

DCpic - Examples - 2013/05/01 (v15)

1 Commutative Diagrams

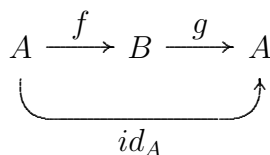
1.1 Curved Arrows

A rectangular curve with rounded corners is easy to specify and should cater for most needs. With this in mind we give the following tip to the user: to specify a rectangular, with rounded corners, curve we choose the points which give us the *expanded chess-horse movement*, that is, (x, y) , $(x \pm 4, y \mp 1)$, $(x \mp 1, y \pm 4)$, or (x, y) , $(x \pm 1, y \mp 4)$, $(x \mp 4, y \pm 1)$, those sets of points will give us the four corners of the rectangle; to form the whole line it is only necessary to add an odd number of points joining the two (or more) corners.

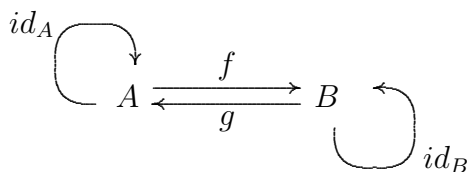
```
\begin{dc}{\commdiag}
\cmor((10,20)(6,21)(5,25)) \pup(5,15){\$x\$}
\end{dc}
```



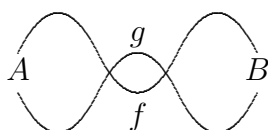
```
\begin{dc}{\commdiag}
\obj(10,15){\$A\$}
\obj(40,15)[A1]{\$A\$}
\obj(25,15){\$B\$}
\mor{\$A\$}{\$B\$}{\$f\$} \mor{\$B\$}{A1}{\$g\$}
\cmor((10,11)(11,7)(15,6)(25,6)(35,6)(39,7)(40,11)) \pup(25,3){\$id_A\$}
\end{dc}
```



```
\begin{dc}{\commdiag}
\obj(14,11){\$A\$}
\obj(39,11){\$B\$}
\mor(14,12)(39,12){\$f\$} \mor(39,10)(14,10){\$g\$}
\cmor((10,10)(6,11)(5,15)(6,19)(10,20)(14,19)(15,15)) \pdown(2,20){\$id_A\$}
\cmor((40,7)(41,3)(45,2)(49,3)(50,7)(49,11)(45,12)) \pleft(54,3){\$id_B\$}
\end{dc}
```



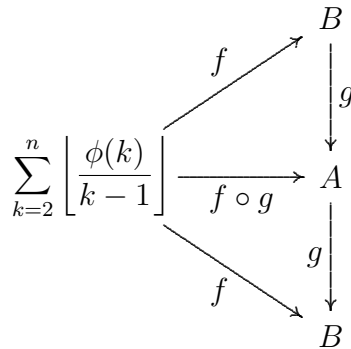
```
\begin{dc}{\commdiag}
\obj(10,18){\$A\$}
\obj(40,18){\$B\$}
\cmor((10,20)(15,25)(20,20)(25,15)(30,20)(35,25)(40,20))
\pdown(25,12){\$f\$}[2]
\cmor((10,15)(15,10)(20,15)(25,20)(30,15)(35,10)(40,15))
\pup(25,22){\$g\$}[2]
\end{dc}
```



