

Makrá:

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\def\rbsmall{\footnotesize}

\newcommand\prvyindent{\hangafter=-1\hangindent=\parindent}
\newcommand\ee{\mathop{\rm e}\nolimits}

%..... makra pre FP vypocty
%
\newcommand\rbPr[3][4]{\FPeval{\rbV}{clip(round(#3,#1))}\FPset{#2}{\rbV}}%
\newcommand\rb[2][4]{\FPeval{\rbV}{clip(round(#2,#1))}\rbV}%
\newcommand\rbx[2][4]{\FPeval{\rbV}{clip(round(#2,#1))}}%
%.....
\newcommand\rbPrCelaCast[3][4]{\FPeval{\rbV}{clip(round(#3,#1))}%
\FPifint{\rbV}\FPset{\rbP}{0}\else\FPset{\rbP}{1}\fi%
\FPifneg{\rbV}\FPeval{\rbW}{trunc(\rbV-\rbP,0)}\else%
\FPeval{\rbW}{trunc(\rbV,0)}\fi\FPset{#2}{\rbW}}%
%.....
\newcommand\testujP[2][\rrT]{\rbx{#2}\FPifpos{\rbV}\FPset{#1}{1}\else\FPset{#1}{0}\fi}%
%.....
\newcommand\testujPM[2][\rrT]{\rbx{#2}\ifthenelse{\equal{\rbV}{0}}{%
\FPset{#1}{0}}{\FPifneg{\rbV}\FPset{#1}{-1}\else\FPset{#1}{1}\fi}}%
%.....
\newcommand\rbPrMaxIII[5][4]{\rbPr{#1}{\rbA}{#3}\rbPr{#1}{\rbB}{#4}%
\rbPr{#1}{\rbC}{#5}\rbPr{#1}{\rbVa}{max(\rbA,\rbB)}%
\rbPr{#1}{#2}{max(\rbVa,\rbC)}}%
%.....
%
% Kompletny graf -- volanie: \CompletGraph{#2}{#3}{#4}
% resp. \CompletGraph[#1]{#2}{#3}{#4}
%
% #2 pocet vrcholov [2...32] -- neprirodzene cislo upravi na prirodzene z intervalu [2,32]
%
% #3 orientovany graf [0 N ON NO] ... orientovany -- neorientovany -- oba -- oba
% #4 zobrazuje cisla vrcholov [A N]
%
% #1 Nepovinnny parameter [...] rozne pomocne nastavenia:
% \def\aaPopis{+} ... cislovanie vrcholov [+ -] .. kladny zaporny smer
% \def\aaHcislo{n} ... cislo najvyssie zobrazeno vrchola, musi byt z intervalu [1,pocet vrcholov]
% \def\aaFarbaV{color} ... farba vrcholov
% \def\aaFarbaH{color} ... farba neorientovanych hran
% \def\aaFarbaHO{color} ... farba orientovanych hran
% \def\aaHrany{A} ... ukaze-neukaze hrany [A N]
% \def\aaPrekvapenie{ano} ... prekvapenie [ano Ano nie] ano -- superprekvapenie -- nie
% \def\aaPolomer{20} ... polomer grafu -- implicitne 20
% \def\aaSkala{1} ... skala obrazku [0.2 ... 3 ...] -- implicitne 1
% \def\aaOtoc{0} ... otoci graf o dany uhol [stupne] -- implicitne 0
%
\newcount\mycount
\newcommand\CompletGraph[4][[]]{\def\aaPopis{+}\def\aaHcislo{1}%
\def\aaPrekvapenie{nie}\def\aaPrekvapenieS{obrazky/prekvapenie12.png}\rbPr{\aaPolomer}{20}%
\def\aaFarbaV{blue!60!black}\def\aaFarbaH{red!70!yellow}\def\aaFarbaHO{red!70}\def\aaSkala{1}%
\rbPr{\aaMax}{32}\def\aaOtoc{0}\def\aaHrany{A}\#1\rbPr{\aaHcislo}{\aaHcislo}%
\rbPr{\bbUhol}{\aaOtoc}\rbPr{\aaPocet}{#2}\def\aaOrient{#3}\def\aaCisla{#4}%
\rbPrCelaCast{\aaPocet}{abs(\aaPocet)}\rbPr{\aaPocet}{min(\aaPocet,\aaMax)}%
\rbPr{\aaPocet}{max(\aaPocet,2)}%
\ifthenelse{\equal{\aaPopis}{+}}{\rbPr{\bbPopis}{1}}{\rbPr{\bbPopis}{-1}}%
\rbPr{\aaPocetN}{(\aaPocet)-1}\rbPr{\aaKrok}{360/(\aaPocet)}%
%
\begin{tikzpicture}[transform shape,scale=\aaSkala,rotate=-\bbUhol]
\foreach \number in {1,...,\aaPocet}{%
\rbPr{\ccU}{90-(\bbPopis)*360*((\aaHcislo)-1)/(\aaPocet)+(\bbPopis)*(\number-1)*(\aaKrok)}
\ifthenelse{\equal{\aaCisla}{A}}{%
\node[\aaFarbaV,fill=\aaFarbaV!10,draw,circle,minimum size=2.1em,rotate=\bbUhol]
(N-\number) at (\ccU:\aaPolomer em) {\textcolor{\aaFarbaV}{\$ \number \$}}%
{\node[\aaFarbaV,fill=\aaFarbaV!10,draw,circle,minimum size=2.1em]
(N-\number) at (\ccU:\aaPolomer em) {\phantom{88}};}}
\ifthenelse{\equal{\aaHrany}{A}}{
\foreach \number in {1,...,\aaPocetN}{%
\mycount=\number\advance\mycount by 1
\foreach \numbera in {\the\mycount,...,\aaPocet}{%
\ifthenelse{\equal{\aaOrient}{N}}{\path (N-\number) edge[\aaFarbaH,-] (N-\numbera);}-%
\ifthenelse{\equal{\aaOrient}{ON}}{\path (N-\number) edge[\aaFarbaH,-] (N-\numbera);}-%
\ifthenelse{\equal{\aaOrient}{NO}}{\path (N-\number) edge[\aaFarbaH,-] (N-\numbera);}-%
\path (N-\number) edge[\aaFarbaHO,->,bend right=6] (N-\numbera)
edge[\aaFarbaHO,<-,bend left=6] (N-\numbera);}}}
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\ifthenelse{\equal{\aaPrekvapenie}{ano}}{\node(0,0){\includegraphics[height=1mm]{\aaPrekvapenieS}};}{
\ifthenelse{\equal{\aaPrekvapenie}{Ano}}{\node(0,0){\includegraphics[height=1cm]{\aaPrekvapenieS}};}{
\end{tikzpicture}
}

