1 BLT set 6 over GF(47)

Points on the quadric $x_0^2 + x_1x_2 + x_3x_4$:

$P_1 = (0, 1, 0, 0, 0)$

$P_2 = (0, 0, 1, 0, 0)$

$P_3 = (0, 1, 28, 46, 28)$

$P_4 = (0, 1, 7, 23, 14)$

$P_5 = (0, 1, 42, 35, 27)$

$P_6 = (1, 2, 24, 4, 23)$

$P_7 = (1, 4, 28, 40, 43)$

$P_8 = (0, 1, 36, 11, 1)$

$P_9 = (1, 12, 14, 10, 16)$

$P_{10} = (1, 7, 16, 11, 41)$

$P_{11} = (1, 40, 23, 39, 27)$

$P_{12} = (1, 25, 42, 32, 45)$

$P_{13} = (1, 22, 5, 10, 3)$

$P_{14} = (1, 31, 13, 25, 44)$

$P_{15} = (1, 42, 12, 16, 36)$

$P_{16} = (1, 20, 10, 11, 33)$

$P_{17} = (1, 16, 14, 9, 22)$

$P_{18} = (1, 20, 13, 29, 38)$

$P_{19} = (1, 30, 41, 28, 45)$

$P_{20} = (1, 35, 44, 22, 9)$

$P_{21} = (1, 5, 45, 11, 35)$

$P_{22} = (1, 14, 32, 26, 46)$

$P_{23} = (1, 27, 16, 2, 42)$

$P_{24} = (1, 20, 43, 6, 21)$

$P_{25} = (1, 2, 6, 29, 19)$

$P_{26} = (1, 13, 39, 39, 40)$

$P_{27} = (1, 17, 25, 11, 4)$

$P_{28} = (1, 22, 26, 29, 24)$

$P_{29} = (1, 19, 40, 16, 20)$

$P_{30} = (1, 25, 27, 4, 19)$

$P_{31} = (1, 27, 2, 26, 25)$

$P_{32} = (1, 45, 38, 31, 10)$

$P_{33} = (1, 33, 22, 40, 30)$

$P_{34} = (1, 40, 38, 18, 33)$

$P_{35} = (1, 10, 45, 40, 4)$

$P_{36} = (1, 18, 34, 6, 31)$

$P_{37} = (1, 37, 16, 3, 6)$

$P_{38} = (1, 28, 34, 35, 5)$

$P_{39} = (1, 11, 44, 11, 20)$

$P_{40} = (1, 32, 8, 26, 10)$

$P_{41} = (1, 36, 18, 22, 41)$

$P_{42} = (1, 27, 1, 31, 37)$

$P_{43} = (1, 29, 30, 24, 44)$

$P_{44} = (1, 43, 5, 44, 25)$

$P_{45} = (1, 7, 1, 32, 35)$

$P_{46} = (1, 15, 23, 11, 7)$

$P_{47} = (1, 45, 19, 6, 14)$

$P_{48} = (1, 34, 2, 5, 5)$

Stabilizer of order 8 is generated by:

$$g_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 46 & 19 & 1 & 19 \\ 0 & 0 & 46 & 0 & 0 \\ 0 & 0 & 19 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \end{pmatrix}$$

$$g_2 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 41 & 20 & 31 & 25 & 17 \\ 14 & 23 & 19 & 13 & 20 \\ 35 & 13 & 8 & 31 & 39 \\ 39 & 11 & 37 & 2 & 23 \end{pmatrix}$$

The induced group has order 8 and is generated by:

g_1 =(1, 3)(5, 8)(6, 47)(7, 44)(9, 20)(10, 34)(11, 45)(12, 13)(14, 17)(15, 21)(16, 42)(18, 23)(19, 27)(22, 33)(24, 31)(25, 32)(26, 48)(28, 30)(29, 38)(35, 37)(36, 43)(39, 41)(40, 46)

g_2 =(1, 38, 20, 47)(2, 21, 4, 15)(3, 6, 9, 29)(5, 42, 37, 34)(7, 19, 31, 14)(8, 10, 35, 16)(11, 30, 32, 13)(12, 25, 28, 45)(17, 24, 27, 44)(18, 48, 39, 46)(22, 36, 43, 33)(23, 40, 41, 26)

group order is small, so we list all elements a_1 =id

a_2 =(1, 3)(5, 8)(6, 47)(7, 44)(9, 20)(10, 34)(11, 45)(12, 13)(14, 17)(15, 21)(16, 42)(18, 23)(19, 27)(22, 33)(24, 31)(25, 32)(26, 48)(28, 30)(29, 38)(35, 37)(36, 43)(39, 41)(40, 46)

a_3 =(1, 38, 20, 47)(2, 21, 4, 15)(3, 6, 9, 29)(5, 42, 37, 34)(7, 19, 31, 14)(8, 10, 35, 16)(11, 30, 32, 13)(12, 25, 28, 45)(17, 24, 27, 44)(18, 48, 39, 46)(22, 36, 43, 33)(23, 40, 41, 26)