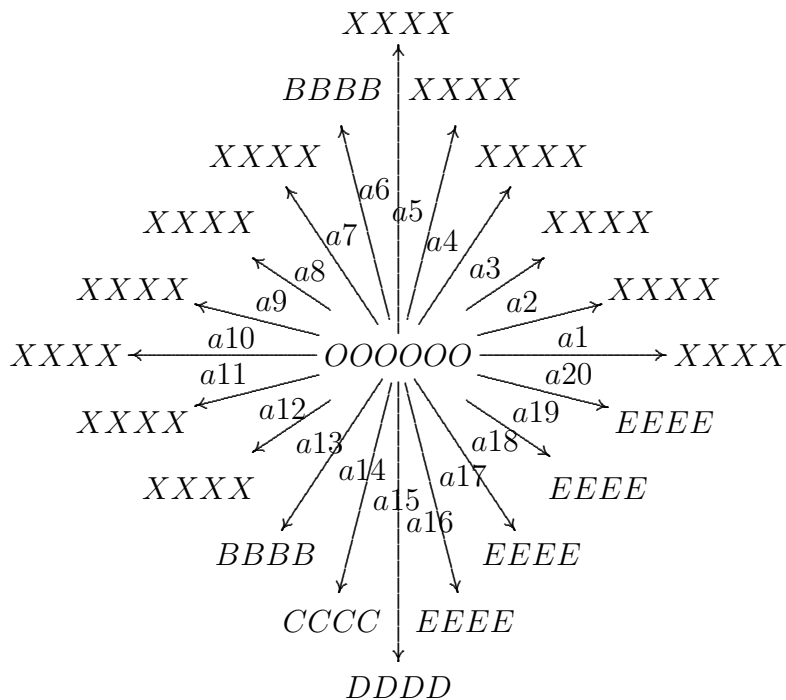
1.2 Size Adjusting

In version 4 (v4.0) two new features are introduced, relative specification $\text{\mor\{objA\}\{objB\}}$ instead of \mor(1,3)(4,5) , and the arrows now automatically adjust their size to the object's box size.

```
\begin{c}
\commdiag[300]
\obj(1,3)[objSum]{\displaystyle\sum_{k=2}^n\left\lfloor\frac{\phi(k)}{k-1}\right\rfloor}
\obj(4,5)[objB]{B}
\obj(4,3)[objA]{A}
\obj(4,1)[objBp]{B}
\mor{objSum}{objB}{f}
\mor{objB}{objA}{f\circ g}
\mor{objSum}{objA}{f}
\mor{objBp}{objA}{f}
\end{c}
```



```
\begin{c}
\commdiag[250]
\obj(10,10)[A]{OOOOO}\obj(15,10)[Aa]{XXXX}\obj(14,11)[Ab]{XXXX}
\obj(13,12)[Ac]{XXXX}\obj(12,13)[Ad]{XXXX}\obj(11,14)[Ae]{XXXX}
\obj(10,15)[Af]{XXXX}\obj(9,14)[Ag]{BBBB}\obj(8,13)[Ah]{XXXX}
\obj(7,12)[Ai]{XXXX}\obj(6,11)[Aj]{XXXX}\obj(5,10)[Ak]{XXXX}
\obj(6,9)[Al]{XXXX}\obj(7,8)[Am]{XXXX}\obj(8,7)[An]{BBBB}
\obj(9,6)[Ao]{CCCC}\obj(10,5)[Ap]{DDDD}\obj(11,6)[Aq]{EEEE}
\obj(12,7)[Ar]{EEEE}\obj(13,8)[As]{EEEE}\obj(14,9)[At]{EEEE}
\mor{A}{Aa}{a1}\mor{A}{Ab}{a2}\mor{A}{Ac}{a3}\mor{A}{Ad}{a4}
\mor{A}{Ae}{a5}\mor{A}{Af}{a6}\mor{A}{Ag}{a7}\mor{A}{Ah}{a8}
\mor{A}{Ai}{a9}\mor{A}{Aj}{a10}\mor{A}{Ak}{a11}\mor{A}{Al}{a12}
\mor{A}{Am}{a13}\mor{A}{An}{a14}\mor{A}{Ao}{a15}\mor{A}{Ap}{a16}
\mor{A}{Aq}{a17}\mor{A}{Ar}{a18}\mor{A}{As}{a19}\mor{A}{At}{a20}
\end{c}
```

