, AppendTo[o12, ResourceFunction["Girth"][n12[[i]]]]];
```

In[234]:=
```
res12 = Tally[o12]
```
Out[234]=
```
{{4, 16}, {5, 3}}
```

In[235]:=
```
Print["Z kolekcie nehamiltonovských grafov triedy R̃(12) je ",
 res12[[1, 2]] , " grafov obvodu ", res12[[1, 1]],
 ", ", res12[[2, 2]], " grafov obvodu ", res12[[2, 1]]]
```
```
Z kolekcie nehamiltonovských grafov triedy R̃(12) je
 16 grafov obvodu 4, 3 grafov obvodu 5
```

In[237]:=
```
j12 = Import[filename <> "jednoznacne_12.g6"];
```

In[238]:=
```
l12 = Length[j12]
```
Out[238]=
```
13
```

In[239]:=
```
oj12 = {};
For[i = 1, i ≤ l12, i++, AppendTo[oj12, ResourceFunction["Girth"][j12[[i]]]]];
```

In[241]:=
```
res12 = Tally[oj12]
```
Out[241]=
```
{{5, 1}, {4, 12}}
```

In[242]:=
```
Print["Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(12) je ",
 res12[[1, 2]] , " grafov obvodu ", res12[[1, 1]],
 ", ", res12[[2, 2]], " grafov obvodu ", res12[[2, 1]]]
```
```
Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(12) je
 1 grafov obvodu 5, 12 grafov obvodu 4
```

In[243]:=
```
n13 = Import[filename <> "nehamiltonovske_13.g6"];
```

In[244]:=
```
l13 = Length[n13]
```
Out[244]=
```
4
```

In[245]:=
```
o13 = {};
For[i = 1, i ≤ l13, i++, AppendTo[o13, ResourceFunction["Girth"][n13[[i]]]]];
```

In[247]:=
```
res13 = Tally[o13]
```

Out[247]=
```
{{4, 4}}
```

In[248]:=
```
Print["Z kolekcie nehamiltonovských grafov triedy R̃(13) je ",
 res13〚1, 2〛 , " grafov obvodu ", res13〚1, 1〛]
```

Z kolekcie nehamiltonovských grafov triedy R̃(13) je 4 grafov obvodu 4

In[249]:=
```
j13 = Import[filename <> "jednoznacne_13.g6"];
```

In[250]:=
```
l13 = Length[j13]
```

Out[250]=
```
7
```

In[251]:=
```
oj13 = {};
For[i = 1, i ≤ l13, i++, AppendTo[oj13, ResourceFunction["Girth"][j13〚i〛]]];
```

In[253]:=
```
res13 = Tally[oj13]
```

Out[253]=
```
{{4, 7}}
```

In[254]:=
```
Print["Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(13) je ",
 res13〚1, 2〛 , " grafov obvodu ", res13〚1, 1〛]
```

Z kolekcie jednoznačne hamiltonovských grafov triedy R̃(13) je 7 grafov obvodu 4