Supplement to Internally 4-connected projective-planar graphs

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This document contains the edge lists for all graphs in $\mathcal{A}$ and $\mathcal{A}'_4$, as well as all of the minor-minimal graphs generated in the proofs of Lemmas 3.1–3.12.

Graphs in $\mathcal{A}$

$A_5 = \{\{1,2\}, \{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,4\}, \{3,5\}, \{4,5\}, \{6,7\}, \{6,8\}, \{6,9\}, \{6,10\}, \{7,8\}, \{7,9\}, \{7,10\}, \{8,9\}, \{8,10\}, \{9,10\}\}$

$C_{11} = \{\{1,2\}, \{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,4\}, \{3,5\}, \{4,5\}, \{6,9\}, \{6,10\}, \{6,11\}, \{7,9\}, \{7,10\}, \{7,11\}, \{8,9\}, \{8,10\}, \{8,11\}\}$

$E_{42} = \{\{1,4\}, \{1,5\}, \{1,6\}, \{2,4\}, \{2,5\}, \{2,6\}, \{3,4\}, \{3,5\}, \{3,6\}, \{7,10\}, \{7,11\}, \{7,12\}, \{8,10\}, \{8,11\}, \{8,12\}, \{9,10\}, \{9,11\}, \{9,12\}\}$

$A_1 = \{\{1,2\}, \{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,4\}, \{3,5\}, \{4,5\}, \{5,6\}, \{5,7\}, \{5,8\}, \{5,9\}, \{6,7\}, \{6,8\}, \{6,9\}, \{7,8\}, \{7,9\}, \{8,9\}\}$

$C_1 = \{\{1,2\}, \{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,4\}, \{3,5\}, \{4,5\}, \{5,6\}, \{5,7\}, \{5,8\}, \{6,9\}, \{6,10\}, \{7,9\}, \{7,10\}, \{8,9\}, \{8,10\}\}$

$E_1 = \{\{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,6\}, \{4,6\}, \{5,6\}, \{6,7\}, \{6,8\}, \{6,9\}, \{7,10\}, \{7,11\}, \{8,10\}, \{8,11\}, \{9,10\}, \{9,11\}\}$

$B_3 = \{\{1,2\}, \{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,4\}, \{3,5\}, \{4,6\}, \{4,7\}, \{4,8\}, \{5,6\}, \{5,7\}, \{5,8\}, \{6,7\}, \{6,8\}, \{7,8\}\}$

$C_2 = \{\{1,2\}, \{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,4\}, \{3,5\}, \{4,6\}, \{4,7\}, \{4,8\}, \{5,6\}, \{5,7\}, \{5,8\}, \{6,9\}, \{7,9\}, \{8,9\}\}$

$D_1 = \{\{1,2\}, \{1,3\}, \{1,4\}, \{2,5\}, \{2,6\}, \{3,5\}, \{3,6\}, \{4,5\}, \{4,6\}, \{5,7\}, \{5,8\}, \{5,9\}, \{6,7\}, \{6,8\}, \{6,9\}, \{7,10\}, \{8,10\}, \{9,10\}\}$

$D_4 = \{\{1,2\}, \{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,4\}, \{3,5\}, \{4,6\}, \{4,8\}, \{5,7\}, \{5,9\}, \{6,7\}, \{6,9\}, \{7,8\}, \{8,9\}\}$

$E_6 = \{\{1,2\}, \{1,3\}, \{1,4\}, \{2,5\}, \{2,6\}, \{3,5\}, \{3,6\}, \{4,5\}, \{4,6\}, \{5,7\}, \{5,9\}, \{6,8\}, \{6,10\}, \{7,9\}, \{7,11\}, \{10,11\}, \{10,13\}, \{11,12\}, \{12,13\}\}$

$F_6 = \{\{1,2\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,6\}, \{3,4\}, \{3,5\}, \{4,6\}, \{5,7\}, \{5,9\}, \{6,8\}, \{6,10\}, \{7,8\}, \{7,10\}, \{8,9\}, \{9,10\}\}$

$B_1 = \{\{1,2\}, \{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,4\}, \{3,5\}, \{3,6\}, \{3,7\}, \{4,5\}, \{4,6\}, \{4,7\}, \{5,6\}, \{5,7\}, \{6,7\}\}$

$C_7 = \{\{1,2\}, \{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,4\}, \{3,6\}, \{4,7\}, \{4,8\}, \{5,6\}, \{5,7\}, \{5,8\}, \{6,7\}, \{6,8\}, \{7,8\}\}$

$D_3 = \{\{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,6\}, \{4,6\}, \{4,7\}, \{4,8\}, \{5,6\}, \{5,7\}, \{5,8\}, \{6,7\}, \{6,8\}, \{7,8\}\}$

$D_9 = \{\{1,3\}, \{1,4\}, \{1,7\}, \{2,3\}, \{2,4\}, \{2,7\}, \{3,5\}, \{3,6\}, \{4,5\}, \{4,9\}, \{4,10\}, \{5,8\}, \{6,7\}, \{6,8\}, \{7,9\}, \{7,10\}, \{8,9\}, \{8,10\}\}$

$D_{12} = \{\{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,6\}, \{3,9\}, \{4,6\}, \{4,7\}, \{4,8\}, \{5,7\}, \{5,9\}, \{6,7\}, \{6,8\}, \{7,8\}, \{8,9\}\}$

$E_3 = \{\{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,6\}, \{3,7\}, \{3,8\}, \{4,6\}, \{4,7\}, \{4,8\}, \{5,6\}, \{5,7\}, \{5,8\}\}$

$E_5 = \{\{1,3\}, \{1,4\}, \{1,6\}, \{2,3\}, \{2,4\}, \{2,6\}, \{3,5\}, \{4,5\}, \{4,8\}, \{4,9\}, \{5,6\}, \{5,7\}, \{6,8\}, \{6,9\}, \{7,8\}, \{7,9\}\}$

$E_{11} = \{\{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,6\}, \{3,7\}, \{4,6\}, \{4,8\}, \{4,9\}, \{5,7\}, \{5,8\}, \{6,10\}, \{7,9\}, \{8,10\}, \{9,10\}\}$

$E_{19} = \{\{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,6\}, \{4,7\}, \{5,8\}, \{5,9\}, \{6,7\}, \{6,8\}, \{6,9\}, \{7,8\}, \{7,9\}, \{8,9\}\}$

$E_{27} = \{\{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,7\}, \{3,8\}, \{4,6\}, \{4,10\}, \{5,8\}, \{5,9\}, \{6,7\}, \{6,9\}, \{7,10\}, \{8,10\}, \{9,10\}\}$

$F_1 = \{\{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,6\}, \{4,6\}, \{4,7\}, \{5,8\}, \{5,9\}, \{6,8\}, \{6,9\}, \{7,8\}, \{7,9\}\}$

$G_1 = \{\{1,3\}, \{1,4\}, \{1,5\}, \{2,3\}, \{2,4\}, \{2,5\}, \{3,6\}, \{4,7\}, \{5,8\}, \{6,9\}, \{6,10\}, \{7,9\}, \{7,10\}, \{8,9\}, \{8,10\}\}$

Graphs in $\mathcal{A}_4'$

$A_2 = \{\{1,2\},\{1,3\},\{1,4\},\{1,5\},\{1,6\},\{2,3\},\{2,4\},\{2,5\},\{2,7\},\{3,4\},\{3,6\},\{3,7\},\{4,5\},\{4,6\},\{4,7\},\{5,6\},\{5,7\},\{6,7\}\}$

$B_7 = \{\{1,2\},\{1,3\},\{1,5\},\{1,6\},\{2,4\},\{2,5\},\{2,6\},\{2,7\},\{3,4\},\{3,8\},\{4,5\},\{4,7\},\{5,6\},\{5,7\},\{5,8\},\{6,7\},\{6,8\},\{7,8\}\}$

$C_3 = \{\{1,2\},\{1,3\},\{1,4\},\{2,5\},\{2,6\},\{2,9\},\{3,5\},\{3,6\},\{3,7\},\{4,5\},\{4,8\},\{5,6\},\{5,7\},\{5,9\},\{6,7\},\{6,9\},\{7,8\},\{8,9\}\}$

$C_4 = \{\{1,2\},\{1,3\},\{1,5\},\{1,6\},\{2,4\},\{2,5\},\{2,7\},\{3,4\},\{3,8\},\{4,5\},\{4,9\},\{5,6\},\{5,8\},\{5,9\},\{6,7\},\{6,8\},\{7,9\},\{8,9\}\}$

$D_2 = \{\{1,2\},\{1,4\},\{1,6\},\{2,3\},\{2,7\},\{3,5\},\{3,6\},\{3,8\},\{4,5\},\{4,9\},\{5,6\},\{5,8\},\{6,7\},\{6,8\},\{6,9\},\{7,10\},\{8,10\},\{9,10\}\}$

$D_{17} = \{\{1,2\},\{1,3\},\{1,4\},\{1,7\},\{2,3\},\{2,4\},\{2,8\},\{3,4\},\{3,5\},\{4,6\},\{5,6\},\{5,7\},\{5,8\},\{6,7\},\{6,8\},\{7,8\}\}$

$E_2 = \{\{1,2\},\{1,3\},\{1,8\},\{2,4\},\{2,7\},\{3,6\},\{3,7\},\{4,5\},\{4,9\},\{5,6\},\{5,7\},\{6,10\},\{7,8\},\{7,9\},\{7,10\},\{8,11\},\{9,11\},\{10,11\}\}$

$E_{18} = \{\{1,2\},\{1,3\},\{1,5\},\{1,8\},\{2,4\},\{2,6\},\{2,7\},\{3,4\},\{3,7\},\{4,5\},\{4,8\},\{5,6\},\{5,7\},\{6,8\},\{7,8\}\}$

$E_{20} = \{\{1,2\},\{1,3\},\{1,4\},\{1,7\},\{2,3\},\{2,4\},\{2,6\},\{3,4\},\{3,8\},\{4,5\},\{5,6\},\{5,7\},\{5,8\},\{6,9\},\{7,9\},\{8,9\}\}$

$E_{22} = \{\{1,2\},\{1,3\},\{1,5\},\{1,8\},\{2,4\},\{2,9\},\{3,4\},\{3,6\},\{4,5\},\{4,7\},\{5,6\},\{5,9\},\{6,7\},\{6,8\},\{7,9\},\{8,9\}\}$

$F_4 = \{\{1,2\},\{1,4\},\{1,8\},\{2,3\},\{2,7\},\{3,5\},\{3,6\},\{3,10\},\{4,5\},\{4,9\},\{5,8\},\{6,7\},\{6,8\},\{7,10\},\{8,9\},\{9,10\}\}$

$B_1' = \{\{1,2\},\{1,3\},\{1,4\},\{1,5\},\{1,6\},\{1,7\},\{2,3\},\{2,4\},\{2,6\},\{3,4\},\{3,5\},\{3,6\},\{4,5\},\{4,6\},\{4,7\},\{5,6\},\{5,7\},\{6,7\}\}$

$B_1'' = \{\{1,2\},\{1,3\},\{1,4\},\{1,7\},\{2,3\},\{2,5\},\{2,6\},\{2,7\},\{2,8\},\{3,5\},\{3,7\},\{4,5\},\{4,8\},\{5,6\},\{5,7\},\{6,7\},\{6,8\},\{7,8\}\}$

$B_1''' = \{\{1,2\},\{1,3\},\{1,4\},\{1,5\},\{2,4\},\{2,5\},\{2,6\},\{3,4\},\{3,6\},\{3,7\},\{4,5\},\{4,7\},\{4,8\},\{5,6\},\{5,7\},\{5,8\},\{6,8\},\{7,8\}\}$

$D_3' = \{\{1,2\},\{1,3\},\{1,4\},\{1,5\},\{1,7\},\{2,3\},\{2,4\},\{2,5\},\{3,4\},\{3,5\},\{3,6\},\{4,7\},\{4,8\},\{5,7\},\{5,8\},\{6,7\},\{6,8\}\}$

$D_3'' = \{\{1,2\},\{1,3\},\{1,4\},\{1,6\},\{2,3\},\{2,5\},\{2,6\},\{3,5\},\{3,6\},\{3,7\},\{4,5\},\{4,8\},\{5,9\},\{6,8\},\{6,9\},\{7,8\},\{7,9\}\}$

$E_3' = \{\{1,2\},\{1,3\},\{1,4\},\{1,6\},\{1,8\},\{2,3\},\{2,5\},\{2,7\},\{3,5\},\{3,6\},\{3,7\},\{4,5\},\{4,7\},\{5,6\},\{5,8\},\{6,7\},\{6,8\},\{7,8\}\}$

$E_3'' = \{\{1,2\},\{1,3\},\{1,4\},\{1,7\},\{1,9\},\{2,3\},\{2,5\},\{2,8\},\{3,6\},\{3,8\},\{4,5\},\{4,8\},\{5,6\},\{5,9\},\{6,7\},\{7,8\},\{7,9\},\{8,9\}\}$

$E_5' = \{\{1,2\},\{1,4\},\{1,6\},\{1,7\},\{2,3\},\{2,5\},\{3,4\},\{3,6\},\{4,5\},\{4,7\},\{4,9\},\{5,6\},\{5,8\},\{6,7\},\{6,9\},\{7,8\},\{8,9\}\}$

$E_5'' = \{\{1,2\},\{1,4\},\{1,7\},\{2,3\},\{2,6\},\{3,5\},\{3,7\},\{4,5\},\{4,8\},\{5,6\},\{5,10\},\{6,7\},\{6,9\},\{7,8\},\{7,10\},\{8,9\},\{9,10\}\}$

$F_1' = \{\{1,2\},\{1,4\},\{1,5\},\{1,8\},\{2,3\},\{2,7\},\{2,9\},\{3,4\},\{3,5\},\{4,9\},\{5,6\},\{5,8\},\{6,7\},\{6,9\},\{7,8\},\{8,9\}\}$

$F_1'' = \{\{1,2\},\{1,3\},\{1,4\},\{2,5\},\{2,7\},\{3,6\},\{3,7\},\{4,7\},\{4,8\},\{4,9\},\{5,6\},\{5,8\},\{6,9\},\{7,10\},\{8,10\},\{9,10\}\}$

$G_1' = \{\{1,2\},\{1,3\},\{1,4\},\{2,5\},\{2,7\},\{3,5\},\{3,8\},\{4,5\},\{4,9\},\{5,6\},\{6,7\},\{6,8\},\{6,9\},\{7,10\},\{8,10\},\{9,10\}\}$

Auxiliary Graphs

$B_1^a = \{\{1,2\},\{1,3\},\{1,4\},\{1,5\},\{2,3\},\{2,4\},\{2,5\},\{3,4\},\{3,6\},\{3,7\},\{3,8\},\{4,6\},\{4,7\},\{4,8\},\{5,6\},\{5,8\},\{6,7\},\{7,8\}\}$

$D_3^a = \{\{1,2\},\{1,3\},\{1,4\},\{1,5\},\{2,3\},\{2,4\},\{2,5\},\{3,4\},\{3,7\},\{3,8\},\{4,5\},\{4,6\},\{4,8\},\{5,7\},\{5,8\},\{6,7\},\{6,8\}\}$

$D_3^{aa} = \{\{1,2\},\{1,3\},\{1,5\},\{2,4\},\{2,6\},\{3,4\},\{3,5\},\{3,6\},\{4,7\},\{4,8\},\{4,9\},\{5,7\},\{5,8\},\{6,7\},\{6,8\},\{6,9\},\{7,9\},\{8,9\}\}$