%.....
%
%   Bipartitny graf -- volanie: \BiGraph{#2}{#3}{#4}{#5}
%                               resp. \BiGraph[#1]{#2}{#3}{#4}{#5}
%
%
% #2 pocet 1.vrcholov Dolne/Lave [max 24] -- neprirodzene cislo upravi na prirodzene z intervalu [1,24]
% #3 pocet 2.vrcholov Horne/Prave [max 24] -- neprirodzene cislo upravi na prirodzene z intervalu [1,24]
%
% #4 orientovany graf [0 N ON NO] ... orientovany -- neorientovany -- oba -- oba
% #5 zobrazuje cisla vrcholov [ano nie]
%
% #1 Nepovinnny parameter [...] rozne pomocne nastavenia:
% \def\aaPopisA{+} ... cislovanie 1.vrcholov [- +] .. - (P-L) + (L-P) smer
% \def\aaPopisB{+} ... cislovanie 2.vrcholov [- +] .. - (P-L) + (L-P) smer
% \def\aaFarbaVA{color} ... farba 1.vrcholov Dole/vLavo
% \def\aaFarbaVB{color} ... farba 2.vrcholov Hore/vPravo
% \def\aaFarbaH{color} ... farba neorientovanych hran
% \def\aaFarbaHO{color} ... farba orientovanych hran
% \def\aaHrany{A} ... ukaze-neukaze hrany [A N]
% \def\aaDlzka{6} ... dlzka hran -- implicitne 6
% \def\aaSkala{1} ... skala obrazku [0.2 ... 3 ...] -- implicitne 1
% \def\aaOtoc{0} ... otoci graf o dany uhol [stupne] -- implicitne 0
%
% \def\aaRovnakaFarbaV{N} ... rovnaka farba vrcholov [A N] -- implicitne N
% \def\aaFarbaV{color} ... farba rovnaka pre vsetky vrcholy -- musi byt \def\aaRovnakaFarbaV{A}
%
\newcommand\BiGraph[5] []{\def\aaPopisA{+}\def\aaPopisB{+}\def\aaDlzka{6}%
\def\aaFarbaV{blue!60!black}\def\aaFarbaVA{blue!60!black}\def\aaFarbaVB{red!30!black}%
\def\aaSkala{1}\def\aaOtoc{0}\def\aaRovnakaFarbaV{N}%
\def\aaFarbaH{red!70!yellow}\def\aaFarbaHO{red!70}\def\aaHrany{A}%
\rbPr{\aaMax}{24}\rbPr{\aaPol}{14}\#1\rbPr{\bbDlzka}{\aaDlzka}%
\ifthenelse{\equal{\aaRovnakaFarbaV}{A}}{\def\aaFarbaVA{\aaFarbaV}\def\aaFarbaVB{\aaFarbaV}}{}%
\rbPr{\aaPocetA}{#2}\rbPr{\aaPocetB}{#3}\def\aaOrient{#4}\def\aaCisla{#5}%
\rbPrCelaCast{\aaPocetA}{abs(\aaPocetA)}\rbPr{\aaPocetA}{min(\aaPocetA,\aaMax)}\rbPr{\aaPocetA}{max(\aaPocetA,1)}%
\rbPrCelaCast{\aaPocetB}{abs(\aaPocetB)}\rbPr{\aaPocetB}{min(\aaPocetB,\aaMax)}\rbPr{\aaPocetB}{max(\aaPocetB,1)}%
\testujPMO[\aaTestuj]{(\aaPocetA)-(\aaPocetB)}\testujP[\aaTestujU]{\aaPol-max(\aaPocetA,\aaPocetB)}%
\ifthenelse{\aaTestujU=1}{\rbPr{\aaUhol}{0}}{\rbPr{\aaUhol}{90}}%
\rbPr{\bbUhol}{\aaOtoc}\rbPr{\aaUhol}{(\aaUhol)+(\bbUhol)}
\rbPr{\aaPomerAB}{(\aaPocetA-1)/max((\aaPocetB-1),1)}
\rbPr{\aaPomerBA}{(\aaPocetB-1)/max((\aaPocetA-1),1)}
%
\begin{tikzpicture}[transform shape,scale=\aaSkala, rotate=-\aaUhol]
\foreach \numberA in {1,...,\aaPocetA}{%
\ifthenelse{\aaTestuj=-1}{\rbPr{\aaNN}{1+(\aaPomerBA)*(\numberA-.5-sgn(\aaPocetA)*.5)}}{\rbPr{\aaNN}{\numberA}}
\ifthenelse{\equal{\aaCisla}{A}}{%
\node[\aaFarbaVA,fill=\aaFarbaVA!10,draw,circle,minimum size=2.1em, rotate=\aaUhol]
(N1-\numberA) at (\aaNN,0) {\textcolor{\aaFarbaVA}{%
\ifthenelse{\equal{\aaPopisA}{-}}{\$}\rb{1+(\aaPocetA)-(\numberA)}{\$}\numberA$}}};%
{\node[\aaFarbaVA,fill=\aaFarbaVA!10,draw,circle,minimum size=2.1em]
(N1-\numberA) at (\aaNN,0) {\phantom{88}}};}
\foreach \numberB in {1,...,\aaPocetB}{\
\ifthenelse{\aaTestuj=1}{\rbPr{\aaNN}{1+(\aaPomerAB)*(\numberB-.5-sgn(\aaPocetB)*.5)}}{\rbPr{\aaNN}{\numberB}}
\ifthenelse{\equal{\aaCisla}{A}}{%
\node[\aaFarbaVB,fill=\aaFarbaVB!10,draw,circle,minimum size=2.1em, rotate=\aaUhol]
(N2-\numberB) at (\aaNN,\bbDlzka) {\textcolor{\aaFarbaVB}{%
\ifthenelse{\equal{\aaPopisB}{-}}{\$}\rb{1+(\aaPocetB)-(\numberB)}{\$}\numberB$}}};%
{\node[\aaFarbaVB,fill=\aaFarbaVB!10,draw,circle,minimum size=2.1em]
(N2-\numberB) at (\aaNN,\bbDlzka) {\phantom{88}}};}
\ifthenelse{\equal{\aaHrany}{A}}{
\foreach \numberA in {1,...,\aaPocetA}{%
\foreach \numberB in {1,...,\aaPocetB}{%
\ifthenelse{\equal{\aaOrient}{N}}{\path (N1-\numberA) edge[\aaFarbaH,-] (N2-\numberB);}{}%
\ifthenelse{\equal{\aaOrient}{ON}}{\path (N1-\numberA) edge[\aaFarbaH,-] (N2-\numberB);}{}%
\ifthenelse{\equal{\aaOrient}{NO}}{\path (N1-\numberA) edge[\aaFarbaH,-] (N2-\numberB);}{}%
\path (N1-\numberA) edge[\aaFarbaHO,->,bend right=3] (N2-\numberB);
\path (N2-\numberB) edge[\aaFarbaHO,->,bend right=3] (N1-\numberA);}}
}{}
\end{tikzpicture}
}