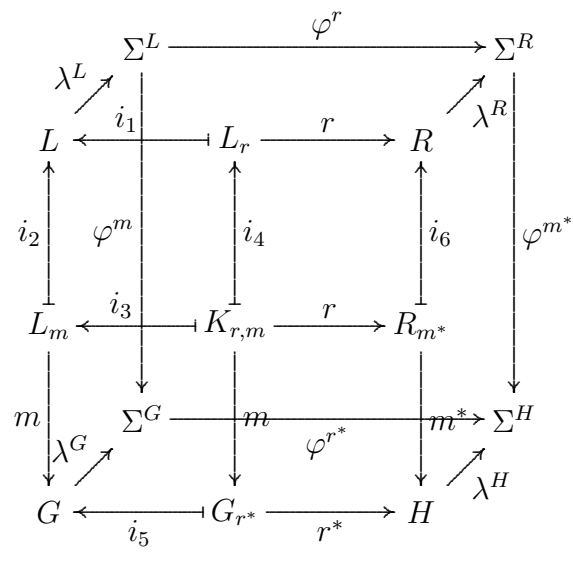


1.3 A Complex Diagram

```

\begin{cd}[commdiag]{350}
\obj(1,1){Gr}{G}
\obj(3,1){Grstar}{G_{r^*}}
\obj(5,1){H}{H}
\obj(2,2){SigmaG}{\Sigma^G}
\obj(6,2){SigmaH}{\Sigma^H}
\obj(1,3){Lm}{L_m}
\obj(3,3){Krm}{K_{r,m}}
\obj(5,3){Rmstar}{R_{m^*}}
\obj(1,5){L}{L}
\obj(3,5){Lr}{L_r}
\obj(5,5){R}{R}
\obj(2,6){SigmaL}{\Sigma^L}
\obj(6,6){SigmaR}{\Sigma^R}
\mor{Gr}{SigmaG}{\lambda^G}
\mor{Grstar}{H}{\varphi^r}
\mor{H}{SigmaH}{\lambda^H}
\mor{SigmaG}{SigmaH}{\varphi^m}
\mor{Lm}{Gr}{i_1}
\mor{Lm}{L}{i_2}
\mor{Krm}{Lm}{i_3}
\mor{Krm}{Lr}{i_4}
\mor{Rmstar}{Krm}{i_5}
\mor{Rmstar}{R}{i_6}
\mor{L}{SigmaL}{\lambda^L}
\mor{Lr}{Lr}{r}
\mor{R}{SigmaR}{\lambda^R}
\mor{SigmaL}{SigmaG}{\varphi^{m^*}}
\mor{SigmaL}{SigmaR}{\lambda^R}
\mor{SigmaL}{SigmaH}{\varphi^{m^*}}
\mor{SigmaL}{SigmaR}{\lambda^R}
\mor{SigmaL}{SigmaG}{\varphi^{m^*}}
\mor{SigmaL}{SigmaR}{\lambda^R}
\mor{SigmaL}{SigmaH}{\varphi^{m^*}}
\end{cd}

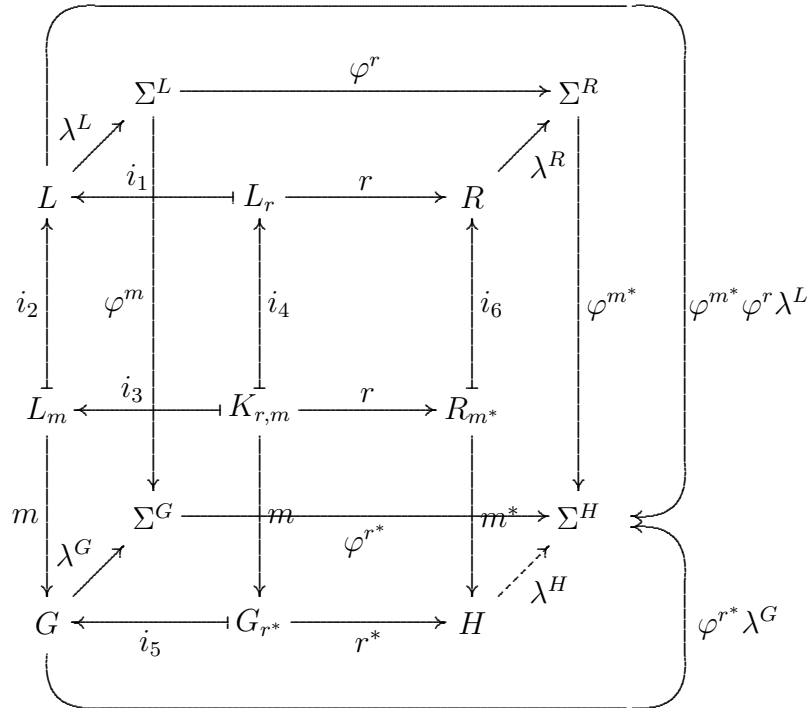
```



```

\begin{cd}[commdiag]{40}
\obj(10,10){G\Sigma}[Gr]
\obj(30,10){G_{r^*}}[Grstar]
\obj(50,10){H\Sigma}[H]
\obj(20,20){\Sigma^G\Sigma}[SigmaG]
\obj(60,20){\Sigma^H\Sigma}[SigmaH]
\obj(10,30){L_m\Sigma}[Lm]
\obj(30,30){K_{r,m}}[Krm]
\obj(50,30){R_{m^*}}[Rmstar]
\obj(10,50){L\Sigma}[L]
\obj(30,50){L_r\Sigma}[Lr]
\obj(50,50){R\Sigma}[R]
\obj(20,60){\Sigma^L\Sigma}[SigmaL]
\obj(60,60){\Sigma^R\Sigma}[SigmaR]
\mor{Gr}{SigmaG}{\lambda^G\Sigma}