$D_3^b = \{\{1,2\},\{1,3\},\{1,4\},\{1,5\},\{2,3\},\{2,4\},\{2,5\},\{3,5\},\{3,6\},\{3,8\},\{4,6\},\{4,7\},\{5,7\},\{5,9\},\{6,9\},\{7,8\},\{8,9\}\}$

$E_3^a = \{\{1,4\},\{1,5\},\{1,6\},\{1,7\},\{1,8\},\{2,4\},\{2,5\},\{2,6\},\{2,7\},\{2,8\},\{3,4\},\{3,5\},\{3,6\},\{3,7\},\{3,8\},\{4,6\}\}$

$E_3^{aa} = \{\{1,4\},\{1,5\},\{1,6\},\{1,7\},\{1,8\},\{2,4\},\{2,5\},\{2,6\},\{2,7\},\{2,8\},\{3,4\},\{3,5\},\{3,6\},\{3,7\},\{3,8\},\{4,5\},\{4,6\}\}$

$E_3^b = \{\{1,5\},\{1,6\},\{1,8\},\{1,9\},\{2,4\},\{2,5\},\{2,7\},\{2,8\},\{2,9\},\{3,4\},\{3,5\},\{3,7\},\{3,8\},\{3,9\},\{4,6\},\{6,7\}\}$

$E_3^{ba} = \{\{1,4\},\{1,5\},\{1,6\},\{2,4\},\{2,5\},\{2,7\},\{2,8\},\{2,9\},\{3,4\},\{3,5\},\{3,7\},\{3,8\},\{3,9\},\{4,7\},\{6,7\},\{6,8\},\{6,9\}\}$

$E_3^{bb} = \{\{1,4\},\{1,5\},\{1,7\},\{2,5\},\{2,6\},\{2,9\},\{2,10\},\{3,4\},\{3,5\},\{3,8\},\{3,9\},\{3,10\},\{4,6\},\{6,8\},\{7,8\},\{7,9\},\{7,10\}\}$

$E_5^a = \{\{1,3\},\{1,4\},\{1,5\},\{2,3\},\{2,4\},\{2,5\},\{3,6\},\{3,7\},\{3,8\},\{4,6\},\{4,8\},\{5,6\},\{5,7\},\{5,8\},\{6,9\},\{7,9\},\{8,9\}\}$

$E_5^b = \{\{1,3\},\{1,4\},\{1,5\},\{2,3\},\{2,4\},\{2,5\},\{3,6\},\{3,7\},\{3,9\},\{4,6\},\{4,8\},\{5,6\},\{5,7\},\{5,9\},\{6,7\},\{7,8\},\{8,9\}\}$

$F_1^a = \{\{1,4\},\{1,5\},\{1,7\},\{1,8\},\{2,4\},\{2,5\},\{2,6\},\{3,4\},\{3,5\},\{3,6\},\{3,9\},\{4,9\},\{6,7\},\{6,8\},\{7,9\},\{8,9\}\}$

$F_1^b = \{\{1,4\},\{1,5\},\{1,7\},\{2,4\},\{2,5\},\{2,10\},\{3,4\},\{3,5\},\{3,7\},\{3,10\},\{4,6\},\{6,8\},\{6,9\},\{7,8\},\{7,9\},\{8,10\},\{9,10\}\}$

$F_1^c = \{\{1,4\},\{1,5\},\{1,8\},\{1,9\},\{2,4\},\{2,5\},\{2,7\},\{3,5\},\{3,6\},\{3,10\},\{4,6\},\{6,7\},\{7,8\},\{7,9\},\{8,10\},\{9,10\}\}$

$F_1^d = \{\{1,4\},\{1,5\},\{1,7\},\{2,4\},\{2,5\},\{2,11\},\{3,4\},\{3,5\},\{3,10\},\{3,11\},\{4,6\},\{6,8\},\{6,9\},\{7,8\},\{7,9\},\{7,11\},\{8,10\},\{9,10\}\}$

B_1 Minor-Minimal Twists

$1 : \{\{1,4\},\{1,5\},\{1,6\},\{1,7\},\{2,3\},\{2,4\},\{2,5\},\{2,6\},\{2,7\},\{3,4\},\{3,5\},\{3,6\},\{4,5\},\{4,6\},\{4,7\},\{5,6\},\{5,7\},\{6,7\}\}$

$2 : \{\{1,2\},\{1,7\},\{1,8\},\{1,9\},\{2,4\},\{2,9\},\{3,4\},\{3,5\},\{3,6\},\{3,7\},\{3,9\},\{4,5\},\{4,6\},\{4,8\},\{5,6\},\{5,7\},\{6,7\},\{7,8\},\{7,9\},$
$\{8,9\}\}$

$3 : \{\{1,2\},\{1,7\},\{1,8\},\{1,9\},\{2,4\},\{2,9\},\{3,5\},\{3,6\},\{3,7\},\{3,8\},\{3,9\},\{4,7\},\{4,8\},\{5,6\},\{5,7\},\{5,8\},\{6,7\},\{6,8\},\{7,9\},$
$\{8,9\}\}$

$4 : \{\{1,2\},\{1,7\},\{1,8\},\{1,9\},\{2,4\},\{2,9\},\{3,5\},\{3,6\},\{3,7\},\{3,8\},\{3,9\},\{4,5\},\{4,6\},\{4,8\},\{5,6\},\{5,7\},\{6,7\},\{7,8\},\{7,9\},$
$\{8,9\}\}$

$5 : \{\{1,2\},\{1,7\},\{1,8\},\{1,9\},\{2,4\},\{2,9\},\{3,4\},\{3,5\},\{3,6\},\{3,7\},\{3,9\},\{4,7\},\{4,8\},\{5,6\},\{5,7\},\{5,8\},\{6,7\},\{6,8\},\{7,9\},$
$\{8,9\}\}$

$6 : \{\{1,2\},\{1,7\},\{1,8\},\{1,9\},\{2,4\},\{2,9\},\{3,5\},\{3,6\},\{3,7\},\{3,8\},\{3,9\},\{4,6\},\{4,7\},\{4,8\},\{5,6\},\{5,7\},\{5,8\},\{6,7\},\{7,9\},$

{8, 9}}
7 : {{1, 2}, {1, 7}, {1, 8}, {1, 9}, {2, 4}, {2, 9}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 9}, {4, 5}, {4, 8}, {5, 6}, {5, 7}, {6, 7}, {6, 8}, {7, 8}, {7, 9},
{8, 9}}
8 : {{1, 2}, {1, 5}, {1, 6}, {1, 8}, {2, 5}, {2, 6}, {2, 7}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {4, 5}, {4, 6}, {4, 7}, {5, 6}, {5, 7}, {6, 8}, {7, 8}}
9 : {{1, 2}, {1, 5}, {1, 6}, {1, 8}, {2, 5}, {2, 6}, {2, 7}, {3, 4}, {3, 5}, {3, 6}, {3, 8}, {4, 5}, {4, 6}, {4, 7}, {5, 6}, {5, 7}, {6, 7}, {7, 8}}
10 : {{1, 2}, {1, 5}, {1, 6}, {1, 8}, {2, 5}, {2, 6}, {2, 7}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {4, 5}, {4, 6}, {4, 7}, {5, 6}, {5, 8}, {6, 8}, {7, 8}}
11 : {{1, 2}, {1, 5}, {1, 6}, {1, 8}, {2, 5}, {2, 6}, {2, 7}, {3, 4}, {3, 5}, {3, 6}, {3, 8}, {4, 5}, {4, 6}, {4, 7}, {5, 6}, {5, 7}, {6, 8}, {7, 8}}

B_1^a Minor-Minimal Twists

1 : {{1, 5}, {1, 6}, {1, 7}, {1, 8}, {2, 3}, {2, 5}, {2, 6}, {2, 7}, {2, 8}, {3, 4}, {3, 6}, {3, 7}, {4, 5}, {4, 6}, {4, 7}, {5, 8}, {6, 7}, {6, 8}, {7, 8}}
2 : {{1, 6}, {1, 7}, {1, 8}, {1, 9}, {2, 3}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {3, 4}, {3, 6}, {3, 7}, {3, 9}, {4, 5}, {4, 7}, {5, 6}, {5, 7}, {6, 8}, {7, 8},
{8, 9}}
3 : {{1, 6}, {1, 7}, {1, 8}, {1, 9}, {2, 3}, {2, 5}, {2, 8}, {3, 4}, {3, 6}, {3, 7}, {3, 9}, {4, 5}, {4, 6}, {4, 7}, {5, 6}, {5, 7}, {6, 7}, {6, 8}, {7, 8},
{8, 9}}
4 : {{1, 5}, {1, 6}, {1, 7}, {1, 8}, {2, 3}, {2, 5}, {2, 6}, {2, 7}, {3, 4}, {3, 6}, {3, 7}, {3, 8}, {4, 5}, {4, 6}, {4, 7}, {5, 8}, {6, 7}, {6, 8}, {7, 8}}
5 : {{1, 6}, {1, 7}, {1, 8}, {1, 9}, {2, 3}, {2, 5}, {2, 8}, {3, 4}, {3, 6}, {3, 7}, {4, 5}, {4, 6}, {4, 7}, {4, 9}, {5, 6}, {5, 7}, {6, 7}, {6, 8}, {7, 8},
{8, 9}}
6 : {{1, 2}, {1, 8}, {1, 9}, {1, 10}, {2, 4}, {2, 10}, {3, 5}, {3, 7}, {3, 10}, {4, 5}, {4, 6}, {4, 7}, {4, 9}, {5, 6}, {5, 8}, {6, 7}, {6, 8}, {7, 8}, {8, 9},
{8, 10}, {9, 10}}
7 : {{1, 2}, {1, 8}, {1, 9}, {1, 10}, {2, 4}, {2, 10}, {3, 5}, {3, 7}, {3, 10}, {4, 8}, {4, 9}, {5, 6}, {5, 8}, {5, 9}, {6, 7}, {6, 8}, {6, 9}, {7, 8}, {7, 9},
{8, 10}, {9, 10}}
8 : {{1, 2}, {1, 8}, {1, 9}, {1, 10}, {2, 4}, {2, 10}, {3, 5}, {3, 6}, {3, 7}, {3, 9}, {3, 10}, {4, 6}, {4, 7}, {4, 9}, {5, 6}, {5, 8}, {5, 9}, {6, 7}, {7, 8},
{8, 10}, {9, 10}}
9 : {{1, 2}, {1, 8}, {1, 9}, {1, 10}, {2, 4}, {2, 10}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 10}, {4, 5}, {4, 9}, {5, 6}, {5, 8}, {6, 7}, {6, 9}, {7, 8}, {7, 9},
{8, 10}, {9, 10}}
10 : {{1, 2}, {1, 8}, {1, 9}, {1, 10}, {2, 4}, {2, 10}, {3, 5}, {3, 7}, {3, 10}, {4, 6}, {4, 7}, {4, 9}, {5, 6}, {5, 8}, {5, 9}, {6, 7}, {6, 8}, {7, 8},
{8, 9}, {8, 10}, {9, 10}}
11 : {{1, 2}, {1, 8}, {1, 9}, {1, 10}, {2, 4}, {2, 10}, {3, 5}, {3, 7}, {3, 10}, {4, 5}, {4, 8}, {4, 9}, {5, 6}, {5, 8}, {6, 7}, {6, 8}, {6, 9}, {7, 8},
{7, 9}, {8, 10}, {9, 10}}
12 : {{1, 2}, {1, 8}, {1, 9}, {1, 10}, {2, 4}, {2, 10}, {3, 5}, {3, 6}, {3, 7}, {3, 9}, {3, 10}, {4, 5}, {4, 7}, {4, 9}, {5, 6}, {5, 8}, {6, 7}, {6, 9},
{7, 8}, {8, 10}, {9, 10}}
13 : {{1, 2}, {1, 8}, {1, 9}, {1, 10}, {2, 4}, {2, 10}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 10}, {4, 6}, {4, 9}, {5, 6}, {5, 8}, {5, 9}, {6, 7}, {7, 8},
{7, 9}, {8, 10}, {9, 10}}
14 : {{1, 2}, {1, 8}, {1, 9}, {1, 10}, {2, 4}, {2, 10}, {3, 5}, {3, 7}, {3, 10}, {4, 5}, {4, 7}, {4, 9}, {5, 6}, {5, 8}, {6, 7}, {6, 8}, {6, 9}, {7, 8},
{8, 9}, {8, 10}, {9, 10}}
15 : {{1, 2}, {1, 8}, {1, 9}, {1, 10}, {2, 4}, {2, 10}, {3, 5}, {3, 7}, {3, 10}, {4, 6}, {4, 8}, {4, 9}, {5, 6}, {5, 8}, {5, 9}, {6, 7}, {6, 8}, {7, 8},
{7, 9}, {8, 10}, {9, 10}}
16 : {{1, 2}, {1, 6}, {1, 7}, {1, 9}, {2, 6}, {2, 7}, {2, 8}, {3, 4}, {3, 6}, {3, 7}, {3, 8}, {4, 5}, {4, 7}, {4, 8}, {5, 6}, {5, 7}, {5, 8}, {7, 9}, {8, 9}}
17 : {{1, 2}, {1, 6}, {1, 7}, {1, 9}, {2, 6}, {2, 7}, {2, 8}, {3, 4}, {3, 6}, {3, 7}, {3, 9}, {4, 5}, {4, 7}, {4, 8}, {5, 6}, {5, 7}, {5, 8}, {7, 8}, {8, 9}}
18 : {{1, 2}, {1, 6}, {1, 7}, {1, 9}, {2, 6}, {2, 7}, {2, 8}, {3, 4}, {3, 6}, {3, 7}, {3, 8}, {4, 5}, {4, 7}, {4, 9}, {5, 6}, {5, 7}, {5, 8}, {7, 8}, {8, 9}}
19 : {{1, 2}, {1, 6}, {1, 7}, {1, 9}, {2, 6}, {2, 7}, {2, 8}, {3, 4}, {3, 6}, {3, 7}, {3, 9}, {4, 5}, {4, 7}, {4, 8}, {5, 6}, {5, 7}, {5, 8}, {7, 9}, {8, 9}}
20 : {{1, 2}, {1, 6}, {1, 7}, {1, 9}, {2, 6}, {2, 7}, {2, 8}, {3, 4}, {3, 6}, {3, 7}, {3, 8}, {4, 5}, {4, 7}, {4, 9}, {5, 6}, {5, 7}, {5, 8}, {7, 9}, {8, 9}}
21 : {{1, 2}, {1, 7}, {1, 8}, {1, 9}, {2, 6}, {2, 7}, {2, 8}, {3, 4}, {3, 7}, {3, 8}, {3, 9}, {4, 5}, {4, 7}, {4, 8}, {5, 6}, {5, 7}, {5, 8}, {6, 9}, {7, 8}}