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% .....
%
%   Tripartitny graf -- volanie: \TriGraph{#2}{#3}{#4}{#5}{#6}
%                               resp. \TriGraph[#1]{#2}{#3}{#4}{#5}{#6}
%
% #2 pocet 1.vrcholov [max 14] -- neprirodzene cislo upravi na prirodzene z intervalu [1,14]
% #3 pocet 2.vrcholov [max 14] -- neprirodzene cislo upravi na prirodzene z intervalu [1,14]
% #4 pocet 3.vrcholov [max 14] -- neprirodzene cislo upravi na prirodzene z intervalu [1,14]
%
% #5 orientovany graf [0 N ON NO] ... orientovany -- neorientovany -- oba -- oba
% #6 zobrazuje cisla vrcholov [ano nie]
%
% #1 Nepovinnny parameter [...] rozne pomocne nastavenia:
%   \def\aaPopisA{+} ... cislovanie 1.vrcholov [+ -] .. kladny zaporny smer
%   \def\aaPopisB{+} ... cislovanie 2.vrcholov [+ -] .. kladny zaporny smer
%   \def\aaPopisC{+} ... cislovanie 3.vrcholov [+ -] .. kladny zaporny smer
%   \def\aaFarbaVA{color} ... farba 1.vrcholov
%   \def\aaFarbaVB{color} ... farba 2.vrcholov
%   \def\aaFarbaVC{color} ... farba 3.vrcholov
%   \def\aaFarbaHAB{color} ... farba neorientovanych hran 1.--2.
%   \def\aaFarbaHAC{color} ... farba neorientovanych hran 1.--3.
%   \def\aaFarbaHBC{color} ... farba neorientovanych hran 2.--3.
%   \def\aaFarbaHOAB{color} ... farba orientovanych hran 1.--2.
%   \def\aaFarbaHOAC{color} ... farba orientovanych hran 1.--3.
%   \def\aaFarbaHOBC{color} ... farba orientovanych hran 2.--3.
%   \def\aaHrany{A} ... ukaze-neukaze hrany [A N]
%   \def\aaSkala{1} ... skala obrazku [0.2 ... 3 ...] -- implicitne 1
%   \def\aaOtoc{0} ... otoci graf o dany uhol [stupne] -- implicitne 0
%
%   \def\aaRovnakaFarbaV{N} ... rovnaka farba vrcholov [A N] -- implicitne N
%   \def\aaFarbaV{color} ... farba rovnaka pre vsetky vrcholy -- musi byt \def\aaRovnakaFarbaV{A}
%
%   \def\aaRovnakaFarbaH{N} ... rovnaka farba vrcholov [A N] -- implicitne N
%   \def\aaFarbaH{color} ... farba rovnaka pre vsetky hrany -- musi byt \def\aaRovnakaFarbaH{A}
%
\newcommand\TriGraph[6][[\def\aaPopisA{+}\def\aaPopisB{+}\def\aaPopisC{+}\def\aaFarbaV{blue!60!black}%
\def\aaFarbaVA{blue!60!black}\def\aaFarbaVB{red!30!black}\def\aaFarbaVC{green!30!black}%
\def\aaSkala{1}\def\aaOtoc{0}\def\aaRovnakaFarbaV{N}\def\aaRovnakaFarbaH{N}\def\aaHrany{A}%
\def\aaFarbaH{red!70!yellow}\def\aaFarbaHO{red!70}%
\def\aaFarbaHAB{brown!70!yellow}\def\aaFarbaHOAB{brown!70}%
\def\aaFarbaHAC{red!70!yellow}\def\aaFarbaHOAC{red!70}%
\def\aaFarbaHBC{magenta!70!yellow}\def\aaFarbaHOBC{magenta!70}%
\rPr{\aaMax}{14}#1\rPr{\aaUhol}{\aaOtoc}%
\ifthenelse{\equal{\aaRovnakaFarbaV}{A}}{%
\def\aaFarbaVA{\aaFarbaV}\def\aaFarbaVB{\aaFarbaV}\def\aaFarbaVC{\aaFarbaV}}{%
\ifthenelse{\equal{\aaRovnakaFarbaH}{A}}{%
\def\aaFarbaHAB{\aaFarbaH}\def\aaFarbaHAC{\aaFarbaH}\def\aaFarbaHBC{\aaFarbaH}%
\def\aaFarbaHOAB{\aaFarbaH}\def\aaFarbaHOAC{\aaFarbaH}\def\aaFarbaHOBC{\aaFarbaH}}{%
\rPr{\aaPocetA}{#2}\rPr{\aaPocetB}{#3}\rPr{\aaPocetC}{#4}%
\def\aaOrient{#5}\def\aaCisla{#6}%
\rPrCelaCast{\aaPocetA}{abs(\aaPocetA)}\rPr{\aaPocetA}{min(\aaPocetA,\aaMax)}\rPr{\aaPocetA}{max(\aaPocetA,1)}%
\rPrCelaCast{\aaPocetB}{abs(\aaPocetB)}\rPr{\aaPocetB}{min(\aaPocetB,\aaMax)}\rPr{\aaPocetB}{max(\aaPocetB,1)}%
\rPrCelaCast{\aaPocetC}{abs(\aaPocetC)}\rPr{\aaPocetC}{min(\aaPocetC,\aaMax)}\rPr{\aaPocetC}{max(\aaPocetC,1)}%
\rPrMaxIII{\aaMaxABC}{\aaPocetA}{\aaPocetB}{\aaPocetC}%
\testujP[\aaTestujA]{(\aaPocetA)-(\aaMaxABC)}%
\testujP[\aaTestujB]{(\aaPocetB)-(\aaMaxABC)}%
\testujP[\aaTestujC]{(\aaPocetC)-(\aaMaxABC)}%
\ifthenelse{\aaTestujA=1}{\rPr{\aaPomerA}{1}}{\rPr{\aaPomerA}{(\aaMaxABC-1)/max((\aaPocetA-1),1)}}%
\ifthenelse{\aaTestujB=1}{\rPr{\aaPomerB}{1}}{\rPr{\aaPomerB}{(\aaMaxABC-1)/max((\aaPocetB-1),1)}}%
\ifthenelse{\aaTestujC=1}{\rPr{\aaPomerC}{1}}{\rPr{\aaPomerC}{(\aaMaxABC-1)/max((\aaPocetC-1),1)}}%
\rPr{\aaPomerAx}{0}\ifthenelse{\aaPocetA=1}{\rPr{\aaPomerAx}{(\aaMaxABC)/2-.5}}{-}
\rPr{\aaPomerBx}{0}\ifthenelse{\aaPocetB=1}{\rPr{\aaPomerBx}{(\aaMaxABC)/2-.5}}{-}
\rPr{\aaPomerCx}{0}\ifthenelse{\aaPocetC=1}{\rPr{\aaPomerCx}{(\aaMaxABC)/2-.5}}{-}
%
\begin{tikzpicture}[transform shape,scale=\aaSkala,rotate=-\aaUhol]
\foreach \numberA in {1,...,\aaPocetA}{
\rPr{\aaNN}{1+(\aaPomerA)*(\numberA-1)+\aaPomerAx}
\ifthenelse{\equal{\aaCisla}{A}}{%
\node[\aaFarbaVA,fill=\aaFarbaVA!10,draw,circle,minimum size=2.1em,rotate=\aaUhol]
(N1-\numberA) at (1+\aaNN,0)
{\ifthenelse{\equal{\aaPopisA}{-}}{\rPr{1+(\aaPocetA)-(\numberA)}}{\rPr{\numberA}}};%
\node[\aaFarbaVA,fill=\aaFarbaVA!10,draw,circle,minimum size=2.1em]
(N1-\numberA) at (1+\aaNN,0) {\phantom{88}};}}
\foreach \numberB in {1,...,\aaPocetB}{\
\rPr{\aaNN}{1+(\aaPomerB)*(\numberB-1)+\aaPomerBx}
\ifthenelse{\equal{\aaCisla}{A}}{%
\node[\aaFarbaVB,fill=\aaFarbaVB!10,draw,circle,minimum size=2.1em,rotate=\aaUhol]
(N2-\numberB) at (0.5+0.5*\aaNN,.866+.866*\aaNN)
{\ifthenelse{\equal{\aaPopisB}{+}}{\rPr{1+(\aaPocetB)-(\numberB)}}{\rPr{\numberB}}};%

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{\node[\aaFarbaVB,fill=\aaFarbaVB!10,draw,circle,minimum size=2.1em]
(N2-\numberB) at (0.5+0.5*\aaNN,.866+.866*\aaNN) {\phantom{88}};}}

\foreach \numberC in {1,...,\aaPocetC}{\
\rbPr{\aaNN}{1+(\aaPomerC)*(\numberC-1)+\aaPomerCx}
\ifthenelse{\equal{\aaCisla}{A}}{%
\node[\aaFarbaVC,fill=\aaFarbaVC!10,draw,circle,minimum size=2.1em, rotate=\aaUhol]
(N3-\numberC) at (\aaMaxABC+2.5-0.5*\aaNN,.866+.866*\aaNN)
{\ifthenelse{\equal{\aaPopisC}{-}}{\$rb{1+(\aaPocetC)-(\numberC)}\$}{\$numberC\$}};}}%
{\node[\aaFarbaVC,fill=\aaFarbaVC!10,draw,circle,minimum size=2.1em]
(N3-\numberC) at (\aaMaxABC+2.5-0.5*\aaNN,.866+.866*\aaNN) {\phantom{88}};}}