\mor{Grstar}{Gr}{i_{-5}}[\atleftarrow,\applicationarrow]
\mor{Grstar}{H}{r^*}[\atrightrightarrow,\solidarrow]
\mor{H}{SigmaH}{\lambda^H\Sigma}[\atrightrightarrow,\dashrightarrow]
\mor{SigmaG}{SigmaH}{\varphi^r}[\atrightrightarrow,\solidarrow]
\mor{Lm}{Gr}{m}[\atrightrightarrow,\solidarrow]
\mor{Lm}{L}{i_{-2}}[\atleftarrow,\applicationarrow]
\mor{Krm}{Lm}{i_{-3}\quad}[\atrightrightarrow,\applicationarrow]
\mor{Krm}{Rmstar}{r}
\mor{Krm}{Lr}{i_{-4}}[\atrightrightarrow,\applicationarrow]
\mor{Krm}{Grstar}{m}
\mor{Rmstar}{R}{i_{-6}}[\atrightrightarrow,\applicationarrow]
\mor{Rmstar}{H}{m^*}
\mor{L}{SigmaL}{\lambda^L\Sigma}
\mor{Lr}{L}{i_{-1}\quad}[\atrightrightarrow,\applicationarrow]
\mor{Lr}{R}{r}
\mor{R}{SigmaR}{\lambda^R\Sigma}[\atrightrightarrow,\solidarrow]
\mor{SigmaL}{SigmaG}{\varphi^{m^*}}[\atrightrightarrow,\solidarrow]
\mor{SigmaL}{SigmaR}{\varphi^r}[\atrightrightarrow,\solidarrow]
\mor{SigmaR}{SigmaH}{\varphi^{m^*}}[\atrightrightarrow,\solidarrow]
\cmor((10,7)(11,3)(15,2)(40,2)(65,2)(69,3)(70,7)(70,10)(70,14)(69,18)(65,19))
\pleft(75,10){\varphi^r\lambda^G\Sigma}
\cmor((10,53)(10,58)(10,63)(11,67)(15,68)(45,68)(65,68)(69,67)(70,63)(70,44)(70,25)(69,21)(65,20))
\pleft(76,40){\varphi^r\lambda^G\Sigma}
\end{cd}

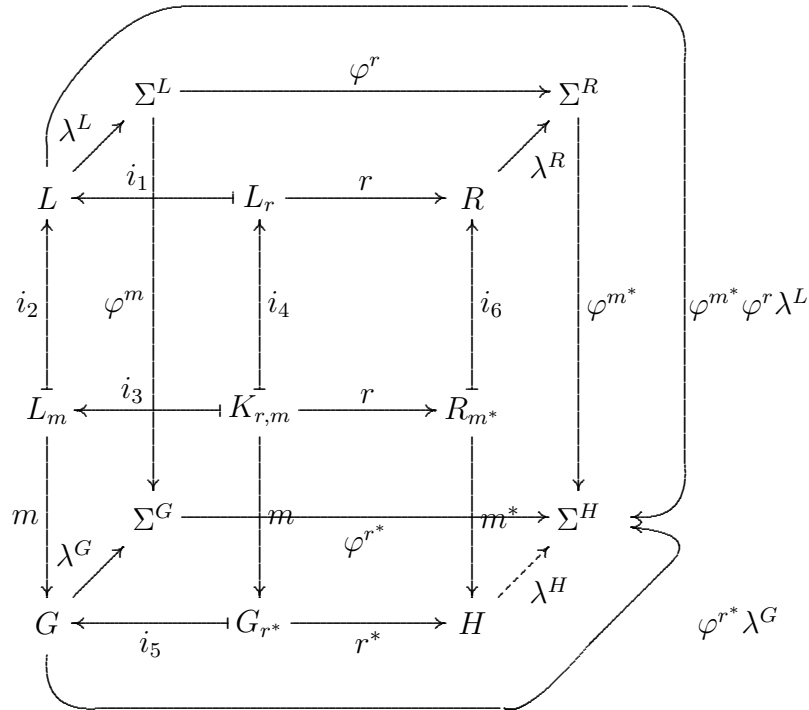
```



```

\begin{cd}[commdiag]{40}
\obj(10,10)[Gr]{G$}
\obj(30,10)[Grstar]{G_{r^*}$}
\obj(50,10)[H]{H$}
\obj(20,20)[SigmaG]{Sigma^G$}
\obj(60,20)[SigmaH]{Sigma^H$}
\obj(10,30)[Lm]{L_m$}
\obj(30,30)[Krm]{K_{r,m}$}