C_7 Minor-Minimal Twists

1 : {{1, 2}, {1, 4}, {1, 5}, {1, 7}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 8}, {4, 5}, {4, 7}, {6, 7}, {6, 8}, {7, 8}}
2 : {{1, 2}, {1, 4}, {1, 5}, {1, 8}, {1, 9}, {2, 4}, {2, 5}, {2, 6}, {3, 4}, {3, 5}, {3, 8}, {4, 5}, {4, 7}, {6, 7}, {6, 8}, {6, 9}, {7, 8}, {7, 9}, {8, 9}}
3 : {{1, 2}, {1, 4}, {1, 5}, {1, 7}, {1, 8}, {2, 4}, {2, 5}, {2, 7}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 8}, {4, 5}, {4, 6}, {6, 7}, {6, 8}, {7, 8}}
4 : {{1, 2}, {1, 4}, {1, 5}, {1, 7}, {2, 4}, {2, 5}, {2, 8}, {3, 4}, {3, 5}, {3, 6}, {4, 5}, {4, 9}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {7, 10}, {8, 9}, {8, 10},
{9, 10}}
5 : {{1, 2}, {1, 4}, {1, 5}, {1, 7}, {2, 4}, {2, 5}, {2, 8}, {3, 4}, {3, 5}, {3, 9}, {4, 5}, {4, 6}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {7, 10}, {8, 9}, {8, 10},
{9, 10}}
6 : {{1, 2}, {1, 4}, {1, 5}, {1, 7}, {2, 4}, {2, 5}, {2, 9}, {3, 4}, {3, 5}, {3, 6}, {4, 5}, {4, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {7, 10}, {8, 9}, {8, 10},
{9, 10}}
7 : {{1, 4}, {1, 5}, {1, 6}, {1, 9}, {2, 4}, {2, 5}, {2, 6}, {2, 7}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 9}, {4, 5}, {6, 8}, {7, 8}, {7, 9}, {8, 9}}
8 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {1, 9}, {2, 4}, {2, 5}, {2, 6}, {2, 7}, {3, 4}, {3, 5}, {3, 8}, {3, 9}, {3, 10}, {4, 5}, {6, 10}, {7, 8}, {7, 9}, {7, 10},
{8, 9}}
9 : {{1, 4}, {1, 5}, {1, 6}, {1, 9}, {1, 10}, {2, 4}, {2, 5}, {2, 6}, {2, 7}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {4, 5}, {6, 8}, {7, 9}, {7, 10}, {8, 9}, {8, 10},
{9, 10}}
10 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {1, 9}, {2, 4}, {2, 5}, {2, 6}, {2, 10}, {3, 4}, {3, 5}, {3, 8}, {3, 9}, {3, 10}, {4, 5}, {6, 7}, {7, 8}, {7, 9}, {7, 10},
{8, 9}}
11 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {4, 5}, {6, 12}, {7, 10}, {7, 11}, {8, 10}, {8, 11}, {8, 12},
{9, 10}, {9, 11}, {9, 12}, {10, 11}}
12 : {{1, 4}, {1, 5}, {1, 6}, {1, 7}, {2, 4}, {2, 5}, {2, 6}, {2, 8}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {4, 5}, {6, 9}, {6, 10}, {7, 9}, {7, 10}, {8, 9}, {8, 10},
{9, 10}}
13 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {2, 12}, {3, 4}, {3, 5}, {3, 7}, {4, 5}, {6, 9}, {7, 10}, {7, 11}, {8, 10}, {8, 11}, {8, 12},
{9, 10}, {9, 11}, {9, 12}, {10, 11}}
14 : {{1, 2}, {1, 5}, {1, 6}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 9}, {4, 5}, {4, 6}, {6, 8}, {7, 8}, {7, 9}, {8, 9}}

D_3 Minor-Minimal Twists

1 : {{1,2}, {1,5}, {1,7}, {1,8}, {2,5}, {2,7}, {2,8}, {3,5}, {3,6}, {3,7}, {3,8}, {4,5}, {4,6}, {4,7}, {5,8}, {6,8}, {7,8}}
2 : {{1,2}, {1,6}, {1,8}, {1,9}, {2,6}, {2,8}, {2,9}, {3,4}, {3,5}, {3,8}, {4,6}, {4,7}, {4,9}, {5,6}, {5,7}, {6,8}, {7,8}, {8,9}}
3 : {{1,2}, {1,5}, {1,6}, {1,7}, {1,8}, {2,5}, {2,7}, {2,8}, {3,5}, {3,6}, {3,7}, {3,8}, {4,5}, {4,6}, {4,7}, {5,8}, {7,8}}
4 : {{1,2}, {1,6}, {1,7}, {1,8}, {1,9}, {2,6}, {2,8}, {2,9}, {3,4}, {3,5}, {3,8}, {4,6}, {4,7}, {4,9}, {5,6}, {5,7}, {6,8}, {8,9}}
5 : {{1,2}, {1,3}, {1,6}, {1,8}, {2,3}, {2,6}, {2,8}, {3,4}, {3,7}, {4,5}, {4,9}, {5,6}, {5,7}, {6,8}, {6,9}, {7,8}, {7,9}, {8,9}}
6 : {{1,2}, {1,3}, {1,9}, {1,10}, {2,3}, {2,9}, {2,10}, {3,4}, {3,8}, {4,6}, {4,7}, {5,6}, {5,7}, {5,9}, {6,8}, {6,10}, {7,8}, {8,9}, {9,10}}
7 : {{1,2}, {1,3}, {1,6}, {1,7}, {1,9}, {2,3}, {2,6}, {2,8}, {3,6}, {3,8}, {4,6}, {4,7}, {4,9}, {5,6}, {5,7}, {5,8}, {8,9}}
8 : {{1,2}, {1,6}, {1,7}, {1,8}, {2,3}, {2,6}, {2,8}, {3,4}, {3,7}, {3,8}, {4,5}, {4,9}, {5,6}, {5,7}, {6,8}, {6,9}, {7,9}, {8,9}}
9 : {{1,2}, {1,8}, {1,9}, {1,10}, {2,3}, {2,9}, {2,10}, {3,4}, {3,8}, {3,9}, {4,6}, {4,7}, {5,6}, {5,7}, {5,9}, {6,8}, {6,10}, {7,8}, {9,10}}
10 : {{1,2}, {1,3}, {1,6}, {1,7}, {1,8}, {2,3}, {2,6}, {2,9}, {3,6}, {3,8}, {4,6}, {4,7}, {4,9}, {5,6}, {5,7}, {5,8}, {8,9}}

D_3^a Minor-Minimal Twists

1 : {{1,5}, {1,6}, {1,7}, {1,8}, {2,3}, {2,4}, {2,6}, {2,8}, {3,5}, {3,7}, {4,5}, {4,6}, {4,7}, {5,6}, {5,8}, {6,7}, {6,8}, {7,8}}
2 : {{1,6}, {1,7}, {1,8}, {1,9}, {2,3}, {2,5}, {2,6}, {2,7}, {2,8}, {3,4}, {3,5}, {3,9}, {4,6}, {4,7}, {5,6}, {5,7}, {6,8}, {7,8}, {8,9}}
3 : {{1,5}, {1,6}, {1,7}, {1,8}, {2,3}, {2,4}, {2,6}, {3,5}, {3,7}, {3,8}, {4,5}, {4,6}, {4,7}, {5,6}, {5,8}, {6,7}, {6,8}, {7,8}}
4 : {{1,6}, {1,7}, {1,8}, {1,9}, {2,4}, {2,5}, {2,7}, {2,8}, {3,4}, {3,5}, {3,7}, {4,6}, {4,9}, {5,6}, {5,7}, {6,7}, {6,8}, {7,8}, {8,9}}
5 : {{1,6}, {1,7}, {1,8}, {1,9}, {2,3}, {2,5}, {2,6}, {2,7}, {2,8}, {3,4}, {3,5}, {4,6}, {4,7}, {4,9}, {5,6}, {5,7}, {6,8}, {7,8}, {8,9}}
6 : {{1,5}, {1,6}, {1,7}, {1,8}, {2,3}, {2,4}, {2,6}, {3,5}, {3,7}, {4,5}, {4,6}, {4,7}, {4,8}, {5,6}, {5,8}, {6,7}, {6,8}, {7,8}}
7 : {{1,6}, {1,7}, {1,8}, {1,9}, {2,4}, {2,5}, {2,7}, {2,8}, {3,4}, {3,5}, {3,7}, {4,6}, {5,6}, {5,7}, {5,9}, {6,7}, {6,8}, {7,8}, {8,9}}
8 : {{1,2}, {1,8}, {1,9}, {1,10}, {2,4}, {2,10}, {3,6}, {3,7}, {3,8}, {3,10}, {4,6}, {4,7}, {4,9}, {5,6}, {5,7}, {5,8}, {7,8}, {8,9}, {8,10},
   {9,10}}
9 : {{1,2}, {1,8}, {1,9}, {1,10}, {2,4}, {2,10}, {3,6}, {3,7}, {3,8}, {3,10}, {4,8}, {4,9}, {5,6}, {5,7}, {5,8}, {6,9}, {7,8}, {7,9}, {8,10},
   {9,10}}
10 : {{1,2}, {1,8}, {1,9}, {1,10}, {2,4}, {2,10}, {3,4}, {3,5}, {3,7}, {3,8}, {3,10}, {4,7}, {4,9}, {5,6}, {5,7}, {6,8}, {6,9}, {7,8},
   {8,10}, {9,10}}
11 : {{1,2}, {1,8}, {1,9}, {1,10}, {2,4}, {2,10}, {3,6}, {3,7}, {3,8}, {3,10}, {4,7}, {4,8}, {4,9}, {5,6}, {5,7}, {5,8}, {6,9}, {7,8},
   {8,10}, {9,10}}
12 : {{1,2}, {1,8}, {1,9}, {1,10}, {2,4}, {2,10}, {3,6}, {3,7}, {3,8}, {3,10}, {4,6}, {4,8}, {4,9}, {5,6}, {5,7}, {5,8}, {7,8}, {7,9},
   {8,10}, {9,10}}
13 : {{1,2}, {1,8}, {1,9}, {1,10}, {2,4}, {2,10}, {3,4}, {3,6}, {3,7}, {3,10}, {4,5}, {4,7}, {4,8}, {5,6}, {5,7}, {6,9}, {7,9}, {8,9},
   {8,10}, {9,10}}
14 : {{1,2}, {1,8}, {1,9}, {1,10}, {2,4}, {2,10}, {3,4}, {3,6}, {3,7}, {3,10}, {4,8}, {4,9}, {5,6}, {5,7}, {5,9}, {6,8}, {7,8}, {7,9},
   {8,10}, {9,10}}
15 : {{1,2}, {1,8}, {1,9}, {1,10}, {2,4}, {2,10}, {3,6}, {3,7}, {3,9}, {3,10}, {4,5}, {4,7}, {4,9}, {5,6}, {5,7}, {6,8}, {7,8}, {8,9},
   {8,10}, {9,10}}
16 : {{1,2}, {1,8}, {1,9}, {1,10}, {2,4}, {2,10}, {3,6}, {3,7}, {3,9}, {3,10}, {4,7}, {4,8}, {4,9}, {5,6}, {5,7}, {5,9}, {6,8}, {7,8},
   {8,10}, {9,10}}
17 : {{1,2}, {1,8}, {1,9}, {1,10}, {2,4}, {2,10}, {3,4}, {3,6}, {3,7}, {3,10}, {4,7}, {4,8}, {5,6}, {5,7}, {5,8}, {6,9}, {7,9}, {8,9},
   {8,10}, {9,10}}
18 : {{1,2}, {1,6}, {1,7}, {1,9}, {2,6}, {2,7}, {2,8}, {3,4}, {3,5}, {3,7}, {4,6}, {4,8}, {5,6}, {5,7}, {5,8}, {6,7}, {7,9}, {8,9}}
19 : {{1,2}, {1,6}, {1,7}, {1,9}, {2,6}, {2,7}, {2,8}, {3,4}, {3,5}, {3,7}, {4,6}, {4,9}, {5,6}, {5,7}, {5,8}, {6,7}, {7,8}, {8,9}}
20 : {{1,2}, {1,6}, {1,7}, {1,9}, {2,6}, {2,7}, {2,8}, {3,4}, {3,5}, {3,7}, {4,6}, {4,8}, {5,6}, {5,7}, {5,9}, {6,7}, {7,8}, {8,9}}
21 : {{1,2}, {1,6}, {1,8}, {1,9}, {2,6}, {2,7}, {2,8}, {3,4}, {3,5}, {3,7}, {4,6}, {4,8}, {5,6}, {5,7}, {5,8}, {6,7}, {7,9}, {8,9}}
22 : {{1,2}, {1,6}, {1,8}, {1,9}, {2,6}, {2,7}, {2,8}, {3,4}, {3,5}, {3,9}, {4,6}, {4,8}, {5,6}, {5,7}, {5,8}, {6,7}, {7,8}, {7,9}}
23 : {{1,2}, {1,6}, {1,8}, {1,9}, {2,6}, {2,7}, {2,8}, {3,4}, {3,5}, {3,7}, {4,6}, {4,8}, {5,6}, {5,8}, {5,9}, {6,7}, {7,8}, {7,9}}
24 : {{1,2}, {1,6}, {1,8}, {1,9}, {2,6}, {2,7}, {2,8}, {3,4}, {3,5}, {3,7}, {4,6}, {4,8}, {5,6}, {5,7}, {5,8}, {6,9}, {7,9}, {8,9}}
25 : {{1,2}, {1,6}, {1,8}, {1,9}, {2,6}, {2,7}, {2,8}, {3,4}, {3,5}, {3,9}, {4,6}, {4,8}, {5,6}, {5,7}, {5,8}, {6,7}, {7,9}, {8,9}}

D_3^b Minor-Minimal Twists

1 : {{1,6}, {1,7}, {1,8}, {1,9}, {2,5}, {2,7}, {2,8}, {2,9}, {3,4}, {3,6}, {3,7}, {4,5}, {4,8}, {5,6}, {6,8}, {6,9}, {7,9}, {8,9}}
2 : {{1,7}, {1,8}, {1,9}, {1,10}, {2,3}, {2,5}, {2,7}, {2,9}, {3,6}, {3,8}, {3,10}, {4,5}, {4,7}, {4,8}, {5,6}, {6,7}, {7,9}, {8,9}, {9,10}}
3 : {{1,7}, {1,8}, {1,9}, {1,10}, {2,3}, {2,4}, {2,9}, {3,6}, {3,8}, {3,10}, {4,5}, {4,7}, {5,6}, {5,8}, {6,7}, {7,8}, {7,9}, {8,9}, {9,10}}
4 : {{1,7}, {1,8}, {1,9}, {1,10}, {2,4}, {2,6}, {2,8}, {2,9}, {3,4}, {3,6}, {3,7}, {3,8}, {3,10}, {4,5}, {4,7}, {5,6}, {5,8}, {7,9}, {8,9}, {9,10}}
5 : {{1,6}, {1,7}, {1,8}, {1,9}, {2,5}, {2,7}, {2,8}, {3,4}, {3,6}, {3,7}, {4,5}, {4,8}, {4,9}, {5,6}, {6,8}, {6,9}, {7,9}, {8,9}}
6 : {{1,7}, {1,8}, {1,9}, {1,10}, {2,3}, {2,5}, {2,7}, {2,9}, {3,6}, {3,8}, {4,5}, {4,7}, {4,8}, {5,6}, {5,10}, {6,7}, {7,9}, {8,9}, {9,10}}
7 : {{1,7}, {1,8}, {1,9}, {1,10}, {2,3}, {2,4}, {2,9}, {3,6}, {3,8}, {4,5}, {4,7}, {5,6}, {5,8}, {5,10}, {6,7}, {7,8}, {7,9}, {8,9}, {9,10}}
8 : {{1,2}, {1,9}, {1,10}, {1,11}, {2,4}, {2,11}, {3,5}, {3,6}, {3,11}, {4,5}, {4,7}, {4,10}, {5,8}, {6,7}, {6,9}, {7,8}, {8,9}, {9,10},
   {9,11}, {10,11}}
9 : {{1,2}, {1,9}, {1,10}, {1,11}, {2,4}, {2,11}, {3,5}, {3,6}, {3,11}, {4,9}, {4,10}, {5,8}, {5,10}, {6,7}, {6,9}, {7,8}, {7,10}, {8,9},
   {9,11}, {10,11}}
10 : {{1,2}, {1,7}, {1,8}, {1,10}, {2,7}, {2,8}, {2,9}, {3,6}, {3,8}, {3,9}, {4,5}, {4,7}, {4,8}, {5,6}, {5,9}, {6,7}, {7,10}, {9,10}}
11 : {{1,2}, {1,7}, {1,8}, {1,10}, {2,7}, {2,8}, {2,9}, {3,6}, {3,8}, {3,10}, {4,5}, {4,7}, {4,8}, {5,6}, {5,9}, {6,7}, {7,9}, {9,10}}
12 : {{1,2}, {1,7}, {1,8}, {1,10}, {2,7}, {2,8}, {2,9}, {3,6}, {3,8}, {3,9}, {4,5}, {4,7}, {4,8}, {5,6}, {5,10}, {6,7}, {7,9}, {9,10}}
13 : {{1,2}, {1,7}, {1,9}, {1,10}, {2,7}, {2,8}, {2,9}, {3,6}, {3,9}, {3,10}, {4,5}, {4,7}, {4,8}, {5,6}, {5,9}, {6,7}, {7,9}, {8,10}}