\ifthenelse{\equal{\aaHrany}{A}}{
\foreach \numberA in {1,...,\aaPocetA}{%
\foreach \numberB in {1,...,\aaPocetB}{%
\ifthenelse{\equal{\aaOrient}{N}}{\path (N1-\numberA) edge[\aaFarbaHAB,-] (N2-\numberB);}-%
\ifthenelse{\equal{\aaOrient}{ON}}{\path (N1-\numberA) edge[\aaFarbaHAB,-] (N2-\numberB);}-%
\ifthenelse{\equal{\aaOrient}{NO}}{\path (N1-\numberA) edge[\aaFarbaHAB,-] (N2-\numberB);}-%
\path (N1-\numberA) edge[\aaFarbaHOAB,->,bend right=5] (N2-\numberB);
\path (N2-\numberB) edge[\aaFarbaHOAB,->,bend right=5] (N1-\numberA);}}}}

\foreach \numberA in {1,...,\aaPocetA}{%
\foreach \numberC in {1,...,\aaPocetC}{%
\ifthenelse{\equal{\aaOrient}{N}}{\path (N1-\numberA) edge[\aaFarbaHAC,-] (N3-\numberC);}-%
\ifthenelse{\equal{\aaOrient}{ON}}{\path (N1-\numberA) edge[\aaFarbaHAC,-] (N3-\numberC);}-%
\ifthenelse{\equal{\aaOrient}{NO}}{\path (N1-\numberA) edge[\aaFarbaHAC,-] (N3-\numberC);}-%
\path (N1-\numberA) edge[\aaFarbaHOAC,->,bend right=5] (N3-\numberC);
\path (N3-\numberC) edge[\aaFarbaHOAC,->,bend right=5] (N1-\numberA);}}}}

\foreach \numberB in {1,...,\aaPocetB}{%
\foreach \numberC in {1,...,\aaPocetC}{%
\ifthenelse{\equal{\aaOrient}{N}}{\path (N2-\numberB) edge[\aaFarbaHBC,-] (N3-\numberC);}-%
\ifthenelse{\equal{\aaOrient}{ON}}{\path (N2-\numberB) edge[\aaFarbaHBC,-] (N3-\numberC);}-%
\ifthenelse{\equal{\aaOrient}{NO}}{\path (N2-\numberB) edge[\aaFarbaHBC,-] (N3-\numberC);}-%
\path (N2-\numberB) edge[\aaFarbaHOBC,->,bend right=5] (N3-\numberC);
\path (N3-\numberC) edge[\aaFarbaHOBC,->,bend right=5] (N2-\numberB);}}}}
}{}

\end{tikzpicture}
}

%.....
%
% Styripartitny graf -- volanie: \TetraGraph{#2}{#3}{#4}{#5}{#6}{#7}
% resp. \TetraGraph[#1]{#2}{#3}{#4}{#5}{#6}{#7}
%
% #2 pocet 1.vrcholov [max 14] -- neprirodzene cislo upravi na prirodzene z intervalu [1,14]
% #3 pocet 2.vrcholov [max 14] -- neprirodzene cislo upravi na prirodzene z intervalu [1,14]
% #4 pocet 3.vrcholov [max 14] -- neprirodzene cislo upravi na prirodzene z intervalu [1,14]
% #5 pocet 4.vrcholov [max 14] -- neprirodzene cislo upravi na prirodzene z intervalu [1,14]
%
% #6 orientovany graf [0 N ON NO] .. orientovany -- neorientovany -- oba -- oba
% #7 zobrazuje cisla vrcholov [ano nie]
%
% #1 Nepovinnny parameter [...] rozne pomocne nastavenia:
% \def\aaPopisA{+} ... cislovanie 1.vrcholov [+ -] .. kladny zaporny smer
% \def\aaPopisB{+} ... cislovanie 2.vrcholov [+ -] .. kladny zaporny smer
% \def\aaPopisC{+} ... cislovanie 3.vrcholov [+ -] .. kladny zaporny smer
% \def\aaPopisD{+} ... cislovanie 4.vrcholov [+ -] .. kladny zaporny smer
% \def\aaFarbaVA{color} ... farba 1.vrcholov
% \def\aaFarbaVB{color} ... farba 2.vrcholov
% \def\aaFarbaVC{color} ... farba 3.vrcholov
% \def\aaFarbaVD{color} ... farba 4.vrcholov
% \def\aaFarbaHAB{color} ... farba neorientovanych hran 1.--2.
% \def\aaFarbaHAC{color} ... farba neorientovanych hran 1.--3.
% \def\aaFarbaHAD{color} ... farba neorientovanych hran 1.--4.
% \def\aaFarbaHBC{color} ... farba neorientovanych hran 2.--3.
% \def\aaFarbaHBD{color} ... farba neorientovanych hran 2.--4.
% \def\aaFarbaHCD{color} ... farba neorientovanych hran 3.--4.
% \def\aaFarbaHOAB{color} ... farba orientovanych hran 1.--2.
% \def\aaFarbaHOAC{color} ... farba orientovanych hran 1.--3.
% \def\aaFarbaHOAD{color} ... farba orientovanych hran 1.--4.
% \def\aaFarbaHOBC{color} ... farba orientovanych hran 2.--3.
% \def\aaFarbaHOBD{color} ... farba orientovanych hran 2.--4.
% \def\aaFarbaHOC{color} ... farba orientovanych hran 3.--4.
% \def\aaHrany{A} ... ukaze-neukaze hrany [A N]
% \def\aaSkala{1} ... skala obrazku [0.2 ... 3 ...] -- implicitne 1
% \def\aaOtoc{0} ... otoci graf o dany uhol [stupne] -- implicitne 0
%
% \def\aaRovnakaFarbaV{N} ... rovnaka farba vrcholov [A N] -- implicitne N

```