\obj(50,30)[Rmstar]{R_{m^*}$}
\obj(10,50)[L]{L$}
\obj(30,50)[Lr]{L_r$}
\obj(50,50)[R]{R$}
\obj(20,60)[SigmaL]{Sigma^L$}
\obj(60,60)[SigmaR]{Sigma^R$}
\mor{Gr}{SigmaG}{\lambda^G$}
\mor{Grstar}{Gr}{i_5$}[\atleft,\applicationarrow]
\mor{Grstar}{H}{i_5^*}$[\atright,\solidarrow]
\mor{H}{SigmaH}{\lambda^H$}[\atright,\dashArrow]
\mor{SigmaG}{SigmaH}{\varphi^r}$[\atright,\solidarrow]
\mor{Lm}{Gr}{i_2$}[\atright,\solidarrow]
\mor{Lm}{L}{i_2^*}$[\atleft,\applicationarrow]
\mor{Krm}{Lm}{i_3}$[\atright,\applicationarrow]
\mor{Krm}{Rmstar}{i_3^*}$[\atright,\applicationarrow]
\mor{Krm}{Lr}{i_4}$[\atright,\applicationarrow]
\mor{Krm}{Grstar}{i_4^*}$[\atright,\applicationarrow]
\mor{Rmstar}{R}{i_6}$[\atright,\applicationarrow]
\mor{Rmstar}{H}{i_6^*}$[\atright,\applicationarrow]
\mor{L}{SigmaL}{\lambda^L$}
\mor{Lr}{L}{i_1}$[\atright,\applicationarrow]
\mor{Lr}{R}{i_1^*}$[\atright,\applicationarrow]
\mor{R}{SigmaR}{\lambda^R$}[\atright,\solidarrow]
\mor{SigmaL}{SigmaG}{\varphi^m}$[\atright,\solidarrow]
\mor{SigmaL}{SigmaR}{\varphi^{r^*}$}[\atright,\solidarrow]
\mor{SigmaR}{SigmaH}{\varphi^{r^*}$}[\atright,\solidarrow]
\cmor((10,7)(11,3)(15,2)(33,2)(53,2)(56,3)(61,8)(66,13)(69,16)(69,18)(65,19))
\pleft(75,10){\varphi^r}$[\varphi^r]$
\cmor((10,53)(10,54)(10,55)(11,59)(15,64)(19,67)(23,68)(44,68)(65,68)(69,67)%
(70,63)(70,44)(70,25)(69,21)(65,20))
\pleft(76,40){\varphi^{r^*}$}[\varphi^{r^*}]
\end{cd}

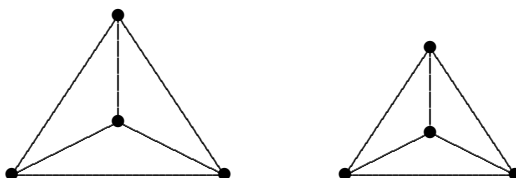
```