a_4 =(1, 6)(2, 21)(3, 38)(4, 15)(5, 10)(7, 17)(8, 42)(9, 47)(11, 12)(13, 25)(14, 24)(16, 37)(18, 40)(19, 44)(20, 29)(23, 48)(26, 39)(27, 31)(28, 32)(30, 45)(33, 36)(34, 35)(41, 46)

a_5 =(1, 29)(2, 15)(3, 47)(4, 21)(5, 16)(6, 20)(7, 27)(8, 34)(9, 38)(10, 37)(11, 28)(12, 32)(13, 45)(14, 44)(17, 31)(18, 26)(19, 24)(22, 43)(23, 46)(25, 30)(35, 42)(39, 40)(41, 48)

a_6 =(1, 20)(2, 4)(3, 9)(5, 37)(6, 29)(7, 31)(8, 35)(10, 16)(11, 32)(12, 28)(13, 30)(14, 19)(15, 21)(17, 27)(18, 39)(22, 43)(23, 41)(24, 44)(25, 45)(26, 40)(33, 36)(34, 42)(38, 47)(46, 48)

a_7 =(1, 47, 20, 38)(2, 15, 4, 21)(3, 29, 9, 6)(5, 34, 37, 42)(7, 14, 31, 19)(8, 16, 35, 10)(11, 13, 32, 30)(12, 45, 28, 25)(17, 44, 27, 24)(18, 46, 39, 48)(22, 33, 43, 36)(23, 26, 41, 40)

a_8 =(1, 9)(2, 4)(3, 20)(5, 35)(6, 38)(7, 24)(8, 37)(10, 42)(11, 25)(12, 30)(13, 28)(14, 27)(16, 34)(17, 19)(18, 41)(22, 36)(23, 39)(26, 46)(29, 47)(31, 44)(32, 45)(33, 43)(40, 48)

and now the elements themselves: $a_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$

$$a_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 46 & 19 & 1 & 19 \\ 0 & 0 & 46 & 0 & 0 \\ 0 & 0 & 19 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 41 & 20 & 31 & 25 & 17 \\ 14 & 23 & 19 & 13 & 20 \\ 35 & 13 & 8 & 31 & 39 \\ 39 & 11 & 37 & 2 & 23 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 14 & 28 & 7 & 9 & 40 \\ 33 & 24 & 28 & 34 & 27 \\ 19 & 27 & 40 & 43 & 43 \\ 6 & 34 & 9 & 15 & 43 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 41 & 27 & 42 & 45 & 21 \\ 14 & 24 & 27 & 36 & 34 \\ 35 & 34 & 21 & 44 & 4 \\ 39 & 36 & 45 & 13 & 44 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 7 & 37 & 42 & 30 \\ 0 & 1 & 7 & 23 & 14 \\ 8 & 14 & 30 & 8 & 10 \\ 9 & 23 & 42 & 16 & 8 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 14 & 19 & 31 & 37 & 8 \\ 33 & 23 & 20 & 11 & 13 \\ 19 & 20 & 17 & 23 & 39 \\ 6 & 13 & 25 & 2 & 31 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 40 & 31 & 2 & 22 \\ 0 & 46 & 40 & 24 & 33 \\ 8 & 33 & 22 & 22 & 41 \\ 9 & 24 & 2 & 39 & 22 \end{pmatrix}$$

Kernel has order 1 and is generated by:

There are 7 orbits on the BLT set.

The orbit length are $[8^5, 4^2]$

The orbits are:

$O_0 = \{1, 3, 6, 9, 20, 29, 38, 47\}$ (length 8)

$O_1 = \{2, 4, 15, 21\}$ (length 4)

$O_2 = \{5, 8, 10, 16, 34, 35, 37, 42\}$ (length 8)

$O_3 = \{7, 14, 17, 19, 24, 27, 31, 44\}$ (length 8)

$O_4 = \{11, 12, 13, 25, 28, 30, 32, 45\}$ (length 8)

$O_5 = \{18, 23, 26, 39, 40, 41, 46, 48\}$ (length 8)

$O_6 = \{22, 33, 36, 43\}$ (length 4)

The actions induced on the orbits are:

Induced action on orbit $O_0 = \{1, 3, 6, 9, 20, 29, 38, 47\}$ (length 8)