```

% \def\aaFarbaV{color} ... farba rovnaka pre vsetky vrcholy -- musi byt \def\aaRovnakaFarbaV{A}
%
% \def\aaRovnakaFarbaH{N} ... rovnaka farba vrcholov [A N] -- implicitne N
% \def\aaFarbaH{color} ... farba rovnaka pre vsetky hrany -- musi byt \def\aaRovnakaFarbaH{A}
%
\newcommand\TetraGraph[7] [] {\def\aaPopisA{+}\def\aaPopisB{+}\def\aaPopisC{+}\def\aaPopisD{+}\def\aaFarbaV{blue!60!black}%
\def\aaFarbaVA{blue!60!black}\def\aaFarbaVB{red!30!black}\def\aaFarbaVC{green!30!black}\def\aaFarbaVD{yellow!40!black}%
\def\aaSkala{1}\def\aaOtoc{0}\def\aaRovnakaFarbaV{N}\def\aaRovnakaFarbaH{N}\def\aaHrany{A}%
\def\aaFarbaH{red!70!yellow}\def\aaFarbaHO{red!70}%
\def\aaFarbaHAB{red!70!yellow}\def\aaFarbaHOAB{red!70}%
\def\aaFarbaHAC{orange!70!yellow}\def\aaFarbaHOAC{orange!70}%
\def\aaFarbaHAD{magenta!70!yellow}\def\aaFarbaHOAD{magenta!70}%
\def\aaFarbaHBC{magenta!70!yellow}\def\aaFarbaHOBC{magenta!70}%
\def\aaFarbaHBD{brown!70!yellow}\def\aaFarbaHOBD{brown!70}%
\def\aaFarbaHCD{red!70!yellow}\def\aaFarbaHOCD{red!70}%
\rPr{\aaMax}{14}#1\rPr{\aaUhol}{\aaOtoc}%
\ifthenelse{\equal{\aaRovnakaFarbaV}{A}}{%
\def\aaFarbaVA{\aaFarbaV}\def\aaFarbaVB{\aaFarbaV}\def\aaFarbaVC{\aaFarbaV}\def\aaFarbaVD{\aaFarbaV}}{%
\ifthenelse{\equal{\aaRovnakaFarbaH}{A}}{%
\def\aaFarbaHAB{\aaFarbaH}\def\aaFarbaHAC{\aaFarbaH}\def\aaFarbaHAD{\aaFarbaH}%
\def\aaFarbaHBC{\aaFarbaH}\def\aaFarbaHBD{\aaFarbaH}\def\aaFarbaHCD{\aaFarbaH}%
\def\aaFarbaHOAB{\aaFarbaH}\def\aaFarbaHOAC{\aaFarbaH}\def\aaFarbaHOAD{\aaFarbaH}%
\def\aaFarbaHOBC{\aaFarbaH}\def\aaFarbaHOBD{\aaFarbaH}\def\aaFarbaHOCD{\aaFarbaH}}{%
\rPr{\aaPocetA}{#2}\rPr{\aaPocetB}{#3}\rPr{\aaPocetC}{#4}\rPr{\aaPocetD}{#5}%
\def\aaOrient{#6}\def\aaCisla{#7}%
\rPrCelaCast{\aaPocetA}{abs(\aaPocetA)}\rPr{\aaPocetA}{min(\aaPocetA,\aaMax)}\rPr{\aaPocetA}{max(\aaPocetA,1)}%
\rPrCelaCast{\aaPocetB}{abs(\aaPocetB)}\rPr{\aaPocetB}{min(\aaPocetB,\aaMax)}\rPr{\aaPocetB}{max(\aaPocetB,1)}%
\rPrCelaCast{\aaPocetC}{abs(\aaPocetC)}\rPr{\aaPocetC}{min(\aaPocetC,\aaMax)}\rPr{\aaPocetC}{max(\aaPocetC,1)}%
\rPrCelaCast{\aaPocetD}{abs(\aaPocetD)}\rPr{\aaPocetD}{min(\aaPocetD,\aaMax)}\rPr{\aaPocetD}{max(\aaPocetD,1)}%
\testujPMO[\aaTestujAC]{(\aaPocetA)-(\aaPocetC)}\rPr{\aaMaxAC}{max(\aaPocetA,\aaPocetC)}
\testujPMO[\aaTestujBD]{(\aaPocetB)-(\aaPocetD)}\rPr{\aaMaxBD}{max(\aaPocetB,\aaPocetD)}
\rPr{\aaPomerAC}{(\aaPocetA-1)/max((\aaPocetC-1),1)}
\rPr{\aaPomerCA}{(\aaPocetC-1)/max((\aaPocetA-1),1)}
\rPr{\aaPomerDB}{(\aaPocetD-1)/max((\aaPocetB-1),1)}
\rPr{\aaPomerBD}{(\aaPocetB-1)/max((\aaPocetD-1),1)}
%
\begin{tikzpicture}[transform shape,scale=\aaSkala, rotate=-\aaUhol]
\foreach \numberA in {1,...,\aaPocetA}{%
\ifthenelse{\aaTestujAC=-1}{\rPr{\aaNN}{1+(\aaPomerCA)*(\numberA-.5-sgn(\aaPocetA)*.5)}}{\rPr{\aaNN}{\numberA}}
\ifthenelse{\equal{\aaCisla}{A}}{%
\node[\aaFarbaVA,fill=\aaFarbaVA!10,draw,circle,minimum size=2.1em, rotate=\aaUhol]
(N1-\numberA) at (\aaNN+.5,0) {\textcolor{\aaFarbaVA}{%
\ifthenelse{\equal{\aaPopisA}{-}}{\rPr{1+(\aaPocetA)-(\numberA)}}{\rPr{\numberA}}}};%
\node[\aaFarbaVA,fill=\aaFarbaVA!10,draw,circle,minimum size=2.1em]
(N1-\numberA) at (\aaNN+.5,0) {\phantom{88}};}}
\foreach \numberB in {1,...,\aaPocetB}{\
\ifthenelse{\aaTestujBD=-1}{\rPr{\aaNN}{1+(\aaPomerDB)*(\numberB-.5-sgn(\aaPocetB)*.5)}}{\rPr{\aaNN}{\numberB}}
\ifthenelse{\equal{\aaCisla}{A}}{%
\node[\aaFarbaVB,fill=\aaFarbaVB!10,draw,circle,minimum size=2.1em, rotate=\aaUhol]
(N2-\numberB) at (\aaMaxAC+2,\aaNN+.5) {\textcolor{\aaFarbaVB}{%
\ifthenelse{\equal{\aaPopisB}{-}}{\rPr{1+(\aaPocetB)-(\numberB)}}{\rPr{\numberB}}}};%
\node[\aaFarbaVB,fill=\aaFarbaVB!10,draw,circle,minimum size=2.1em]
(N2-\numberB) at (\aaMaxAC+2,\aaNN+.5) {\phantom{88}};}}
\foreach \numberC in {1,...,\aaPocetC}{\
\ifthenelse{\aaTestujAC=1}{\rPr{\aaNN}{1+(\aaPomerAC)*(\numberC-.5-sgn(\aaPocetC)*.5)}}{\rPr{\aaNN}{\numberC}}
\ifthenelse{\equal{\aaCisla}{A}}{%
\node[\aaFarbaVC,fill=\aaFarbaVC!10,draw,circle,minimum size=2.1em, rotate=\aaUhol]
(N3-\numberC) at (\aaNN+.5,\aaMaxBD+2) {\textcolor{\aaFarbaVC}{%
\ifthenelse{\equal{\aaPopisC}{+}}{\rPr{1+(\aaPocetC)-(\numberC)}}{\rPr{\numberC}}}};%
\node[\aaFarbaVC,fill=\aaFarbaVC!10,draw,circle,minimum size=2.1em]
(N3-\numberC) at (\aaNN+.5,\aaMaxBD+2) {\phantom{88}};}}
\foreach \numberD in {1,...,\aaPocetD}{\
\ifthenelse{\aaTestujBD=1}{\rPr{\aaNN}{1+(\aaPomerBD)*(\numberD-.5-sgn(\aaPocetD)*.5)}}{\rPr{\aaNN}{\numberD}}
\ifthenelse{\equal{\aaCisla}{A}}{%
\node[\aaFarbaVD,fill=\aaFarbaVD!10,draw,circle,minimum size=2.1em, rotate=\aaUhol]
(N4-\numberD) at (0,\aaNN+.5) {\textcolor{\aaFarbaVD}{%
\ifthenelse{\equal{\aaPopisD}{+}}{\rPr{1+(\aaPocetD)-(\numberD)}}{\rPr{\numberD}}}};%
\node[\aaFarbaVD,fill=\aaFarbaVD!10,draw,circle,minimum size=2.1em, rotate=\aaUhol]
(N4-\numberD) at (0,\aaNN+.5) {\phantom{88}};}}
\ifthenelse{\equal{\aaHrany}{A}}{
\foreach \numberA in {1,...,\aaPocetA}{%
\foreach \numberB in {1,...,\aaPocetB}{%
\ifthenelse{\equal{\aaOrient}{N}}{\path (N1-\numberA) edge[\aaFarbaHAB,-] (N2-\numberB);}%
\ifthenelse{\equal{\aaOrient}{ON}}{\path (N1-\numberA) edge[\aaFarbaHAB,-] (N2-\numberB);}%
\ifthenelse{\equal{\aaOrient}{NO}}{\path (N1-\numberA) edge[\aaFarbaHAB,-] (N2-\numberB);}%
\path (N1-\numberA) edge[\aaFarbaHOAB,->,bend right=5] (N2-\numberB);
\path (N2-\numberB) edge[\aaFarbaHOAB,->,bend right=5] (N1-\numberA);}}}}

```

```

\foreach \numberA in {1,...,\aaPocetA}{%
\foreach \numberC in {1,...,\aaPocetC}{%
\ifthenelse{\equal{\aaOrient}{N}}{\path (N1-\numberA) edge[\aaFarbaHAC,-] (N3-\numberC);}-%
\ifthenelse{\equal{\aaOrient}{ON}}{\path (N1-\numberA) edge[\aaFarbaHAC,-] (N3-\numberC);}-%
\ifthenelse{\equal{\aaOrient}{NO}}{\path (N1-\numberA) edge[\aaFarbaHAC,-] (N3-\numberC);}-%
\path (N1-\numberA) edge[\aaFarbaHOAC,->,bend right=5] (N3-\numberC);
\path (N3-\numberC) edge[\aaFarbaHOAC,->,bend right=5] (N1-\numberA);}}