2 Graphs

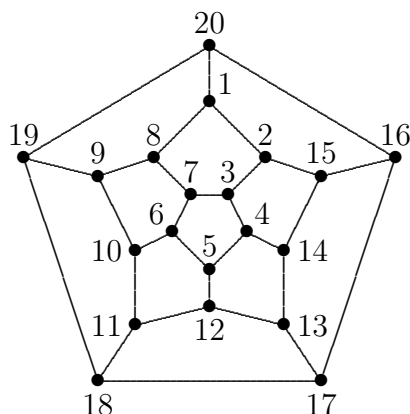
2.1 Undirected Graphs — Magnification Factor,

The magnification factor gives us the capability of adapting the size of the graph to the available space, without having to redesign the graph, for example the specification of the next two graphs differs only in the magnification factor: 200 for the first; and 160 for the second.



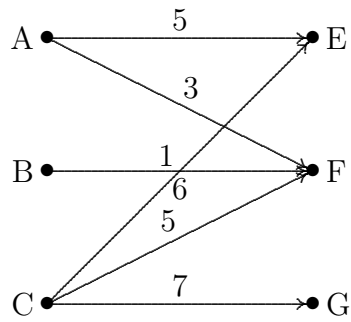
<pre>\begin{dc}\undigraph}[200] \obj(1,1)[1]{} \obj(3,2)[2]{} \obj(5,1)[3]{} \obj(3,4)[4]{} \mor{1}{2}{} \mor{1}{3}{} \mor{2}{3}{} \mor{4}{1}{} \mor{4}{3}{} \mor{2}{4}{} \end{dc}</pre>	<pre>\begin{dc}\undigraph}[160] \obj(1,1)[1]{} \obj(3,2)[2]{} \obj(5,1)[3]{} \obj(3,4)[4]{} \mor{1}{2}{} \mor{1}{3}{} \mor{2}{3}{} \mor{4}{1}{} \mor{4}{3}{} \mor{2}{4}{} \end{dc}</pre>
--	--

2.2 Undirected Graphs — “Around the World”



```
\begin{dc}\undigraph}[70]
\obj(6,4){18}[\south]
\obj(18,4){17}[\south]
\obj(8,7){11}[\west]
\obj(12,8){12}[\south]
\obj(16,7){13}[\east]
\obj(8,11){10}[\west]
\obj(10,12){6}[\northwest]
\obj(12,10){5}
\obj(14,12){4}[\northeast]
\obj(16,11){14}[\east]
\obj(2,16){19} \obj(6,15){9} \obj(9,16){8} \obj(11,14){7}
\obj(13,14){3} \obj(15,16){2} \obj(18,15){15} \obj(22,16){16}
\obj(12,19){1}[\northeast]
\obj(12,22){20}
\mor{18}{17}{} \mor{18}{11}{} \mor{18}{19}{} \mor{11}{12}{} \mor{11}{10}{} \mor{12}{13}{}
\mor{12}{5}{} \mor{10}{6}{} \mor{10}{9}{} \mor{5}{6}{} \mor{5}{4}{} \mor{13}{17}{}
\mor{13}{14}{} \mor{9}{19}{} \mor{9}{8}{} \mor{6}{7}{} \mor{4}{3}{} \mor{4}{14}{}
\mor{19}{20}{} \mor{8}{1}{} \mor{8}{7}{} \mor{7}{3}{} \mor{3}{2}{} \mor{2}{1}{}
\mor{2}{15}{} \mor{14}{15}{} \mor{17}{16}{} \mor{16}{20}{} \mor{1}{20}{} \mor{15}{16}{}
\end{dc}
```