D_3^{aa} Minor-Minimal Twists

1 : {{1,6}, {1,8}, {1,9}, {2,6}, {2,7}, {2,8}, {2,9}, {3,5}, {3,6}, {3,7}, {3,8}, {3,9}, {4,5}, {4,6}, {4,7}, {4,8}, {5,6}, {5,8}, {7,9}}

2 : {{1,4}, {1,10}, {1,11}, {2,3}, {2,4}, {2,10}, {2,11}, {3,5}, {3,11}, {4,6}, {5,7}, {5,8}, {5,9}, {6,7}, {6,8}, {7,9}, {7,10}, {7,11}, {8,9}, {8,10}, {9,10}}

3 : {{1,7}, {1,9}, {1,10}, {2,7}, {2,8}, {2,9}, {2,10}, {3,4}, {3,5}, {3,6}, {3,9}, {4,6}, {4,7}, {4,8}, {4,10}, {5,6}, {5,7}, {5,8}, {6,7}, {8,9}}

4 : {{1,4}, {1,11}, {1,12}, {2,3}, {2,4}, {2,11}, {2,12}, {3,6}, {3,11}, {4,7}, {5,8}, {5,9}, {5,10}, {5,11}, {6,8}, {6,9}, {6,10}, {7,8}, {7,9}, {8,10}, {8,12}, {9,10}}

5 : {{1,3}, {1,9}, {1,10}, {2,3}, {2,9}, {2,10}, {2,11}, {3,5}, {4,6}, {4,7}, {4,8}, {4,10}, {5,6}, {5,7}, {6,8}, {6,9}, {6,11}, {7,8}, {7,9}, {8,9}, {10,11}}

6 : {{1,9}, {1,10}, {1,11}, {2,3}, {2,9}, {2,10}, {2,11}, {3,5}, {3,10}, {4,6}, {4,7}, {4,10}, {5,6}, {5,7}, {5,8}, {6,8}, {6,9}, {6,11}, {7,8}, {7,9}, {8,9}}

7 : {{1,7}, {1,8}, {1,9}, {2,7}, {2,8}, {2,9}, {2,10}, {3,4}, {3,5}, {3,9}, {4,6}, {4,7}, {4,8}, {4,10}, {5,6}, {5,7}, {5,8}, {6,7}, {6,8}, {9,10}}

8 : {{1,6}, {1,8}, {1,9}, {2,6}, {2,7}, {2,8}, {2,9}, {3,5}, {3,6}, {3,7}, {3,8}, {4,5}, {4,6}, {4,7}, {4,8}, {5,6}, {5,8}, {5,9}, {7,9}}

9 : {{1,4}, {1,10}, {1,11}, {2,3}, {2,4}, {2,10}, {2,11}, {3,5}, {3,11}, {4,6}, {5,7}, {5,8}, {5,9}, {6,7}, {6,8}, {7,9}, {7,10}, {8,9}, {8,10}, {9,10}, {9,11}}

10 : {{1,7}, {1,9}, {1,10}, {2,7}, {2,8}, {2,9}, {2,10}, {3,4}, {3,5}, {3,6}, {3,9}, {4,6}, {4,7}, {4,8}, {5,6}, {5,7}, {5,8}, {6,7}, {6,10}, {8,9}}

11 : {{1,4}, {1,11}, {1,12}, {2,3}, {2,4}, {2,11}, {2,12}, {3,6}, {3,11}, {4,7}, {5,8}, {5,9}, {5,10}, {5,11}, {6,8}, {6,9}, {6,10}, {7,8}, {7,9}, {8,10}, {9,10}, {10,12}}

12 : {{1,3}, {1,9}, {1,10}, {2,3}, {2,9}, {2,10}, {2,11}, {3,5}, {4,6}, {4,7}, {4,8}, {4,10}, {5,6}, {5,7}, {6,8}, {6,9}, {7,8}, {7,9}, {8,9}, {8,11}, {10,11}}

13 : {{1,9}, {1,10}, {1,11}, {2,3}, {2,9}, {2,10}, {2,11}, {3,5}, {3,10}, {4,6}, {4,7}, {4,10}, {5,6}, {5,7}, {5,8}, {6,8}, {6,9}, {7,8}, {7,9}, {8,9}, {8,11}}

14 : {{1,7}, {1,8}, {1,9}, {2,7}, {2,8}, {2,9}, {2,10}, {3,4}, {3,5}, {3,9}, {4,6}, {4,7}, {4,8}, {5,6}, {5,7}, {5,8}, {6,7}, {6,8}, {6,10}, {9,10}}

15 : {{1,7}, {1,9}, {1,10}, {2,7}, {2,8}, {2,9}, {2,10}, {3,5}, {3,6}, {3,9}, {3,10}, {4,6}, {4,7}, {4,8}, {4,9}, {5,6}, {5,7}, {5,8}, {6,7}, {8,10}}

16 : {{1,4}, {1,11}, {1,12}, {2,3}, {2,4}, {2,11}, {2,12}, {3,6}, {3,12}, {4,7}, {5,9}, {5,10}, {5,11}, {5,12}, {6,8}, {6,9}, {6,10}, {7,8}, {7,9}, {8,10}, {8,11}, {9,10}}

17 : {{1,9}, {1,10}, {1,11}, {2,3}, {2,9}, {2,10}, {2,11}, {3,5}, {3,11}, {4,6}, {4,7}, {4,11}, {5,7}, {5,8}, {5,10}, {6,8}, {6,9}, {6,10}, {7,8}, {7,9}, {8,9}}

18 : {{1,4}, {1,11}, {1,12}, {2,3}, {2,4}, {2,11}, {2,12}, {3,6}, {3,12}, {4,7}, {5,8}, {5,9}, {5,12}, {6,8}, {6,9}, {6,10}, {7,9}, {7,10}, {7,11}, {8,10}, {8,11}, {9,10}}

19 : {{1,4}, {1,11}, {1,12}, {2,3}, {2,4}, {2,11}, {2,12}, {3,6}, {3,12}, {4,7}, {5,8}, {5,9}, {5,10}, {5,12}, {6,9}, {6,10}, {6,11}, {7,8}, {7,9}, {8,10}, {8,11}, {9,10}}

20 : {{1,3}, {1,10}, {1,11}, {2,3}, {2,9}, {2,10}, {2,11}, {3,5}, {4,6}, {4,7}, {4,8}, {4,11}, {5,7}, {5,8}, {5,10}, {6,8}, {6,9}, {6,10}, {7,8}, {7,9}, {9,11}}

21 : {{1,7}, {1,9}, {1,10}, {2,7}, {2,8}, {2,9}, {2,10}, {3,4}, {3,5}, {3,9}, {3,10}, {4,6}, {4,7}, {4,8}, {5,6}, {5,7}, {5,8}, {6,7}, {6,9}, {8,10}}

22 : {{1,4}, {1,11}, {1,12}, {2,3}, {2,4}, {2,11}, {2,12}, {3,6}, {3,12}, {4,7}, {5,8}, {5,9}, {5,11}, {5,12}, {6,8}, {6,9}, {6,10}, {7,8}, {7,9}, {8,10}, {9,10}, {10,11}}

23 : {{1,9}, {1,10}, {1,11}, {2,3}, {2,9}, {2,10}, {2,11}, {3,5}, {3,11}, {4,6}, {4,7}, {4,11}, {5,6}, {5,7}, {5,10}, {6,8}, {6,9}, {7,8}, {7,9}, {8,9}, {8,10}}

24 : {{1,4}, {1,11}, {1,12}, {2,3}, {2,4}, {2,11}, {2,12}, {3,6}, {3,12}, {4,7}, {5,8}, {5,9}, {5,12}, {6,8}, {6,9}, {6,10}, {7,8}, {7,9}, {7,11}, {8,10}, {9,10}, {10,11}}

25 : {{1,4}, {1,11}, {1,12}, {2,3}, {2,4}, {2,11}, {2,12}, {3,6}, {3,12}, {4,7}, {5,8}, {5,9}, {5,10}, {5,12}, {6,8}, {6,9}, {6,11}, {7,8}, {7,9}, {8,10}, {9,10}, {10,11}}

26 : {{1,3}, {1,10}, {1,11}, {2,3}, {2,9}, {2,10}, {2,11}, {3,5}, {4,6}, {4,7}, {4,8}, {4,11}, {5,6}, {5,7}, {5,10}, {6,8}, {6,9}, {7,8}, {7,9}, {8,10}, {9,11}}

27 : {{1,2}, {1,7}, {1,9}, {2,6}, {2,7}, {2,8}, {3,5}, {3,6}, {3,7}, {3,8}, {3,9}, {4,5}, {4,6}, {4,7}, {4,8}, {5,6}, {5,8}, {6,9}, {8,9}}

28 : {{1,2}, {1,3}, {1,11}, {2,3}, {2,4}, {2,10}, {3,5}, {4,6}, {4,11}, {5,7}, {5,8}, {5,9}, {6,7}, {6,8}, {7,9}, {7,10}, {7,11}, {8,9}, {8,10}, {9,10}, {10,11}}

29 : {{1,2}, {1,8}, {1,9}, {2,7}, {2,8}, {2,10}, {3,4}, {3,5}, {3,6}, {3,9}, {4,6}, {4,7}, {4,8}, {4,10}, {5,6}, {5,7}, {5,8}, {6,7}, {7,9}, {9,10}}

30 : {{1,2}, {1,3}, {1,11}, {2,3}, {2,4}, {2,12}, {3,6}, {4,7}, {4,11}, {5,8}, {5,9}, {5,10}, {5,11}, {6,8}, {6,9}, {6,10}, {7,8}, {7,9}, {8,10}, {8,12}, {9,10}, {11,12}}

31 : {{1,2}, {1,10}, {1,11}, {2,3}, {2,9}, {2,11}, {3,5}, {3,10}, {4,6}, {4,7}, {4,8}, {4,10}, {5,6}, {5,7}, {6,8}, {6,9}, {6,11}, {7,8}, {7,9}, {8,9}, {9,10}}

32 : {{1,2}, {1,3}, {1,10}, {2,3}, {2,9}, {2,11}, {3,5}, {4,6}, {4,7}, {4,10}, {5,6}, {5,7}, {5,8}, {6,8}, {6,9}, {6,11}, {7,8}, {7,9}, {8,9}, {9,10}, {10,11}}

33 : {{1,2}, {1,9}, {1,10}, {2,7}, {2,8}, {2,10}, {3,4}, {3,5}, {3,9}, {4,6}, {4,7}, {4,8}, {4,10}, {5,6}, {5,7}, {5,8}, {6,7}, {6,8}, {7,9}, {8,9}}

34 : {{1,2}, {1,7}, {1,9}, {2,6}, {2,7}, {2,8}, {3,5}, {3,6}, {3,7}, {3,8}, {4,5}, {4,6}, {4,7}, {4,8}, {5,6}, {5,8}, {5,9}, {6,9}, {8,9}}

35 : {{1,2}, {1,3}, {1,11}, {2,3}, {2,4}, {2,10}, {3,5}, {4,6}, {4,11}, {5,7}, {5,8}, {5,9}, {6,7}, {6,8}, {7,9}, {7,10}, {8,9}, {8,10}, {9,10}, {9,11}, {10,11}}

36 : {{1,2}, {1,8}, {1,9}, {2,7}, {2,8}, {2,10}, {3,4}, {3,5}, {3,6}, {3,9}, {4,6}, {4,7}, {4,8}, {5,6}, {5,7}, {5,8}, {6,7}, {6,10}, {7,9}, {9,10}}

37 : {{1,2}, {1,3}, {1,11}, {2,3}, {2,4}, {2,12}, {3,6}, {4,7}, {4,11}, {5,8}, {5,9}, {5,10}, {5,11}, {6,8}, {6,9}, {6,10}, {7,8}, {7,9}, {8,10}, {9,10}, {10,12}, {11,12}}

38 : {{1,2}, {1,10}, {1,11}, {2,3}, {2,9}, {2,11}, {3,5}, {3,10}, {4,6}, {4,7}, {4,8}, {4,10}, {5,6}, {5,7}, {6,8}, {6,9}, {7,8}, {7,9}, {8,9}, {8,11}, {9,10}}

39 : {{1,2}, {1,3}, {1,10}, {2,3}, {2,9}, {2,11}, {3,5}, {4,6}, {4,7}, {4,10}, {5,6}, {5,7}, {5,8}, {6,8}, {6,9}, {7,8}, {7,9}, {8,9}, {8,11}, {9,10}, {10,11}}

40 : {{1,2}, {1,9}, {1,10}, {2,7}, {2,8}, {2,10}, {3,4}, {3,5}, {3,9}, {4,6}, {4,7}, {4,8}, {5,6}, {5,7}, {5,8}, {6,7}, {6,8}, {6,10}, {7,9}, {8,9}}

41 : {{1,2}, {1,3}, {1,11}, {2,3}, {2,9}, {2,10}, {3,5}, {4,6}, {4,7}, {4,11}, {5,7}, {5,8}, {5,10}, {6,8}, {6,9}, {6,10}, {7,8}, {7,9}, {8,9}, {9,11}, {10,11}}

42 : {{1,2}, {1,3}, {1,12}, {2,3}, {2,4}, {2,11}, {3,6}, {4,7}, {4,12}, {5,8}, {5,9}, {5,12}, {6,8}, {6,9}, {6,10}, {7,9}, {7,10}, {7,11}, {8,10}, {8,11}, {9,10}, {11,12}}

43 : {{1,2}, {1,3}, {1,12}, {2,3}, {2,4}, {2,11}, {3,6}, {4,7}, {4,12}, {5,8}, {5,9}, {5,10}, {5,12}, {6,9}, {6,10}, {6,11}, {7,8}, {7,9}, {8,10}, {8,11}, {9,10}, {11,12}}

44 : {{1,2}, {1,9}, {1,11}, {2,3}, {2,9}, {2,10}, {3,5}, {3,11}, {4,6}, {4,7}, {4,8}, {4,11}, {5,7}, {5,8}, {5,10}, {6,8}, {6,9}, {6,10},