\foreach \numberA in {1,...,\aaPocetA}{%
\foreach \numberD in {1,...,\aaPocetD}{%
\ifthenelse{\equal{\aaOrient}{N}}{\path (N1-\numberA) edge[\aaFarbaHAD,-] (N4-\numberD);}-%
\ifthenelse{\equal{\aaOrient}{ON}}{\path (N1-\numberA) edge[\aaFarbaHAD,-] (N4-\numberD);}-%
\ifthenelse{\equal{\aaOrient}{NO}}{\path (N1-\numberA) edge[\aaFarbaHAD,-] (N4-\numberD);}-%
\path (N1-\numberA) edge[\aaFarbaHOAD,->,bend right=5] (N4-\numberD);
\path (N4-\numberD) edge[\aaFarbaHOAD,->,bend right=5] (N1-\numberA);}}

\foreach \numberB in {1,...,\aaPocetB}{%
\foreach \numberC in {1,...,\aaPocetC}{%
\ifthenelse{\equal{\aaOrient}{N}}{\path (N2-\numberB) edge[\aaFarbaHBC,-] (N3-\numberC);}-%
\ifthenelse{\equal{\aaOrient}{ON}}{\path (N2-\numberB) edge[\aaFarbaHBC,-] (N3-\numberC);}-%
\ifthenelse{\equal{\aaOrient}{NO}}{\path (N2-\numberB) edge[\aaFarbaHBC,-] (N3-\numberC);}-%
\path (N2-\numberB) edge[\aaFarbaHOBC,->,bend right=5] (N3-\numberC);
\path (N3-\numberC) edge[\aaFarbaHOBC,->,bend right=5] (N2-\numberB);}}

\foreach \numberB in {1,...,\aaPocetB}{%
\foreach \numberD in {1,...,\aaPocetD}{%
\ifthenelse{\equal{\aaOrient}{N}}{\path (N2-\numberB) edge[\aaFarbaHBD,-] (N4-\numberD);}-%
\ifthenelse{\equal{\aaOrient}{ON}}{\path (N2-\numberB) edge[\aaFarbaHBD,-] (N4-\numberD);}-%
\ifthenelse{\equal{\aaOrient}{NO}}{\path (N2-\numberB) edge[\aaFarbaHBD,-] (N4-\numberD);}-%
\path (N2-\numberB) edge[\aaFarbaHOBD,->,bend right=5] (N4-\numberD);
\path (N4-\numberD) edge[\aaFarbaHOBD,->,bend right=5] (N2-\numberB);}}

\foreach \numberC in {1,...,\aaPocetC}{%
\foreach \numberD in {1,...,\aaPocetD}{%
\ifthenelse{\equal{\aaOrient}{N}}{\path (N3-\numberC) edge[\aaFarbaHCD,-] (N4-\numberD);}-%
\ifthenelse{\equal{\aaOrient}{ON}}{\path (N3-\numberC) edge[\aaFarbaHCD,-] (N4-\numberD);}-%
\ifthenelse{\equal{\aaOrient}{NO}}{\path (N3-\numberC) edge[\aaFarbaHCD,-] (N4-\numberD);}-%
\path (N3-\numberC) edge[\aaFarbaHOCD,->,bend right=5] (N4-\numberD);
\path (N4-\numberD) edge[\aaFarbaHOCD,->,bend right=5] (N3-\numberC);}}
}

\end{tikzpicture}
}

%.....
%
% Domcek -- volanie: \aaDom resp. \aaDom[#1]
% Domcek bez strednych hran -- volanie: \aaDomI resp. \aaDomI[#1]
%
% #1 Nepovinný parameter [...] rozne pomocne nastavenia:
% \def\aaFarbaV{color} ... farba vrcholov
% \def\aaFarbaH{color} ... farba hran
% \def\aaSkala{1} ... skala obrazku [0.2 ... 3 ...] -- implicitne 1
% \def\aaOtoc{0} ... otoci graf o dany uhol [stupne] -- implicitne 0
% \def\aaObtek{Opt} ... zaoblenie lomenia hran vo vrcholoch
%
%.....
\newcommand\aaDom[1] [] {\def\aaFarbaV{red}\def\aaFarbaH{black}\def\aaSkala{1}\def\aaOtoc{0}%
\def\aaObtek{Opt}\rbPr{\aaUhol}{\aaOtoc}\def\aaFarbaVV{\aaFarbaV!20}%
\draw[\aaFarbaV,rotate=\aaUhol,fill=\aaFarbaVV,scale=\aaSkala]
(0,0)circle(8pt) (0,2)circle(8pt) (1,3.25)circle(8pt) (2,2)circle(8pt) (1,1)circle(8pt)
(2,0)circle(8pt) (0,2)circle(8pt) (2,2)circle(8pt) (0,0)circle(8pt) (2,0)circle(8pt);
\draw[\aaFarbaH,thick,rotate=\aaUhol,scale=\aaSkala,rounded corners=\aaObtek]
(0,0)--(0,2)--(1,3.25)--(2,2)--(2,0)--(0,2)--(2,2)--(0,0)--(2,0);}

%.....
\newcommand\aaDomX[1] [] {\def\aaFarbaV{red}\def\aaFarbaH{black}\def\aaSkala{1}\def\aaOtoc{0}\#1%
\def\aaObtek{Opt}\rbPr{\aaUhol}{\aaOtoc}\def\aaFarbaVV{\aaFarbaV!20}%
\tikz{\draw[\aaFarbaV,rotate=\aaUhol,fill=\aaFarbaVV,scale=\aaSkala]
(0,0)circle(8pt) (0,2)circle(8pt) (1,3.25)circle(8pt) (2,2)circle(8pt) (1,1)circle(8pt)
(2,0)circle(8pt) (0,2)circle(8pt) (2,2)circle(8pt) (0,0)circle(8pt) (2,0)circle(8pt);
\draw[\aaFarbaH,thick,rotate=\aaUhol,scale=\aaSkala,rounded corners=\aaObtek]
(0,0)--(0,2)--(1,3.25)--(2,2)--(2,0)--(0,2)--(2,2)--(0,0)--(2,0);}}

%.....
%
% Komplettný graf -- volanie: \CGraph{#2}{#3}{#4}{#5}
% resp. \CGraph{#1}{#2}{#3}{#4}{#5}
%
%

```