2.3 Directed Graphs

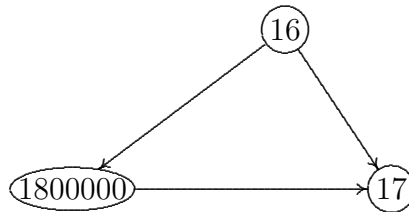


```

\begin{dc}\digraph [250]
\obj(1,5){A}\west
\obj(1,3){B}\west
\obj(1,1){C}\west
\obj(5,5){E}\east
\obj(5,3){F}\east
\obj(5,1){G}\east
\mor{A}{E}{5} \mor{A}{F}{3}
\mor{B}{F}{6}\atrightright, \solidarrow]
\mor{C}{E}{1} \mor{C}{F}{5} \mor{C}{G}{7}
\end{dc}

```

2.4 Circled Directed Graphs



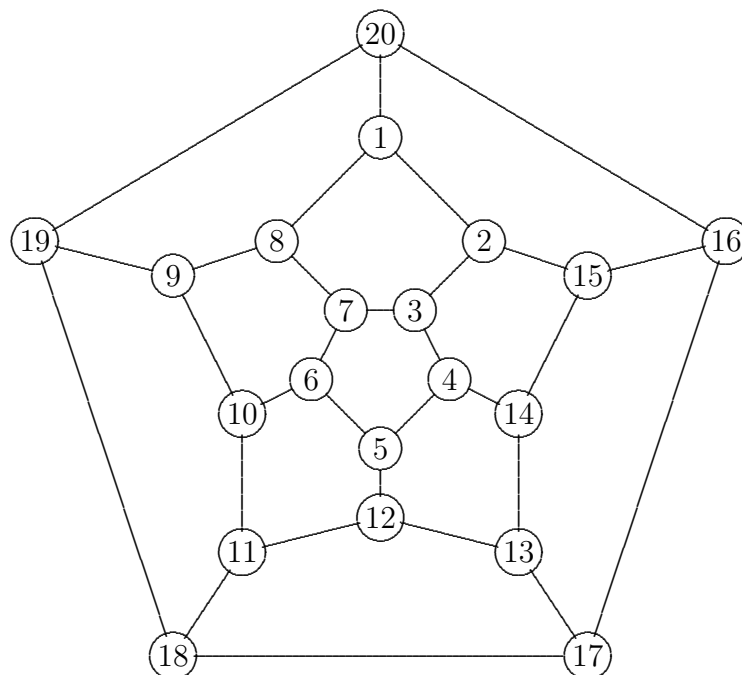
```

\begin{dc}\cdigraph [200]
\obj(6,6)[A]{1800000}
\obj(12,6){17}
\obj(10,9){16}
\mor{A}{17}[240,90]{}
\mor{16}{17}[90,90]{}
\mor{16}{A}[95,125]{}
\end{dc}

```

2.5 Circled Undirected Graphs

Some fine adjustment is needed in some lines.