{7, 8}, {7, 9}, {10, 11}}

45 : {{1, 2}, {1, 3}, {1, 11}, {2, 3}, {2, 9}, {2, 10}, {3, 5}, {4, 6}, {4, 7}, {4, 11}, {5, 6}, {5, 7}, {5, 10}, {6, 8}, {6, 9}, {7, 8}, {7, 9}, {8, 9}, {8, 10}, {9, 11}, {10, 11}}

46 : {{1, 2}, {1, 3}, {1, 12}, {2, 3}, {2, 4}, {2, 11}, {3, 6}, {4, 7}, {4, 12}, {5, 8}, {5, 9}, {5, 12}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {7, 11}, {8, 10}, {9, 10}, {10, 11}, {11, 12}}

47 : {{1, 2}, {1, 3}, {1, 12}, {2, 3}, {2, 4}, {2, 11}, {3, 6}, {4, 7}, {4, 12}, {5, 8}, {5, 9}, {5, 10}, {5, 12}, {6, 8}, {6, 9}, {6, 11}, {7, 8}, {7, 9}, {8, 10}, {9, 10}, {10, 11}, {11, 12}}

48 : {{1, 2}, {1, 9}, {1, 11}, {2, 3}, {2, 9}, {2, 10}, {3, 5}, {3, 11}, {4, 6}, {4, 7}, {4, 8}, {4, 11}, {5, 6}, {5, 7}, {5, 10}, {6, 8}, {6, 9}, {7, 8}, {7, 9}, {8, 10}, {10, 11}}

49 : {{1, 2}, {1, 7}, {1, 9}, {2, 6}, {2, 8}, {3, 5}, {3, 6}, {3, 7}, {3, 8}, {3, 9}, {4, 5}, {4, 6}, {4, 7}, {4, 8}, {5, 6}, {5, 8}, {6, 9}, {7, 9}, {8, 9}}

50 : {{1, 2}, {1, 3}, {1, 11}, {2, 4}, {2, 10}, {3, 5}, {3, 11}, {4, 6}, {4, 11}, {5, 7}, {5, 8}, {5, 9}, {6, 7}, {6, 8}, {7, 9}, {7, 10}, {7, 11}, {8, 9}, {8, 10}, {9, 10}, {10, 11}}

51 : {{1, 2}, {1, 8}, {1, 9}, {2, 7}, {2, 10}, {3, 4}, {3, 5}, {3, 6}, {3, 9}, {4, 6}, {4, 7}, {4, 8}, {4, 10}, {5, 6}, {5, 7}, {5, 8}, {6, 7}, {7, 9}, {8, 9}, {9, 10}}

52 : {{1, 2}, {1, 3}, {1, 11}, {2, 4}, {2, 12}, {3, 6}, {3, 11}, {4, 7}, {4, 11}, {5, 8}, {5, 9}, {5, 10}, {5, 11}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {8, 10}, {8, 12}, {9, 10}, {11, 12}}

53 : {{1, 2}, {1, 10}, {1, 11}, {2, 3}, {2, 9}, {3, 5}, {3, 10}, {4, 6}, {4, 7}, {4, 8}, {4, 10}, {5, 6}, {5, 7}, {6, 8}, {6, 9}, {6, 11}, {7, 8}, {7, 9}, {8, 9}, {9, 10}, {10, 11}}

54 : {{1, 2}, {1, 3}, {1, 10}, {2, 9}, {2, 11}, {3, 5}, {3, 10}, {4, 6}, {4, 7}, {4, 10}, {5, 6}, {5, 7}, {5, 8}, {6, 8}, {6, 9}, {6, 11}, {7, 8}, {7, 9}, {8, 9}, {9, 10}, {10, 11}}

55 : {{1, 2}, {1, 9}, {1, 10}, {2, 7}, {2, 8}, {3, 4}, {3, 5}, {3, 9}, {4, 6}, {4, 7}, {4, 8}, {4, 10}, {5, 6}, {5, 7}, {5, 8}, {6, 7}, {6, 8}, {7, 9}, {8, 9}, {9, 10}}

56 : {{1, 2}, {1, 7}, {1, 9}, {2, 6}, {2, 8}, {3, 5}, {3, 6}, {3, 7}, {3, 8}, {4, 5}, {4, 6}, {4, 7}, {4, 8}, {5, 6}, {5, 8}, {5, 9}, {6, 9}, {7, 9}, {8, 9}}

57 : {{1, 2}, {1, 3}, {1, 11}, {2, 4}, {2, 10}, {3, 5}, {3, 11}, {4, 6}, {4, 11}, {5, 7}, {5, 8}, {5, 9}, {6, 7}, {6, 8}, {7, 9}, {7, 10}, {8, 9}, {8, 10}, {9, 10}, {9, 11}, {10, 11}}

58 : {{1, 2}, {1, 8}, {1, 9}, {2, 7}, {2, 10}, {3, 4}, {3, 5}, {3, 6}, {3, 9}, {4, 6}, {4, 7}, {4, 8}, {5, 6}, {5, 7}, {5, 8}, {6, 7}, {6, 10}, {7, 9}, {8, 9}, {9, 10}}

59 : {{1, 2}, {1, 3}, {1, 11}, {2, 4}, {2, 12}, {3, 6}, {3, 11}, {4, 7}, {4, 11}, {5, 8}, {5, 9}, {5, 10}, {5, 11}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {8, 10}, {9, 10}, {10, 12}, {11, 12}}

60 : {{1, 2}, {1, 10}, {1, 11}, {2, 3}, {2, 9}, {3, 5}, {3, 10}, {4, 6}, {4, 7}, {4, 8}, {4, 10}, {5, 6}, {5, 7}, {6, 8}, {6, 9}, {7, 8}, {7, 9}, {8, 9}, {8, 11}, {9, 10}, {10, 11}}

61 : {{1, 2}, {1, 3}, {1, 10}, {2, 9}, {2, 11}, {3, 5}, {3, 10}, {4, 6}, {4, 7}, {4, 10}, {5, 6}, {5, 7}, {5, 8}, {6, 8}, {6, 9}, {7, 8}, {7, 9}, {8, 9}, {8, 11}, {9, 10}, {10, 11}}

62 : {{1, 2}, {1, 9}, {1, 10}, {2, 7}, {2, 8}, {3, 4}, {3, 5}, {3, 9}, {4, 6}, {4, 7}, {4, 8}, {5, 6}, {5, 7}, {5, 8}, {6, 7}, {6, 8}, {6, 10}, {7, 9}, {8, 9}, {9, 10}}

63 : {{1, 2}, {1, 3}, {1, 11}, {2, 9}, {2, 10}, {3, 5}, {3, 11}, {4, 6}, {4, 7}, {4, 11}, {5, 7}, {5, 8}, {5, 10}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {8, 9}, {9, 11}, {10, 11}}

64 : {{1, 2}, {1, 3}, {1, 12}, {2, 4}, {2, 11}, {3, 6}, {3, 12}, {4, 7}, {4, 12}, {5, 8}, {5, 9}, {5, 12}, {6, 8}, {6, 9}, {6, 10}, {7, 9}, {7, 10}, {7, 11}, {8, 10}, {8, 11}, {9, 10}, {11, 12}}

65 : {{1, 2}, {1, 3}, {1, 12}, {2, 4}, {2, 11}, {3, 6}, {3, 12}, {4, 7}, {4, 12}, {5, 8}, {5, 9}, {5, 10}, {5, 12}, {6, 9}, {6, 10}, {6, 11}, {7, 8}, {7, 9}, {8, 10}, {8, 11}, {9, 10}, {11, 12}}

66 : {{1, 2}, {1, 9}, {1, 11}, {2, 3}, {2, 10}, {3, 5}, {3, 11}, {4, 6}, {4, 7}, {4, 8}, {4, 11}, {5, 7}, {5, 8}, {5, 10}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {9, 11}, {10, 11}}

67 : {{1, 2}, {1, 3}, {1, 11}, {2, 9}, {2, 10}, {3, 5}, {3, 11}, {4, 6}, {4, 7}, {4, 11}, {5, 6}, {5, 7}, {5, 10}, {6, 8}, {6, 9}, {7, 8}, {7, 9}, {8, 9}, {8, 10}, {9, 11}, {10, 11}}

68 : {{1, 2}, {1, 3}, {1, 12}, {2, 4}, {2, 11}, {3, 6}, {3, 12}, {4, 7}, {4, 12}, {5, 8}, {5, 9}, {5, 12}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {7, 11}, {8, 10}, {9, 10}, {10, 11}, {11, 12}}

69 : {{1, 2}, {1, 3}, {1, 12}, {2, 4}, {2, 11}, {3, 6}, {3, 12}, {4, 7}, {4, 12}, {5, 8}, {5, 9}, {5, 10}, {5, 12}, {6, 8}, {6, 9}, {6, 11}, {7, 8}, {7, 9}, {8, 10}, {9, 10}, {10, 11}, {11, 12}}

70 : {{1, 2}, {1, 9}, {1, 11}, {2, 3}, {2, 10}, {3, 5}, {3, 11}, {4, 6}, {4, 7}, {4, 8}, {4, 11}, {5, 6}, {5, 7}, {5, 10}, {6, 8}, {6, 9}, {7, 8}, {7, 9}, {8, 10}, {9, 11}, {10, 11}}

71 : {{1, 2}, {1, 3}, {1, 8}, {2, 7}, {2, 10}, {3, 7}, {3, 8}, {3, 9}, {4, 6}, {4, 7}, {4, 8}, {4, 10}, {5, 6}, {5, 7}, {5, 8}, {5, 9}, {6, 7}, {6, 9}, {9, 10}}

72 : {{1, 2}, {1, 3}, {1, 4}, {2, 5}, {2, 12}, {3, 4}, {3, 5}, {3, 11}, {4, 6}, {5, 7}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {8, 10}, {8, 12}, {9, 10}, {9, 11}, {10, 11}, {11, 12}}

73 : {{1, 2}, {1, 3}, {1, 8}, {2, 7}, {2, 10}, {3, 7}, {3, 8}, {3, 9}, {4, 6}, {4, 7}, {4, 8}, {4, 9}, {5, 6}, {5, 7}, {5, 8}, {5, 10}, {6, 7}, {6, 10}, {9, 10}}

74 : {{1, 2}, {1, 3}, {1, 4}, {2, 5}, {2, 12}, {3, 4}, {3, 5}, {3, 11}, {4, 6}, {5, 7}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {8, 10}, {8, 11}, {9, 10}, {9, 12}, {10, 12}, {11, 12}}

75 : {{1, 2}, {1, 3}, {1, 8}, {2, 7}, {2, 10}, {3, 7}, {3, 8}, {3, 9}, {4, 6}, {4, 7}, {4, 8}, {4, 9}, {5, 6}, {5, 7}, {5, 8}, {5, 9}, {6, 7}, {6, 10}, {9, 10}}

76 : {{1, 2}, {1, 3}, {1, 4}, {2, 5}, {2, 12}, {3, 4}, {3, 5}, {3, 11}, {4, 6}, {5, 7}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {8, 10}, {8, 11}, {9, 10}, {9, 11}, {10, 12}, {11, 12}}

77 : {{1, 2}, {1, 3}, {1, 8}, {2, 7}, {2, 10}, {3, 7}, {3, 8}, {3, 9}, {4, 6}, {4, 7}, {4, 8}, {4, 10}, {5, 6}, {5, 7}, {5, 8}, {5, 10}, {6, 7}, {6, 9}, {9, 10}}

78 : {{1, 2}, {1, 3}, {1, 4}, {2, 5}, {2, 12}, {3, 4}, {3, 5}, {3, 11}, {4, 6}, {5, 7}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {8, 10}, {8, 12}, {9, 10}, {9, 12}, {10, 11}, {11, 12}}

79 : {{1, 2}, {1, 3}, {1, 10}, {2, 7}, {2, 9}, {3, 7}, {3, 8}, {3, 9}, {4, 6}, {4, 7}, {4, 9}, {4, 10}, {5, 6}, {5, 7}, {5, 8}, {5, 9}, {6, 7}, {6, 9}, {8, 10}}

D_9 Minor-Minimal Twists

1 : {{1, 7}, {1, 8}, {1, 9}, {2, 4}, {2, 8}, {2, 9}, {2, 10}, {3, 4}, {3, 7}, {3, 8}, {4, 5}, {4, 6}, {5, 7}, {5, 9}, {6, 7}, {6, 9}, {7, 10}, {8, 10}, {9, 10}}

2 : {{1, 8}, {1, 9}, {1, 11}, {2, 3}, {2, 6}, {2, 7}, {2, 10}, {3, 5}, {3, 9}, {3, 11}, {4, 5}, {4, 8}, {4, 9}, {5, 6}, {5, 7}, {6, 8}, {7, 8}, {8, 10}, {9, 10}, {10, 11}}

3 : {{1, 8}, {1, 9}, {1, 11}, {2, 3}, {2, 4}, {2, 10}, {3, 5}, {3, 9}, {3, 11}, {4, 5}, {4, 8}, {5, 6}, {5, 7}, {6, 8}, {6, 9}, {7, 8}, {7, 9}, {8, 10}, {9, 10}, {10, 11}}

4 : {{1, 8}, {1, 9}, {1, 11}, {2, 4}, {2, 6}, {2, 7}, {2, 10}, {3, 5}, {3, 8}, {3, 9}, {3, 11}, {4, 5}, {4, 8}, {5, 6}, {5, 7}, {6, 9}, {7, 9}, {8, 10}, {9, 10}, {10, 11}}

5 : {{1, 7}, {1, 8}, {1, 9}, {2, 4}, {2, 8}, {2, 9}, {3, 4}, {3, 7}, {3, 8}, {4, 5}, {4, 6}, {4, 10}, {5, 7}, {5, 9}, {6, 7}, {6, 9}, {7, 10}, {8, 10}, {9, 10}}

6 : {{1, 8}, {1, 9}, {1, 11}, {2, 3}, {2, 4}, {2, 10}, {3, 5}, {3, 9}, {4, 5}, {4, 8}, {5, 6}, {5, 7}, {5, 11}, {6, 8}, {6, 9}, {7, 8}, {7, 9}, {8, 10}, {9, 10}, {10, 11}}

7 : {{1, 7}, {1, 8}, {1, 9}, {2, 4}, {2, 8}, {2, 9}, {3, 4}, {3, 7}, {3, 8}, {4, 5}, {4, 6}, {5, 7}, {5, 9}, {5, 10}, {6, 7}, {6, 9}, {7, 10}, {8, 10}, {9, 10}}

8 : {{1, 8}, {1, 9}, {1, 11}, {2, 3}, {2, 6}, {2, 7}, {2, 10}, {3, 5}, {3, 9}, {4, 5}, {4, 8}, {4, 9}, {5, 6}, {5, 7}, {6, 8}, {6, 11}, {7, 8}, {8, 10},