```

%
% #2 pocet vrcholov [2...32] -- neprirodzene cislo upravi na prirodzene z intervalu [2,32]
%
% #3 orientovany graf [0 N ON NO] ... orientovany -- neorientovany -- oba -- oba
% #4 zobrazuje cisla vrcholov [A N]
% #5 zoznam hran v tvare: 1/2, 3/4, .... [cislo Z vrchola/cislo K vrchola]
%
% #1 Nepovinnny parameter [...] rozne pomocne nastavenia:
% \def\aaPopis{+} ... cislovanie vrcholov [+ -] .. kladny zaporny smer
% \def\aaHcislo{n} ... cislo najvyssie zobrazeneho vrchola, musi byt z intervalu [1,pocet vrcholov]
% \def\aaFarbaV{color} ... farba vrcholov
% \def\aaFarbaH{color} ... farba neorientovanych hran
% \def\aaFarbaHO{color} ... farba orientovanych hran
% \def\aaPolomer{20} ... polomer grafu -- implicitne 20
% \def\aaSkala{1} ... skala obrazku [0.2 ... 3 ... ] -- implicitne 1
% \def\aaOtoc{0} ... otoci graf o dany uhol [stupne] -- implicitne 0
%
\newcommand\CGraph[5][\def\aaPopis{+}\def\aaHcislo{1}\rbPr{\aaPolomer}{20}%
\def\aaFarbaV{blue!60!black}\def\aaFarbaH{red!70!yellow}\def\aaFarbaHO{red!70}\def\aaSkala{1}%
\rbPr{\aaMax}{32}\def\aaOtoc{0}\def\aaHrany{A}#1\rbPr{\aaHcislo}{\aaHcislo}%
\rbPr{\bbUhol}{\aaOtoc}\rbPr{\aaPocet}{#2}\def\aaOrient{#3}\def\aaCisla{#4}%
\rbPrCelaCast{\aaPocet}{abs(\aaPocet)}\rbPr{\aaPocet}{min(\aaPocet,\aaMax)}%
\rbPr{\aaPocet}{max(\aaPocet,1)}%
\ifthenelse{\equal{\aaPopis}{+}}{\rbPr{\bbPopis}{1}}{\rbPr{\bbPopis}{-1}}%
\rbPr{\aaPocetN}{(\aaPocet)-1}\rbPr{\aaKrok}{360/(\aaPocet)}%
%
\begin{tikzpicture}[transform shape,scale=\aaSkala, rotate=-\bbUhol]
\foreach \number in {1,...,\aaPocet}{%
\rbPr{\ccU}{90-(\bbPopis)*360*((\aaHcislo)-1)/(\aaPocet)+(\bbPopis)*(\number-1)*(\aaKrok)}
\ifthenelse{\equal{\aaCisla}{A}}{%
\node[\aaFarbaV,fill=\aaFarbaV!10,draw,circle,minimum size=2.1em, rotate=\bbUhol]
(\number) at (\ccU:\aaPolomer em) {\textcolor{\aaFarbaV}{\number}};%
}{\node[\aaFarbaV,fill=\aaFarbaV!10,draw,circle,minimum size=2.1em]
(\number) at (\ccU:\aaPolomer em) {\phantom{88}};}}
\foreach \aaZAC/\aaKON in {#5}{%
\ifthenelse{\equal{\aaOrient}{N}}{\path (\aaZAC) edge[\aaFarbaH,-] (\aaKON);}{%
\path (\aaZAC) edge[\aaFarbaHO,->,bend right=6] (\aaKON);}}
\end{tikzpicture}
}

```

Obrázky:

Detský domček, jeho kresba jedným ťahom, pootočenie a zloženie viacerých domčekov

```
\begin{figure}[ht]
\begin{center}
\tikz[scale=.35]{\draw[red,fill=red!20]
(0,0)circle(8pt) (0,2)circle(8pt) (1,3.25)circle(8pt) (2,2)circle(8pt)
(2,0)circle(8pt) (0,2)circle(8pt) (2,2)circle(8pt) (0,0)circle(8pt) (2,0)circle(8pt) (1,1)circle(8pt);}
%
\tikz[scale=.35]{\draw[black,thick] (0,0)--(0,2)--(1,3.25)--(2,2)--(2,0)--(0,2)--(2,2)--(0,0)--(2,0);}
%
\quad
\tikz[scale=.35]{\aaDom}
%
\quad
\tikz[scale=.35]{\aaDom[\def\aaObtek{5pt}\def\aaFarbaV{blue}]}
%
\tikz[scale=.35,rotate=30]{\aaDom[\def\aaObtek{5pt}\def\aaFarbaV{blue}]}
%
\quad
\tikz[scale=.35,rotate=180]{\aaDom}
%
\tikz[scale=.35,rotate=-30]{\aaDom}
%
\tikz[scale=.35,rotate=90]{\aaDom}
%
\quad
\tikz[scale=.36]{\aaDom\aaDom[\def\aaOtoc{30}]\aaDom[\def\aaOtoc{60}]\aaDom[\def\aaOtoc{90}]}
\caption{Detský domček, jeho kresba jedným ťahom, pootočenie a zloženie viacerých domčekov}
\label{picture11}
\end{center}
\end{figure}
```

Použitie príkazu \foreach na kreslenie obrázkov

```
\rbPr{\xxMaximum}{6}\rbPr{\xxMaxR}{90/(\xxMaximum)}
\begin{figure}[ht]
\begin{center}
\vspace{-\baselineskip}

\tikz{\foreach \xx in {1,...,\xxMaximum}{\rbPr{\xxRot}{(\xx)*360/(\xxMaximum)}
\node (N-\xx) at (\xxRot:1.2) {\aaDomX[\def\aaSkala{.24}]};}}
%
\quad
\tikz{\foreach \N in {1,...,16}{\rbPr{\NN}{360/16*(\N)} \aaDom[\def\aaSkala{.45}\def\aaOtoc{\NN}]}
%
\quad
\tikz{\foreach \xx in {1,...,\xxMaximum}{\rbPr{\xxRot}{(\xx)*360/(\xxMaximum)}\rbPr{\xxRott}{90+(\xx)*360/(\xxMaximum)}
\node (N-\xx) at (\xxRot:1.2) {\aaDomX[\def\aaSkala{.24}\def\aaOtoc{\xxRott}]};}}
%
\caption{Použitie príkazu \texttt{\textbackslash foreach} na kreslenie obrázkov}
\label{picture12}
\end{center}
\end{figure}
```

Grafy zostrojené pomocou makra \CGraph

```
\begin{figure}[ht]
\begin{center}
\CGraph[\def\aaSkala{.35}\def\aaPolomer{5}\def\aaOtoc{0}]{3}OA{3/2,2/1,2/3}
%
\CGraph[\def\aaSkala{.35}\def\aaPolomer{3}\def\aaOtoc{10}]{3}NA{3/2,2/1,2/3}
%
\CGraph[\def\aaSkala{.35}\def\aaPolomer{5}\def\aaFarbaV{black}]{9}NA{}
%
\CGraph[\def\aaSkala{.35}\def\aaPolomer{5}\def\aaOtoc{0}\def\aaHcislo{4}]{6}OA{1/3,1/5,2/1,2/4,3/1,3/2,3/6,5/1,5/2,5/3,6/5}
%
\CGraph[\def\aaSkala{.35}\def\aaPolomer{5}\def\aaPopis{0}]{6}NA{1/2,2/3,3/4,4/5,5/6,6/1,2/6,3/5,1/4}
%
\CGraph[\def\aaSkala{.35}\def\aaPolomer{5}\def\aaFarbaV{red}]{6}NA{1/2,2/3,3/4,4/5,5/6,6/1,2/5,3/6,1/4}
%
\CGraph[\def\aaSkala{.35}\def\aaPolomer{5}]{8}NA{1/2,1/3,1/4,3/4,6/7,6/8}
%
\caption{Grafy zostrojené pomocou makra \texttt{\textbackslash CGraph}}
\label{picture13}
\end{center}
\end{figure}
```


Úplné grafy vytvorené pomocou \CompletGraph

```
\begin{figure}[ht]
\begin{center}
\CompletGraph[\def\aaSkala{.32}\def\aaPolomer{5}]{2}{0N}{A}
\CompletGraph[\def\aaSkala{.32}\def\aaPolomer{5}\def\aaFarbaV{red}\def\aaFarbaH{black}]{3}{N}{N}
\CompletGraph[\def\aaSkala{.32}\def\aaPolomer{5}\def\aaFarbaH{green}]{4}{0}{N}
\CompletGraph[\def\aaSkala{.32}\def\aaPolomer{5}\def\aaFarbaH0{magenta}]{5}{N}{A}
\CompletGraph[\def\aaSkala{.32}\def\aaPolomer{5}\def\aaHrany{N}]{6}{N}{A}
\CompletGraph[\def\aaSkala{.32}\def\aaPolomer{5}\def\aaPopis{-}\def\aaHcislo{3}]{7}{0}{A}
\CompletGraph[\def\aaSkala{.32}\def\aaPolomer{5}\def\aaPopis{+}\def\aaHcislo{3}]{7}{0}{A}