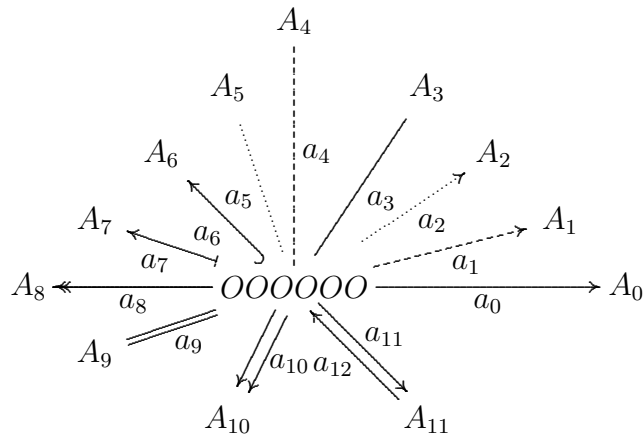
```

\begin{cundigraph}[130]
\obj(6,4)[A]{18}{\south}\obj(18,4){17}{\south}
\obj(8,7){11}{\west}\obj(12,8){12}{\south}
\obj(16,7){13}{\east}\obj(8,11){10}{\west}
\obj(10,12){6}{6}{\south}\obj(12,10){5}{5}{\east}
\obj(14,12){4}{\northeast}\obj(16,11){14}{\east}
\obj(2,16){19}{\west}\obj(6,15){9}
\obj(9,16){8}\obj(11,14){7}{\west}
\obj(13,14){3}\obj(15,16){2}
\obj(18,15){15}\obj(22,16){16}{\east}
\obj(12,19){1}{\west}\obj(12,22){20}{\north}
\mor{A}{17}{80,80}{\mor{A}{11}{\mor{A}{19}{\mor{11}{12}{\mor{11}{10}{\mor{12}{13}{\mor{12}{5}{\mor{10}{6}{\mor{10}{9}{\mor{5}{6}{\mor{5}{4}{\mor{13}{17}{80,80}{\mor{13}{14}{\mor{9}{19}{\mor{9}{8}{\mor{6}{7}{\mor{4}{3}{\mor{4}{14}{\mor{19}{20}{\mor{8}{1}{\mor{8}{7}{\mor{7}{3}{\mor{3}{2}{\mor{2}{1}{\mor{2}{15}{\mor{14}{15}{\mor{17}{16}{\mor{16}{20}{\mor{1}{20}{\mor{15}{16}{\enddc

```

3 New Arrows and Lines in v4 and v5

3.1 Dashed, Dotted Lines, Dotted Arrows, Equaline, ...



```

\begin{commdiag}[250]
\obj(10,10)[A]{\OOOOOOS}
\obj(15,10)[A0]{\$A_0\$}
\obj(14,11)[A1]{\$A_1\$}
\obj(13,12)[A2]{\$A_2\$}
\obj(12,13)[A3]{\$A_3\$}
\obj(10,14)[A4]{\$A_4\$}
\obj(9,13)[A5]{\$A_5\$}
\obj(8,12)[A6]{\$A_6\$}
\obj(7,11)[A7]{\$A_7\$}
\obj(6,10)[A8]{\$A_8\$}
\obj(7,9)[A9]{\$A_9\$}
\obj(9,8)[A10]{\$A_{10}\$}
\obj(12,8)[A11]{\$A_{11}\$}
\mor{A}{A0}{\$a_0\$}{\atright,\solidarrow}
\mor{A}{A1}{\$a_1\$}{\atright,\dashArrow}
\mor{A}{A2}{\$a_2\$}{\atright,\dotArrow}
\mor{A}{A3}{\$a_3\$}{\atright,\solidline}
\mor{A}{A4}{\$a_4\$}{\atright,\dashline}
\mor{A}{A5}{\$a_5\$}{\atleft,\dotline}
\mor{A}{A6}{\$a_6\$}{\atleft,\injectionarrow}
\mor{A}{A7}{\$a_7\$}{\atleft,\aplicationarrow}
\mor{A}{A8}{\$a_8\$}{\atleft,\surjectivearrow}
\mor{A}{A9}{\$a_9\$}{\atleft,\equalline}
\mor{A}{A10}{\$a_{10}\$}{\atleft,\doublearrow}
\mor{A}{A11}{\$a_{11}\$}{\atleft,\doubleopposite}
\mor{A}{A11}{\$a_{12}\$}{\atright,\nullarrow}
\enddc

```