{9, 10}, {10, 11}}
9 : {{1, 8}, {1, 9}, {1, 11}, {2, 3}, {2, 4}, {2, 10}, {3, 5}, {3, 9}, {4, 5}, {4, 8}, {5, 6}, {5, 7}, {6, 8}, {6, 9}, {6, 11}, {7, 8}, {7, 9}, {8, 10},
{9, 10}, {10, 11}}
10 : {{1, 2}, {1, 10}, {1, 11}, {2, 4}, {2, 12}, {3, 5}, {3, 6}, {3, 12}, {4, 8}, {4, 9}, {4, 11}, {5, 7}, {5, 11}, {6, 7}, {6, 10}, {7, 8}, {7, 9}, {8, 10},
{9, 10}, {10, 12}, {11, 12}}
11 : {{1, 2}, {1, 10}, {1, 11}, {2, 4}, {2, 12}, {3, 6}, {3, 8}, {3, 9}, {3, 12}, {4, 8}, {4, 9}, {4, 11}, {5, 7}, {5, 10}, {5, 11}, {6, 7}, {6, 10}, {7, 8},
{7, 9}, {10, 12}, {11, 12}}
12 : {{1, 2}, {1, 10}, {1, 11}, {2, 4}, {2, 12}, {3, 5}, {3, 6}, {3, 12}, {4, 5}, {4, 9}, {4, 11}, {5, 7}, {6, 7}, {6, 10}, {7, 8}, {7, 9}, {8, 10}, {8, 11},
{9, 10}, {10, 12}, {11, 12}}
13 : {{1, 2}, {1, 10}, {1, 11}, {2, 4}, {2, 12}, {3, 6}, {3, 8}, {3, 9}, {3, 12}, {4, 5}, {4, 9}, {4, 11}, {5, 7}, {5, 10}, {6, 7}, {6, 10}, {7, 8}, {7, 9},
{8, 11}, {10, 12}, {11, 12}}
14 : {{1, 8}, {1, 9}, {1, 11}, {2, 8}, {2, 9}, {2, 10}, {3, 5}, {3, 9}, {3, 11}, {4, 5}, {4, 8}, {4, 9}, {5, 6}, {5, 7}, {6, 8}, {6, 10}, {7, 8}, {7, 10},
{10, 11}}
15 : {{1, 8}, {1, 9}, {1, 11}, {2, 8}, {2, 9}, {2, 10}, {3, 5}, {3, 9}, {3, 10}, {4, 5}, {4, 8}, {4, 9}, {5, 6}, {5, 7}, {6, 8}, {6, 11}, {7, 8}, {7, 10},
{10, 11}}
16 : {{1, 8}, {1, 10}, {1, 11}, {2, 8}, {2, 9}, {2, 10}, {3, 5}, {3, 10}, {3, 11}, {4, 5}, {4, 8}, {4, 9}, {5, 6}, {5, 7}, {6, 8}, {6, 10}, {7, 8}, {7, 10},
{9, 11}}

D_{12} Minor-Minimal Twists

1 : {{1, 6}, {1, 7}, {1, 8}, {2, 3}, {2, 4}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 6}, {3, 7}, {4, 5}, {4, 7}, {5, 6}, {5, 8}, {6, 9}, {7, 9}, {8, 9}}
2 : {{1, 7}, {1, 8}, {1, 10}, {2, 3}, {2, 6}, {2, 9}, {3, 4}, {3, 5}, {3, 8}, {3, 10}, {4, 5}, {4, 7}, {4, 8}, {5, 6}, {5, 8}, {6, 7}, {7, 9}, {8, 9}, {9, 10}}
3 : {{1, 7}, {1, 8}, {1, 10}, {2, 3}, {2, 4}, {2, 5}, {2, 9}, {3, 4}, {3, 5}, {3, 8}, {3, 10}, {4, 5}, {4, 7}, {5, 6}, {6, 7}, {6, 8}, {7, 9}, {8, 9}, {9, 10}}
4 : {{1, 7}, {1, 8}, {1, 10}, {2, 4}, {2, 6}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 10}, {4, 5}, {4, 7}, {5, 6}, {5, 7}, {6, 8}, {7, 9}, {8, 9}, {9, 10}}
5 : {{1, 6}, {1, 7}, {1, 8}, {2, 3}, {2, 4}, {2, 7}, {2, 8}, {3, 4}, {3, 6}, {3, 7}, {4, 5}, {4, 7}, {4, 9}, {5, 6}, {5, 8}, {6, 9}, {7, 9}, {8, 9}}
6 : {{1, 7}, {1, 8}, {1, 10}, {2, 3}, {2, 6}, {2, 9}, {3, 4}, {3, 5}, {3, 8}, {4, 5}, {4, 7}, {4, 8}, {5, 6}, {5, 8}, {5, 10}, {6, 7}, {7, 9}, {8, 9}, {9, 10}}
7 : {{1, 6}, {1, 7}, {1, 8}, {2, 3}, {2, 4}, {2, 7}, {2, 8}, {3, 4}, {3, 6}, {3, 7}, {4, 5}, {4, 7}, {5, 6}, {5, 8}, {5, 9}, {6, 9}, {7, 9}, {8, 9}}
8 : {{1, 7}, {1, 8}, {1, 10}, {2, 3}, {2, 4}, {2, 5}, {2, 9}, {3, 4}, {3, 5}, {3, 8}, {4, 5}, {4, 7}, {5, 6}, {6, 7}, {6, 8}, {6, 10}, {7, 9}, {8, 9}, {9, 10}}
9 : {{1, 2}, {1, 9}, {1, 10}, {2, 4}, {2, 11}, {3, 5}, {3, 8}, {3, 11}, {4, 6}, {4, 7}, {4, 10}, {5, 6}, {5, 7}, {5, 10}, {6, 7}, {6, 9}, {7, 8}, {8, 9},
{9, 11}, {10, 11}}
10 : {{1, 2}, {1, 9}, {1, 10}, {2, 4}, {2, 11}, {3, 6}, {3, 8}, {3, 11}, {4, 6}, {4, 7}, {4, 9}, {5, 6}, {5, 7}, {5, 9}, {5, 10}, {6, 7}, {7, 8}, {8, 10},
{9, 11}, {10, 11}}
11 : {{1, 2}, {1, 9}, {1, 10}, {2, 4}, {2, 11}, {3, 5}, {3, 8}, {3, 11}, {4, 5}, {4, 6}, {4, 10}, {5, 6}, {5, 7}, {6, 7}, {6, 9}, {7, 8}, {7, 10}, {8, 9},
{9, 11}, {10, 11}}
12 : {{1, 7}, {1, 8}, {1, 10}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 8}, {3, 10}, {4, 5}, {4, 7}, {4, 8}, {5, 6}, {5, 8}, {6, 7}, {6, 9}, {9, 10}}
13 : {{1, 7}, {1, 9}, {1, 10}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 9}, {3, 10}, {4, 5}, {4, 7}, {4, 8}, {5, 6}, {5, 8}, {6, 7}, {6, 9}, {8, 10}}
14 : {{1, 7}, {1, 9}, {1, 10}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 8}, {3, 9}, {4, 5}, {4, 7}, {4, 8}, {5, 6}, {5, 10}, {6, 7}, {6, 9}, {8, 10}}

E_3 Minor-Minimal Twists

1 : {{1, 4}, {1, 5}, {1, 6}, {1, 7}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {2, 7}, {2, 8}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 8}, {4, 6}}
2 : {{1, 4}, {1, 5}, {1, 7}, {1, 8}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {4, 6}, {6, 7}, {6, 8}, {6, 9}}
3 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {3, 4}, {3, 5}, {3, 8}, {3, 9}, {3, 10}, {4, 7}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {7, 10}}
4 : {{1, 5}, {1, 6}, {1, 8}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 9}, {4, 6}, {6, 7}}

E_3^a Minor-Minimal Twists

1 : {{1, 4}, {1, 5}, {1, 6}, {1, 7}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {2, 7}, {2, 8}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 8}, {4, 5}, {4, 6}}
2 : {{1, 4}, {1, 5}, {1, 7}, {1, 8}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {4, 5}, {4, 6}, {6, 7}, {6, 8}, {6, 9}}
3 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {3, 4}, {3, 5}, {3, 8}, {3, 9}, {3, 10}, {4, 5}, {4, 7}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {7, 10}}
4 : {{1, 5}, {1, 6}, {1, 8}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 9}, {4, 5}, {4, 6}, {6, 7}}

E_3^{aa} Minor-Minimal Twists

1 : {{1, 4}, {1, 5}, {1, 6}, {1, 7}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {2, 7}, {2, 8}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 8}, {4, 6}, {6, 7}, {7, 8}}
2 : {{1, 4}, {1, 5}, {1, 7}, {1, 8}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {4, 6}, {6, 7}, {6, 8}, {6, 9}, {7, 8}, {8, 9}}
3 : {{1, 4}, {1, 5}, {1, 6}, {1, 7}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {2, 7}, {2, 8}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 8}, {4, 7}, {6, 7}, {7, 8}}
4 : {{1, 4}, {1, 5}, {1, 7}, {1, 8}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 8}, {4, 6}, {6, 7}, {6, 8}, {6, 9}, {7, 8}, {8, 9}}
5 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {3, 4}, {3, 5}, {3, 8}, {3, 9}, {3, 10}, {4, 7}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {7, 10}, {8, 9},
{9, 10}}
6 : {{1, 4}, {1, 5}, {1, 6}, {1, 9}, {2, 4}, {2, 5}, {2, 6}, {3, 4}, {3, 5}, {3, 8}, {3, 9}, {3, 10}, {4, 7}, {6, 8}, {6, 10}, {7, 8}, {7, 9}, {7, 10}, {8, 9},
{9, 10}}

7 : {{1, 5}, {1, 6}, {1, 8}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 9}, {4, 6}, {6, 7}, {7, 8}, {8, 9}}
8 : {{1, 5}, {1, 6}, {1, 7}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 9}, {4, 6}, {6, 8}, {7, 8}, {8, 9}}

E_3^b Minor-Minimal Twists

1 : {{1, 4}, {1, 5}, {1, 6}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 9}, {4, 7}, {6, 7}, {6, 8}, {6, 9}}
2 : {{1, 4}, {1, 5}, {1, 7}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 9}, {4, 6}, {6, 7}, {6, 8}, {6, 9}}
3 : {{1, 4}, {1, 5}, {1, 7}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {3, 4}, {3, 5}, {3, 8}, {3, 9}, {3, 10}, {4, 6}, {6, 8}, {6, 9}, {6, 10}, {7, 9}, {7, 10}}
4 : {{1, 4}, {1, 5}, {1, 7}, {2, 5}, {2, 6}, {2, 9}, {2, 10}, {3, 4}, {3, 5}, {3, 8}, {3, 9}, {3, 10}, {4, 6}, {6, 8}, {7, 8}, {7, 9}, {7, 10}}

E_3^{ba} Minor-Minimal Twists

1 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {2, 7}, {2, 9}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 9}, {4, 6}, {6, 7}, {7, 8}, {8, 9}}
2 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 10}, {3, 4}, {3, 5}, {3, 7}, {4, 6}, {6, 7}, {6, 8}, {6, 10}, {7, 8}, {8, 9}, {9, 10}}
3 : {{1, 4}, {1, 5}, {1, 7}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 10}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 10}, {4, 6}, {6, 7}, {6, 9}, {7, 8}, {8, 9}, {9, 10}}
4 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {2, 7}, {2, 9}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 9}, {4, 7}, {6, 7}, {7, 8}, {8, 9}}
5 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 10}, {3, 4}, {3, 5}, {3, 8}, {4, 6}, {6, 7}, {6, 8}, {6, 10}, {7, 8}, {8, 9}, {9, 10}}
6 : {{1, 4}, {1, 5}, {1, 8}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 10}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 10}, {4, 6}, {6, 7}, {6, 9}, {7, 8}, {8, 9}, {9, 10}}
7 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {2, 7}, {2, 9}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 9}, {4, 8}, {6, 7}, {7, 8}, {8, 9}}
8 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 10}, {3, 4}, {3, 5}, {3, 9}, {4, 6}, {6, 7}, {6, 8}, {6, 10}, {7, 8}, {8, 9}, {9, 10}}
9 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {2, 7}, {2, 9}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 9}, {4, 9}, {6, 7}, {7, 8}, {8, 9}}
10 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 10}, {3, 4}, {3, 5}, {3, 10}, {4, 6}, {6, 7}, {6, 8}, {6, 10}, {7, 8}, {8, 9}, {9, 10}}
11 : {{1, 4}, {1, 5}, {1, 10}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 10}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 10}, {4, 6}, {6, 7}, {6, 9}, {7, 8}, {8, 9}, {9, 10}}
12 : {{1, 4}, {1, 5}, {1, 8}, {1, 10}, {2, 4}, {2, 5}, {2, 6}, {2, 11}, {3, 4}, {3, 5}, {3, 6}, {4, 7}, {6, 8}, {6, 9}, {7, 8}, {7, 9}, {7, 11}, {8, 9}, {9, 10}, {10, 11}}
13 : {{1, 4}, {1, 5}, {1, 7}, {2, 4}, {2, 5}, {2, 7}, {2, 11}, {3, 4}, {3, 5}, {3, 8}, {3, 9}, {3, 11}, {4, 6}, {6, 8}, {6, 10}, {7, 8}, {7, 9}, {8, 9}, {9, 10}, {10, 11}}
14 : {{1, 5}, {1, 6}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 10}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 10}, {4, 6}, {6, 7}, {7, 8}, {8, 9}, {9, 10}}
15 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {2, 5}, {2, 6}, {2, 8}, {2, 10}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 10}, {4, 6}, {6, 7}, {7, 8}, {8, 9}, {9, 10}}
16 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {2, 5}, {2, 6}, {2, 7}, {2, 10}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 10}, {4, 6}, {6, 8}, {7, 8}, {8, 9}, {9, 10}}
17 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {2, 5}, {2, 6}, {2, 7}, {2, 8}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 10}, {4, 6}, {6, 10}, {7, 8}, {8, 9}, {9, 10}}

E_3^{bb} Minor-Minimal Twists

1 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {3, 10}, {4, 6}, {6, 7}, {6, 9}, {8, 10}, {9, 10}}
2 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {2, 4}, {2, 5}, {2, 8}, {2, 9}, {2, 10}, {3, 4}, {3, 5}, {3, 7}, {4, 6}, {6, 8}, {6, 11}, {7, 8}, {7, 10}, {9, 11}, {10, 11}}
3 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {2, 4}, {2, 5}, {2, 7}, {3, 4}, {3, 5}, {3, 8}, {3, 11}, {4, 6}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 10}, {9, 11}, {10, 11}}
4 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {3, 10}, {4, 7}, {6, 7}, {6, 9}, {8, 10}, {9, 10}}
5 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {2, 4}, {2, 5}, {2, 8}, {2, 9}, {2, 10}, {3, 4}, {3, 5}, {3, 8}, {4, 6}, {6, 8}, {6, 11}, {7, 8}, {7, 10}, {9, 11}, {10, 11}}
6 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {2, 4}, {2, 5}, {2, 8}, {3, 4}, {3, 5}, {3, 8}, {3, 11}, {4, 6}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 10}, {9, 11}, {10, 11}}
7 : {{1, 4}, {1, 5}, {1, 8}, {2, 4}, {2, 5}, {2, 8}, {2, 9}, {2, 10}, {3, 4}, {3, 5}, {3, 8}, {3, 11}, {4, 6}, {6, 7}, {6, 9}, {7, 8}, {7, 10}, {9, 11}, {10, 11}}
8 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {2, 4}, {2, 5}, {2, 7}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {3, 10}, {4, 9}, {6, 7}, {6, 9}, {8, 10}, {9, 10}}
9 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {2, 4}, {2, 5}, {2, 8}, {2, 9}, {2, 10}, {3, 4}, {3, 5}, {3, 10}, {4, 6}, {6, 8}, {6, 11}, {7, 8}, {7, 10}, {9, 11}, {10, 11}}
10 : {{1, 5}, {1, 6}, {1, 9}, {2, 4}, {2, 5}, {2, 8}, {2, 9}, {2, 10}, {3, 4}, {3, 5}, {3, 8}, {3, 11}, {4, 6}, {6, 7}, {7, 8}, {7, 10}, {9, 11}, {10, 11}}
11 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {2, 5}, {2, 6}, {2, 9}, {2, 10}, {3, 4}, {3, 5}, {3, 8}, {3, 11}, {4, 6}, {6, 8}, {7, 8}, {7, 10}, {9, 11}, {10, 11}}
12 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {2, 5}, {2, 6}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 8}, {3, 11}, {4, 6}, {6, 10}, {7, 8}, {7, 10}, {9, 11}, {10, 11}}