\bigskip

\CompletGraph[\def\aaSkala{.32}\def\aaPolomer{5}\def\aaOtoc{0}]{6}{N}{A}
\CompletGraph[\def\aaSkala{.32}\def\aaPolomer{5}\def\aaOtoc{20}]{6}{N}{A}
\CompletGraph[\def\aaSkala{.32}\def\aaPolomer{5}\def\aaOtoc{40}]{6}{N}{A}
\quad
\CompletGraph[\def\aaSkala{.04}\def\aaPolomer{5}\def\aaOtoc{30}]{7}{N}{A}
\CompletGraph[\def\aaSkala{.08}\def\aaPolomer{5}\def\aaOtoc{30}]{7}{N}{A}
\CompletGraph[\def\aaSkala{.12}\def\aaPolomer{5}\def\aaOtoc{30}]{7}{N}{A}
\CompletGraph[\def\aaSkala{.22}\def\aaPolomer{5}\def\aaOtoc{30}]{7}{N}{A}
\CompletGraph[\def\aaSkala{.32}\def\aaPolomer{5}\def\aaOtoc{30}]{7}{N}{A}
\caption{Úplné grafy vytvorené pomocou \texttt{\textbackslash CompletGraph}}
\label{picture1}
\end{center}
\end{figure}
```

Aj graf môže tvoriť umelecké dielo

```
\begin{figure}[ht]
\begin{center}
\CompletGraph[\def\aaSkala{.45}\def\aaPolomer{13}\def\aaOtoc{0}\def\aaFarbaH{red!60!black}]{24}{N}{N}
\quad
\rbPr{\xxMaximum}{10}
\begin{tikzpicture}
\node at (0,0) {\CompletGraph[\def\aaSkala{.35}\def\aaPolomer{7.5}\def\aaFarbaH{green!50!black}%
\def\aaFarbaV{green!50!black}]{16}{N}{N}};
\foreach \xx in {1,...,\xxMaximum}{\rbPr{\xxRot}{(\xx)*360/(\xxMaximum)}%
\rbPr{\xxRFar}{(\xx)*100/(\xxMaximum)}\def\xxFar{blue!\xxRFar!red}
\node (N-\xx) at (\xxRot:2.) {\CompletGraph[\def\aaSkala{.25}\def\aaPolomer{4}\def\aaOtoc{-\xxRot}%
\def\aaFarbaH{\xxFar}\def\aaFarbaV{\xxFar}]{8}{N}{N}};
\end{tikzpicture}
\caption{Aj graf môže tvoriť umelecké dielo}
\label{picture4}
\end{center}
\end{figure}
```

Úplné bipartitné grafy vytvorené pomocou \BiGraph

```
\begin{figure}[ht]
\begin{center}
\BiGraph[\def\aaSkala{.32}\def\aaDlзка{2.5}]{1}{1}{0}{A}
\BiGraph[\def\aaSkala{.32}\def\aaDlзка{3}\def\aaOtoc{45}]{1}{2}{0}{A}
\BiGraph[\def\aaSkala{.32}\def\aaDlзка{3}\def\aaOtoc{60}]{2}{1}{0}{A}
\BiGraph[\def\aaSkala{.32}\def\aaDlзка{3}\def\aaOtoc{90}]{2}{1}{0}{A}
\BiGraph[\def\aaSkala{.32}\def\aaDlзка{3.5}]{2}{2}{0}{A}
\BiGraph[\def\aaSkala{.32}\def\aaDlзка{3.5}\def\aaFarbaV{red}\def\aaFarbaH{black}]{3}{4}{N}{N}
\BiGraph[\def\aaSkala{.32}\def\aaDlзка{3.5}\def\aaFarbaH{green}]{4}{5}{0}{N}

\medskip

\BiGraph[\def\aaSkala{.32}\def\aaDlзка{4}\def\aaFarbaH0{magenta}]{6}{2}{N}{A}
\BiGraph[\def\aaSkala{.32}\def\aaDlзка{4}]{6}{1}{NO}{A}
\BiGraph[\def\aaSkala{.32}\def\aaDlзка{4}\def\aaPopis{-}\def\aaHcislo{3}]{7}{2}{0}{A}
\BiGraph[\def\aaSkala{.32}\def\aaDlзка{4}\def\aaHcislo{3}]{3}{9}{N}{N}
\caption{Úplné bipartitné grafy vytvorené pomocou \texttt{\textbackslash BiGraph}}
\label{picture6}
\end{center}
\end{figure}
```

Grafy vytvorené pomocou \TriGraph a \TetraGraph

```
\begin{figure}[ht]
\begin{center}
\TriGraph[\def\aaSkala{.32}\def\aaDlзка{2.5}]{1}{1}{1}{0}{A}
\TriGraph[\def\aaSkala{.32}\def\aaDlзка{3}]{2}{2}{2}{0}{A}
\TriGraph[\def\aaSkala{.32}\def\aaDlзка{3}\def\aaPopisA{-}\def\aaPopisB{-}\def\aaPopisC{-}]{2}{2}{2}{0}{A}
\TriGraph[\def\aaSkala{.32}\def\aaDlзка{3}\def\aaOtoc{45}]{2}{2}{2}{0}{A}
\end{center}
\end{figure}
```

```
\TriGraph[\def\aaSkala{.32}\def\aaDlзка{3}\def\aaOtoc{60}\def\aaPopisC{-}] {2}{2}{2}{0}{A}
\TriGraph[\def\aaSkala{.32}\def\aaDlзка{3}\def\aaOtoc{90}] {2}{2}{2}{N}{N}
```

\medskip

```
\TriGraph[\def\aaSkala{.32}\def\aaDlзка{4}] {6}{1}{1}{N0}{A}
\TriGraph[\def\aaSkala{.32}\def\aaDlзка{3.5}] {2}{1}{4}{0}{A}
\TriGraph[\def\aaSkala{.32}\def\aaDlзка{3.5}\def\aaFarbaV{red}\def\aaFarbaH{black}] {2}{4}{3}{0}{N}
\TriGraph[\def\aaSkala{.32}\def\aaDlзка{3.5}\def\aaFarbaH{green}] {5}{4}{4}{N}{N}
```

\medskip

```
\TriGraph[\def\aaSkala{.32}\def\aaDlзка{4}\def\aaFarbaH0{magenta}] {6}{2}{4}{N}{A}
\TriGraph[\def\aaSkala{.32}\def\aaDlзка{4}\def\aaPopis{-}\def\aaHcislo{3}] {7}{2}{3}{0}{A}
\TriGraph[\def\aaSkala{.32}\def\aaDlзка{4}\def\aaHcislo{3}] {3}{7}{3}{N}{N}
```

\medskip

```
\TetraGraph[\def\aaSkala{.32}] {1}{1}{1}{1}{0}{A}
\TetraGraph[\def\aaSkala{.32}\def\aaOtoc{45}] {1}{1}{1}{1}{0}{A}
\TetraGraph[\def\aaSkala{.32}] {1}{1}{2}{2}{0}{A}
\TetraGraph[\def\aaSkala{.32}\def\aaPopisA{-}\def\aaPopisB{-}\def\aaPopisC{-}] {2}{2}{2}{2}{0}{N}
\TetraGraph[\def\aaSkala{.32}\def\aaOtoc{45}] {2}{2}{2}{2}{N}{A}
```

\medskip

```
\TetraGraph[\def\aaSkala{.32}] {4}{2}{3}{1}{N}{A}
\TetraGraph[\def\aaSkala{.32}] {8}{2}{8}{2}{N}{N}
\TetraGraph[\def\aaSkala{.32}] {8}{2}{8}{1}{N}{N}
\caption{Grafy vytvorené pomocou \texttt{\textbackslash TriGraph} a \texttt{\textbackslash TetraGraph}}
\label{picture7}
\end{center}
\end{figure}
```