E_5 Minor-Minimal Twists

1 : {{1, 4}, {1, 5}, {1, 6}, {1, 7}, {1, 9}, {2, 4}, {2, 5}, {2, 6}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 9}, {4, 7}, {6, 8}, {7, 8}, {8, 9}}
2 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {1, 10}, {2, 4}, {2, 5}, {2, 6}, {3, 4}, {3, 5}, {3, 8}, {4, 7}, {6, 7}, {6, 9}, {7, 8}, {7, 10}, {8, 9}, {9, 10}}
3 : {{1, 4}, {1, 5}, {1, 6}, {1, 7}, {1, 9}, {2, 4}, {2, 5}, {2, 6}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 9}, {4, 8}, {6, 8}, {7, 8}, {8, 9}}
4 : {{1, 4}, {1, 5}, {1, 6}, {1, 7}, {1, 9}, {2, 4}, {2, 5}, {2, 8}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 9}, {4, 6}, {6, 8}, {7, 8}, {8, 9}}
5 : {{1, 4}, {1, 5}, {1, 7}, {1, 9}, {1, 10}, {2, 4}, {2, 5}, {2, 10}, {3, 4}, {3, 5}, {3, 6}, {3, 7}, {3, 9}, {4, 6}, {6, 8}, {6, 10}, {7, 8}, {8, 9}}

6 : {{1, 4}, {1, 5}, {1, 6}, {1, 7}, {2, 4}, {2, 5}, {2, 6}, {3, 4}, {3, 5}, {3, 7}, {4, 8}, {6, 9}, {6, 11}, {7, 8}, {7, 10}, {8, 9}, {8, 11}, {9, 10}, {10, 11}}
7 : {{1, 4}, {1, 5}, {1, 6}, {1, 7}, {2, 4}, {2, 5}, {2, 6}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 10}, {4, 7}, {6, 8}, {6, 10}, {7, 9}, {8, 9}, {9, 10}}
8 : {{1, 4}, {1, 5}, {1, 6}, {1, 8}, {2, 4}, {2, 5}, {2, 6}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 10}, {4, 7}, {6, 7}, {6, 10}, {7, 9}, {8, 9}, {9, 10}}
9 : {{1, 5}, {1, 6}, {1, 8}, {1, 10}, {2, 4}, {2, 5}, {2, 7}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 10}, {4, 6}, {6, 7}, {7, 9}, {8, 9}, {9, 10}}
10 : {{1, 5}, {1, 6}, {1, 7}, {1, 10}, {2, 4}, {2, 5}, {2, 7}, {3, 4}, {3, 5}, {3, 7}, {3, 8}, {3, 10}, {4, 6}, {6, 8}, {7, 9}, {8, 9}, {9, 10}}

E_5^a Minor-Minimal Twists

1 : {{1, 6}, {1, 7}, {1, 8}, {2, 5}, {2, 6}, {2, 7}, {2, 8}, {2, 9}, {3, 5}, {3, 6}, {3, 8}, {4, 5}, {4, 6}, {4, 7}, {4, 8}, {6, 9}, {7, 9}, {8, 9}}
2 : {{1, 7}, {1, 8}, {1, 10}, {2, 3}, {2, 4}, {2, 5}, {2, 9}, {3, 6}, {3, 7}, {3, 8}, {3, 10}, {4, 6}, {4, 7}, {5, 6}, {5, 7}, {5, 8}, {7, 9}, {8, 9}, {9, 10}}
3 : {{1, 7}, {1, 8}, {1, 10}, {2, 3}, {2, 5}, {2, 9}, {3, 6}, {3, 7}, {3, 8}, {3, 10}, {4, 6}, {4, 7}, {4, 8}, {5, 6}, {5, 7}, {5, 8}, {7, 9}, {8, 9}, {9, 10}}
4 : {{1, 6}, {1, 7}, {1, 8}, {2, 5}, {2, 6}, {2, 7}, {2, 8}, {3, 5}, {3, 6}, {3, 8}, {3, 9}, {4, 5}, {4, 6}, {4, 7}, {4, 8}, {6, 9}, {7, 9}, {8, 9}}
5 : {{1, 7}, {1, 8}, {1, 10}, {2, 3}, {2, 4}, {2, 5}, {2, 9}, {3, 6}, {3, 7}, {3, 8}, {4, 6}, {4, 7}, {4, 10}, {5, 6}, {5, 7}, {5, 8}, {7, 9}, {8, 9}, {9, 10}}
6 : {{1, 7}, {1, 8}, {1, 10}, {2, 3}, {2, 5}, {2, 9}, {3, 6}, {3, 7}, {3, 8}, {4, 6}, {4, 7}, {4, 8}, {4, 10}, {5, 6}, {5, 7}, {5, 8}, {7, 9}, {8, 9}, {9, 10}}
7 : {{1, 6}, {1, 7}, {1, 8}, {2, 5}, {2, 6}, {2, 7}, {2, 8}, {3, 5}, {3, 6}, {3, 8}, {4, 5}, {4, 6}, {4, 7}, {4, 8}, {5, 9}, {6, 9}, {7, 9}, {8, 9}}
8 : {{1, 2}, {1, 9}, {1, 10}, {2, 4}, {2, 11}, {3, 5}, {3, 7}, {3, 11}, {4, 6}, {4, 7}, {4, 10}, {5, 8}, {5, 9}, {5, 10}, {6, 8}, {6, 9}, {7, 8}, {7, 9}, {9, 11}, {10, 11}}
9 : {{1, 2}, {1, 9}, {1, 10}, {2, 4}, {2, 11}, {3, 5}, {3, 6}, {3, 7}, {3, 11}, {4, 6}, {4, 7}, {4, 10}, {5, 8}, {5, 9}, {5, 10}, {6, 8}, {7, 8}, {7, 9}, {9, 11}, {10, 11}}
10 : {{1, 2}, {1, 9}, {1, 10}, {2, 4}, {2, 11}, {3, 5}, {3, 7}, {3, 11}, {4, 5}, {4, 7}, {4, 10}, {5, 8}, {5, 9}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {9, 11}, {10, 11}}
11 : {{1, 2}, {1, 9}, {1, 10}, {2, 4}, {2, 11}, {3, 5}, {3, 6}, {3, 7}, {3, 11}, {4, 5}, {4, 7}, {4, 10}, {5, 8}, {5, 9}, {6, 8}, {6, 10}, {7, 8}, {7, 9}, {9, 11}, {10, 11}}
12 : {{1, 7}, {1, 8}, {1, 10}, {2, 7}, {2, 8}, {2, 9}, {3, 6}, {3, 7}, {3, 8}, {3, 10}, {4, 6}, {4, 7}, {4, 9}, {5, 6}, {5, 7}, {5, 8}, {5, 9}, {9, 10}}
13 : {{1, 7}, {1, 8}, {1, 10}, {2, 7}, {2, 8}, {2, 9}, {3, 6}, {3, 7}, {3, 8}, {3, 9}, {4, 6}, {4, 7}, {4, 10}, {5, 6}, {5, 7}, {5, 8}, {5, 9}, {9, 10}}
14 : {{1, 7}, {1, 9}, {1, 10}, {2, 7}, {2, 8}, {2, 9}, {3, 6}, {3, 7}, {3, 9}, {3, 10}, {4, 6}, {4, 7}, {4, 9}, {5, 6}, {5, 7}, {5, 8}, {5, 9}, {8, 10}}

E_{11} Minor-Minimal Twists

1 : {{1, 7}, {1, 8}, {1, 9}, {2, 4}, {2, 6}, {2, 8}, {2, 10}, {3, 6}, {3, 8}, {3, 9}, {4, 7}, {4, 9}, {5, 6}, {5, 7}, {5, 8}, {7, 10}, {8, 10}, {9, 10}}
2 : {{1, 8}, {1, 9}, {1, 11}, {2, 4}, {2, 5}, {2, 10}, {3, 5}, {3, 7}, {3, 9}, {3, 11}, {4, 7}, {4, 9}, {5, 8}, {6, 7}, {6, 8}, {6, 9}, {8, 10}, {9, 10}, {10, 11}}
3 : {{1, 8}, {1, 9}, {1, 11}, {2, 3}, {2, 4}, {2, 6}, {2, 10}, {3, 5}, {3, 7}, {3, 11}, {4, 7}, {4, 9}, {5, 8}, {5, 9}, {6, 7}, {6, 8}, {8, 10}, {9, 10}, {10, 11}}
4 : {{1, 7}, {1, 8}, {1, 9}, {2, 4}, {2, 6}, {2, 8}, {3, 6}, {3, 8}, {3, 9}, {3, 10}, {4, 7}, {4, 9}, {5, 6}, {5, 7}, {5, 8}, {7, 10}, {8, 10}, {9, 10}}
5 : {{1, 8}, {1, 9}, {1, 11}, {2, 4}, {2, 5}, {2, 10}, {3, 5}, {3, 7}, {3, 9}, {4, 7}, {4, 9}, {4, 11}, {5, 8}, {6, 7}, {6, 8}, {6, 9}, {8, 10}, {9, 10}, {10, 11}}
6 : {{1, 8}, {1, 9}, {1, 11}, {2, 3}, {2, 4}, {2, 6}, {2, 10}, {3, 5}, {3, 7}, {4, 7}, {4, 9}, {4, 11}, {5, 8}, {5, 9}, {6, 7}, {6, 8}, {8, 10}, {9, 10}, {10, 11}}
7 : {{1, 8}, {1, 9}, {1, 11}, {2, 5}, {2, 6}, {2, 10}, {3, 5}, {3, 7}, {3, 8}, {4, 7}, {4, 8}, {4, 9}, {4, 11}, {5, 9}, {6, 7}, {6, 8}, {8, 10}, {9, 10}, {10, 11}}
8 : {{1, 7}, {1, 8}, {1, 9}, {2, 4}, {2, 6}, {2, 8}, {3, 6}, {3, 8}, {3, 9}, {4, 7}, {4, 9}, {4, 10}, {5, 6}, {5, 7}, {5, 8}, {7, 10}, {8, 10}, {9, 10}}
9 : {{1, 8}, {1, 9}, {1, 11}, {2, 4}, {2, 5}, {2, 10}, {3, 5}, {3, 7}, {3, 9}, {4, 7}, {4, 9}, {5, 8}, {5, 11}, {6, 7}, {6, 8}, {6, 9}, {8, 10}, {9, 10}, {10, 11}}
10 : {{1, 8}, {1, 9}, {1, 11}, {2, 3}, {2, 4}, {2, 6}, {2, 10}, {3, 5}, {3, 7}, {4, 7}, {4, 9}, {5, 8}, {5, 9}, {5, 11}, {6, 7}, {6, 8}, {8, 10}, {9, 10}, {10, 11}}
11 : {{1, 7}, {1, 8}, {1, 9}, {2, 4}, {2, 6}, {2, 8}, {3, 6}, {3, 8}, {3, 9}, {4, 7}, {4, 9}, {5, 6}, {5, 7}, {5, 8}, {6, 10}, {7, 10}, {8, 10}, {9, 10}}
12 : {{1, 8}, {1, 9}, {1, 11}, {2, 4}, {2, 5}, {2, 10}, {3, 5}, {3, 7}, {3, 9}, {4, 7}, {4, 9}, {5, 8}, {6, 7}, {6, 8}, {6, 9}, {7, 11}, {8, 10}, {9, 10}, {10, 11}}
13 : {{1, 2}, {1, 10}, {1, 11}, {2, 4}, {2, 12}, {3, 6}, {3, 7}, {3, 12}, {4, 6}, {4, 8}, {4, 11}, {5, 7}, {5, 9}, {5, 11}, {6, 9}, {7, 10}, {8, 9}, {8, 10}, {10, 12}, {11, 12}}
14 : {{1, 8}, {1, 9}, {1, 11}, {2, 8}, {2, 9}, {2, 10}, {3, 5}, {3, 7}, {3, 9}, {4, 7}, {4, 9}, {4, 11}, {5, 8}, {5, 10}, {6, 7}, {6, 8}, {6, 9}, {10, 11}}
15 : {{1, 8}, {1, 10}, {1, 11}, {2, 8}, {2, 9}, {2, 10}, {3, 5}, {3, 7}, {3, 11}, {4, 7}, {4, 9}, {4, 10}, {5, 8}, {5, 10}, {6, 7}, {6, 8}, {6, 9}, {9, 11}}
16 : {{1, 8}, {1, 10}, {1, 11}, {2, 8}, {2, 9}, {2, 10}, {3, 5}, {3, 7}, {3, 9}, {4, 7}, {4, 10}, {4, 11}, {5, 8}, {5, 10}, {6, 7}, {6, 8}, {6, 9}, {9, 11}}}

E_{19} Minor-Minimal Twists

1 : {{1, 4}, {1, 5}, {1, 6}, {2, 4}, {2, 5}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {4, 8}, {6, 7}, {6, 8}, {6, 9}, {7, 8}, {7, 9}, {8, 9}}
2 : {{1, 4}, {1, 5}, {1, 6}, {2, 4}, {2, 5}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 8}, {4, 7}, {6, 7}, {6, 8}, {6, 9}, {7, 8}, {7, 9}, {8, 9}}
3 : {{1, 4}, {1, 5}, {1, 6}, {2, 4}, {2, 5}, {2, 8}, {3, 4}, {3, 5}, {3, 9}, {4, 7}, {6, 8}, {6, 9}, {6, 10}, {7, 9}, {7, 10}, {8, 9}, {8, 10}, {9, 10}}
4 : {{1, 4}, {1, 5}, {1, 6}, {2, 4}, {2, 5}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 7}, {4, 10}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {7, 10}, {8, 9}}
5 : {{1, 4}, {1, 5}, {1, 6}, {2, 4}, {2, 5}, {2, 8}, {2, 9}, {3, 4}, {3, 5}, {3, 10}, {4, 7}, {6, 8}, {6, 9}, {6, 10}, {7, 8}, {7, 9}, {7, 10}, {8, 9}}
6 : {{1, 4}, {1, 5}, {1, 6}, {2, 4}, {2, 5}, {2, 8}, {3, 4}, {3, 5}, {3, 11}, {4, 7}, {6, 9}, {6, 10}, {6, 11}, {7, 9}, {7, 10}, {8, 9}, {8, 10}, {8, 11}, {9, 10}}
7 : {{1, 4}, {1, 5}, {1, 7}, {2, 5}, {2, 6}, {2, 10}, {3, 4}, {3, 5}, {3, 8}, {4, 6}, {6, 9}, {7, 8}, {7, 9}, {7, 10}, {8, 9}, {8, 10}, {9, 10}}

E_{27} Minor-Minimal Twists

1 : {{1,7},{1,8},{1,9},{2,3},{2,5},{2,8},{2,10},{3,6},{3,9},{4,6},{4,7},{4,9},{5,6},{5,7},{6,8},{7,10},{8,10},{9,10}}
2 : {{1,8},{1,9},{1,11},{2,4},{2,5},{2,10},{3,4},{3,6},{3,9},{3,11},{4,7},{5,7},{5,8},{6,7},{6,8},{7,9},{8,10},{9,10},{10,11}}
3 : {{1,8},{1,9},{1,11},{2,3},{2,7},{2,10},{3,4},{3,6},{3,11},{4,7},{4,9},{5,7},{5,8},{5,9},{6,7},{6,8},{8,10},{9,10},{10,11}}
4 : {{1,7},{1,8},{1,9},{2,3},{2,5},{2,8},{3,6},{3,9},{3,10},{4,6},{4,7},{4,9},{5,6},{5,7},{6,8},{7,10},{8,10},{9,10}}
5 : {{1,8},{1,9},{1,11},{2,4},{2,5},{2,10},{3,4},{3,6},{3,9},{4,7},{4,11},{5,7},{5,8},{6,7},{6,8},{7,9},{8,10},{9,10},{10,11}}
6 : {{1,8},{1,9},{1,11},{2,3},{2,7},{2,10},{3,4},{3,6},{4,7},{4,9},{4,11},{5,7},{5,8},{5,9},{6,7},{6,8},{8,10},{9,10},{10,11}}
7 : {{1,8},{1,9},{1,11},{2,5},{2,6},{2,10},{3,4},{3,6},{3,8},{4,7},{4,9},{4,11},{5,7},{5,9},{6,7},{7,8},{8,10},{9,10},{10,11}}
8 : {{1,7},{1,8},{1,9},{2,3},{2,5},{2,8},{3,6},{3,9},{4,6},{4,7},{4,9},{4,10},{5,6},{5,7},{6,8},{7,10},{8,10},{9,10}}
9 : {{1,8},{1,9},{1,11},{2,4},{2,5},{2,10},{3,4},{3,6},{3,9},{4,7},{5,7},{5,8},{5,11},{6,7},{6,8},{7,9},{8,10},{9,10},{10,11}}
10 : {{1,8},{1,9},{1,11},{2,3},{2,7},{2,10},{3,4},{3,6},{4,7},{4,9},{5,7},{5,8},{5,9},{5,11},{6,7},{6,8},{8,10},{9,10},{10,11}}
11 : {{1,7},{1,8},{1,9},{2,3},{2,5},{2,8},{3,6},{3,9},{4,6},{4,7},{4,9},{5,6},{5,7},{6,8},{6,10},{7,10},{8,10},{9,10}}
12 : {{1,8},{1,9},{1,11},{2,4},{2,5},{2,10},{3,4},{3,6},{3,9},{4,7},{5,7},{5,8},{6,7},{6,8},{7,9},{7,11},{8,10},{9,10},{10,11}}
13 : {{1,8},{1,9},{1,11},{2,3},{2,7},{2,10},{3,4},{3,6},{4,7},{4,9},{5,7},{5,8},{5,9},{6,7},{6,8},{7,11},{8,10},{9,10},{10,11}}
14 : {{1,8},{1,9},{1,11},{2,8},{2,9},{2,10},{3,4},{3,6},{3,9},{4,7},{4,11},{5,7},{5,8},{5,10},{6,7},{6,8},{7,9},{10,11}}
15 : {{1,8},{1,10},{1,11},{2,8},{2,9},{2,10},{3,4},{3,6},{3,11},{4,7},{4,10},{5,7},{5,8},{5,10},{6,7},{6,8},{7,9},{9,11}}

F_1 Minor-Minimal Twists

1 : {{1,4},{1,5},{1,7},{1,8},{2,4},{2,5},{2,6},{3,4},{3,5},{3,6},{3,9},{4,7},{6,7},{6,8},{7,9},{8,9}}
2 : {{1,4},{1,5},{1,8},{1,9},{2,4},{2,5},{2,6},{3,4},{3,5},{3,8},{4,7},{6,7},{6,8},{6,9},{7,10},{8,10},{9,10}}
3 : {{1,4},{1,5},{1,7},{1,8},{2,4},{2,5},{2,6},{3,4},{3,5},{3,6},{3,9},{4,7},{6,7},{6,8},{7,9},{8,9}}
4 : {{1,4},{1,5},{1,8},{1,9},{2,4},{2,5},{2,6},{3,4},{3,5},{3,10},{4,7},{6,7},{6,8},{6,9},{7,10},{8,10},{9,10}}
5 : {{1,4},{1,5},{1,7},{2,4},{2,5},{2,10},{3,4},{3,5},{3,7},{3,10},{4,6},{6,8},{6,9},{7,8},{7,9},{8,10},{9,10}}
6 : {{1,4},{1,5},{1,7},{2,4},{2,5},{2,11},{3,4},{3,5},{3,10},{3,11},{4,6},{6,8},{6,9},{7,8},{7,9},{7,11},{8,10},{9,10}}
7 : {{1,5},{1,6},{1,9},{2,4},{2,5},{2,7},{3,4},{3,5},{3,7},{3,10},{4,6},{6,8},{7,8},{7,9},{8,10},{9,10}}
8 : {{1,4},{1,5},{1,8},{1,9},{2,4},{2,5},{2,7},{3,5},{3,6},{3,10},{4,6},{6,7},{7,8},{7,9},{8,10},{9,10}}

F_1^a Minor-Minimal Twists

1 : {{1,4},{1,5},{1,9},{1,10},{2,4},{2,7},{2,9},{2,10},{3,4},{3,5},{3,7},{3,8},{4,6},{4,9},{5,6},{6,7},{8,9},{8,10}}
2 : {{1,4},{1,5},{1,9},{1,10},{2,4},{2,7},{2,9},{2,10},{3,4},{3,5},{3,7},{3,9},{4,6},{4,8},{5,6},{6,7},{8,9},{8,10}}
3 : {{1,4},{1,5},{1,10},{1,11},{2,4},{2,7},{2,10},{3,4},{3,5},{3,7},{3,8},{4,6},{4,9},{5,6},{6,7},{8,10},{8,11},{9,10},{9,11}}
4 : {{1,4},{1,5},{1,9},{1,10},{2,4},{2,7},{2,9},{2,10},{3,4},{3,5},{3,7},{3,8},{4,6},{5,6},{5,9},{6,7},{8,9},{8,10}}
5 : {{1,4},{1,5},{1,9},{1,10},{2,4},{2,7},{2,9},{2,10},{3,4},{3,5},{3,7},{3,9},{4,6},{5,6},{5,8},{6,7},{8,9},{8,10}}
6 : {{1,4},{1,5},{1,10},{2,4},{2,7},{2,10},{2,11},{3,4},{3,5},{3,7},{3,8},{4,6},{5,6},{5,9},{6,7},{8,10},{8,11},{9,10},{9,11}}
7 : {{1,4},{1,5},{1,9},{1,10},{2,4},{2,7},{2,9},{2,10},{3,4},{3,5},{3,7},{3,8},{4,6},{5,6},{6,7},{6,9},{8,9},{8,10}}
8 : {{1,5},{1,8},{1,11},{2,4},{2,7},{2,10},{2,11},{3,4},{3,5},{3,7},{3,9},{4,6},{4,8},{5,6},{6,7},{8,10},{9,10},{9,11}}

F_1^b Minor-Minimal Twists

1 : {{1,6},{1,7},{1,8},{1,9},{2,4},{2,5},{2,8},{2,9},{3,5},{3,6},{3,8},{3,9},{4,6},{4,7},{4,8},{5,6},{5,7}}
2 : {{1,6},{1,7},{1,9},{1,10},{2,4},{2,5},{2,9},{3,5},{3,6},{3,9},{3,10},{4,6},{4,7},{4,8},{5,6},{5,7},{8,9},{8,10}}
3 : {{1,6},{1,7},{1,9},{2,4},{2,5},{2,9},{2,10},{3,5},{3,6},{3,9},{3,10},{4,6},{4,7},{4,8},{5,6},{5,7},{8,9},{8,10}}
4 : {{1,6},{1,7},{1,8},{1,9},{2,4},{2,5},{2,8},{3,5},{3,6},{3,8},{3,9},{4,6},{4,7},{5,6},{5,7},{5,8}}
5 : {{1,6},{1,7},{1,9},{1,10},{2,4},{2,5},{2,9},{2,10},{3,5},{3,6},{3,9},{4,6},{4,7},{5,6},{5,7},{5,8},{8,9},{8,10}}
6 : {{1,6},{1,7},{1,9},{1,10},{2,4},{2,5},{2,9},{3,5},{3,6},{3,9},{3,10},{4,6},{4,7},{5,6},{5,7},{5,8},{8,9},{8,10}}
7 : {{1,6},{1,7},{1,9},{2,4},{2,5},{2,9},{2,10},{3,5},{3,6},{3,9},{3,10},{4,6},{4,7},{5,6},{5,7},{5,8},{8,9},{8,10}}
8 : {{1,7},{1,8},{1,10},{2,4},{2,5},{2,9},{2,10},{3,5},{3,6},{3,9},{3,10},{4,6},{4,7},{5,6},{5,7},{6,8},{8,9}}
9 : {{1,6},{1,7},{1,9},{1,10},{2,4},{2,5},{2,9},{2,10},{3,6},{3,8},{3,10},{4,6},{4,7},{5,6},{5,7},{5,8},{8,9}}

F_1^c Minor-Minimal Twists

1 : {{1, 6}, {1, 7}, {1, 9}, {1, 10}, {2, 4}, {2, 5}, {2, 9}, {2, 10}, {3, 5}, {3, 7}, {3, 8}, {4, 6}, {4, 7}, {4, 9}, {5, 6}, {8, 9}, {8, 10}}
2 : {{1, 6}, {1, 7}, {1, 9}, {1, 10}, {2, 4}, {2, 5}, {2, 9}, {2, 10}, {3, 5}, {3, 7}, {3, 9}, {4, 6}, {4, 7}, {4, 8}, {5, 6}, {8, 9}, {8, 10}}
3 : {{1, 6}, {1, 7}, {1, 10}, {1, 11}, {2, 4}, {2, 5}, {2, 10}, {3, 5}, {3, 7}, {3, 8}, {4, 6}, {4, 7}, {4, 9}, {5, 6}, {8, 10}, {8, 11}, {9, 10}, {9, 11}}
4 : {{1, 6}, {1, 7}, {1, 9}, {1, 10}, {2, 4}, {2, 5}, {2, 9}, {2, 10}, {3, 5}, {3, 7}, {3, 8}, {4, 6}, {4, 7}, {5, 6}, {5, 9}, {8, 9}, {8, 10}}
5 : {{1, 6}, {1, 7}, {1, 9}, {1, 10}, {2, 4}, {2, 5}, {2, 9}, {2, 10}, {3, 5}, {3, 7}, {3, 9}, {4, 6}, {4, 7}, {5, 6}, {5, 8}, {8, 9}, {8, 10}}
6 : {{1, 6}, {1, 7}, {1, 10}, {1, 11}, {2, 4}, {2, 5}, {2, 10}, {3, 5}, {3, 7}, {3, 8}, {4, 6}, {4, 7}, {5, 6}, {5, 9}, {8, 10}, {8, 11}, {9, 10}, {9, 11}}
7 : {{1, 6}, {1, 7}, {1, 10}, {2, 4}, {2, 5}, {2, 10}, {2, 11}, {3, 5}, {3, 7}, {3, 8}, {4, 6}, {4, 7}, {5, 6}, {5, 9}, {8, 10}, {8, 11}, {9, 10}, {9, 11}}
8 : {{1, 7}, {1, 8}, {1, 11}, {2, 4}, {2, 5}, {2, 10}, {2, 11}, {3, 5}, {3, 7}, {3, 9}, {4, 6}, {4, 7}, {5, 6}, {6, 8}, {8, 10}, {9, 10}, {9, 11}}

F_1^d Minor-Minimal Twists

1 : {{1, 3}, {1, 4}, {1, 6}, {1, 8}, {2, 4}, {2, 7}, {2, 10}, {2, 11}, {3, 5}, {3, 7}, {3, 9}, {4, 5}, {4, 10}, {5, 6}, {6, 7}, {8, 10}, {8, 11}, {9, 10}, {9, 11}}
2 : {{1, 3}, {1, 4}, {1, 6}, {1, 8}, {2, 4}, {2, 7}, {2, 10}, {2, 11}, {3, 5}, {3, 7}, {3, 10}, {4, 5}, {4, 9}, {5, 6}, {6, 7}, {8, 10}, {8, 11}, {9, 10}, {9, 11}}
3 : {{1, 3}, {1, 4}, {1, 6}, {1, 8}, {2, 4}, {2, 7}, {2, 11}, {3, 5}, {3, 7}, {3, 9}, {4, 5}, {4, 10}, {5, 6}, {6, 7}, {8, 11}, {8, 12}, {9, 11}, {9, 12}, {10, 11}, {10, 12}}
4 : {{1, 3}, {1, 4}, {1, 6}, {1, 10}, {2, 4}, {2, 7}, {2, 10}, {2, 11}, {3, 5}, {3, 7}, {3, 8}, {4, 5}, {4, 9}, {5, 6}, {6, 7}, {8, 10}, {8, 11}, {9, 10}, {9, 11}}
5 : {{1, 3}, {1, 4}, {1, 6}, {1, 8}, {2, 4}, {2, 7}, {2, 10}, {2, 11}, {3, 5}, {3, 7}, {3, 9}, {4, 5}, {5, 6}, {5, 10}, {6, 7}, {8, 10}, {8, 11}, {9, 10}, {9, 11}}
6 : {{1, 3}, {1, 4}, {1, 6}, {1, 8}, {2, 4}, {2, 7}, {2, 10}, {2, 11}, {3, 5}, {3, 7}, {3, 10}, {4, 5}, {5, 6}, {5, 9}, {6, 7}, {8, 10}, {8, 11}, {9, 10}, {9, 11}}
7 : {{1, 3}, {1, 4}, {1, 6}, {1, 8}, {2, 4}, {2, 7}, {2, 11}, {3, 5}, {3, 7}, {3, 9}, {4, 5}, {5, 6}, {5, 10}, {6, 7}, {8, 11}, {8, 12}, {9, 11}, {9, 12}, {10, 11}, {10, 12}}
8 : {{1, 3}, {1, 4}, {1, 6}, {1, 9}, {2, 7}, {2, 8}, {2, 12}, {3, 5}, {3, 7}, {3, 10}, {4, 5}, {4, 8}, {5, 6}, {6, 7}, {8, 11}, {9, 11}, {9, 12}, {10, 11}, {10, 12}}
9 : {{1, 4}, {1, 6}, {1, 8}, {1, 9}, {2, 4}, {2, 7}, {2, 11}, {2, 12}, {3, 5}, {3, 7}, {3, 8}, {3, 10}, {4, 5}, {5, 6}, {6, 7}, {8, 11}, {9, 11}, {9, 12}, {10, 11}, {10, 12}}
10 : {{1, 4}, {1, 6}, {1, 8}, {1, 9}, {2, 4}, {2, 7}, {2, 11}, {2, 12}, {3, 5}, {3, 7}, {3, 8}, {3, 11}, {4, 5}, {5, 6}, {6, 7}, {8, 10}, {9, 11}, {9, 12}, {10, 11}, {10, 12}}
11 : {{1, 4}, {1, 6}, {1, 8}, {1, 9}, {2, 4}, {2, 7}, {2, 12}, {3, 5}, {3, 7}, {3, 8}, {3, 10}, {4, 5}, {5, 6}, {6, 7}, {8, 11}, {9, 12}, {9, 13}, {10, 12}, {10, 13}, {11, 12}, {11, 13}}