The induced group has order 8 and is generated by:

g_1 =(1, 2)(3, 8)(4, 5)(6, 7)

g_2 =(1, 7, 5, 8)(2, 3, 4, 6)

group order is small, so we list all elements a_1 =id

a_2 =(1, 2)(3, 8)(4, 5)(6, 7)

a_3 =(1, 7, 5, 8)(2, 3, 4, 6)

a_4 =(1, 3)(2, 7)(4, 8)(5, 6)

a_5 =(1, 6)(2, 8)(3, 5)(4, 7)

a_6 =(1, 5)(2, 4)(3, 6)(7, 8)

a_7 =(1, 8, 5, 7)(2, 6, 4, 3)

a_8 =(1, 4)(2, 5)(3, 7)(6, 8)

and now the elements themselves: $a_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$

$$a_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 46 & 19 & 1 & 19 \\ 0 & 0 & 46 & 0 & 0 \\ 0 & 0 & 19 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 41 & 20 & 31 & 25 & 17 \\ 14 & 23 & 19 & 13 & 20 \\ 35 & 13 & 8 & 31 & 39 \\ 39 & 11 & 37 & 2 & 23 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 14 & 28 & 7 & 9 & 40 \\ 33 & 24 & 28 & 34 & 27 \\ 19 & 27 & 40 & 43 & 43 \\ 6 & 34 & 9 & 15 & 43 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 41 & 27 & 42 & 45 & 21 \\ 14 & 24 & 27 & 36 & 34 \\ 35 & 34 & 21 & 44 & 4 \\ 39 & 36 & 45 & 13 & 44 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 7 & 37 & 42 & 30 \\ 0 & 1 & 7 & 23 & 14 \\ 8 & 14 & 30 & 8 & 10 \\ 9 & 23 & 42 & 16 & 8 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 14 & 19 & 31 & 37 & 8 \\ 33 & 23 & 20 & 11 & 13 \\ 19 & 20 & 17 & 23 & 39 \\ 6 & 13 & 25 & 2 & 31 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 40 & 31 & 2 & 22 \\ 0 & 46 & 40 & 24 & 33 \\ 8 & 33 & 22 & 22 & 41 \\ 9 & 24 & 2 & 39 & 22 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_1 = \{2, 4, 15, 21\}$ (length 4)

The induced group has order 8 and is generated by:

g_1 =(3, 4)

g_2 =(1, 4, 2, 3)

group order is small, so we list all elements a_1 =id

a_2 =(3, 4)

a_3 =(1, 4, 2, 3)

a_4 =(1, 4)(2, 3)

a_5 =(1, 3)(2, 4)

a_6 =(1, 2)(3, 4)

a_7 =(1, 3, 2, 4)

a_8 =(1, 2)

and now the elements themselves: $a_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$

$$a_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 46 & 19 & 1 & 19 \\ 0 & 0 & 46 & 0 & 0 \\ 0 & 0 & 19 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 41 & 20 & 31 & 25 & 17 \\ 14 & 23 & 19 & 13 & 20 \\ 35 & 13 & 8 & 31 & 39 \\ 39 & 11 & 37 & 2 & 23 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 14 & 28 & 7 & 9 & 40 \\ 33 & 24 & 28 & 34 & 27 \\ 19 & 27 & 40 & 43 & 43 \\ 6 & 34 & 9 & 15 & 43 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 41 & 27 & 42 & 45 & 21 \\ 14 & 24 & 27 & 36 & 34 \\ 35 & 34 & 21 & 44 & 4 \\ 39 & 36 & 45 & 13 & 44 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 7 & 37 & 42 & 30 \\ 0 & 1 & 7 & 23 & 14 \\ 8 & 14 & 30 & 8 & 10 \\ 9 & 23 & 42 & 16 & 8 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 14 & 19 & 31 & 37 & 8 \\ 33 & 23 & 20 & 11 & 13 \\ 19 & 20 & 17 & 23 & 39 \\ 6 & 13 & 25 & 2 & 31 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 40 & 31 & 2 & 22 \\ 0 & 46 & 40 & 24 & 33 \\ 8 & 33 & 22 & 22 & 41 \\ 9 & 24 & 2 & 39 & 22 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_2 = \{5, 8, 10, 16, 34, 35, 37, 42\}$ (length 8)

The induced group has order 8 and is generated by:

g_1 =(1, 2)(3, 5)(4, 8)(6, 7)

g_2 =(1, 8, 7, 5)(2, 3, 6, 4)

group order is small, so we list all elements a_1 =id

a_2 =(1, 2)(3, 5)(4, 8)(6, 7)

a_3 =(1, 8, 7, 5)(2, 3, 6, 4)

a_4 =(1, 3)(2, 8)(4, 7)(5, 6)

a_5 =(1, 4)(2, 5)(3, 7)(6, 8)

a_6 =(1, 7)(2, 6)(3, 4)(5, 8)

a_7 =(1, 5, 7, 8)(2, 4, 6, 3)

a_8 =(1, 6)(2, 7)(3, 8)(4, 5)

and now the elements themselves: $a_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$

$$a_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 46 & 19 & 1 & 19 \\ 0 & 0 & 46 & 0 & 0 \\ 0 & 0 & 19 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 41 & 20 & 31 & 25 & 17 \\ 14 & 23 & 19 & 13 & 20 \\ 35 & 13 & 8 & 31 & 39 \\ 39 & 11 & 37 & 2 & 23 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 14 & 28 & 7 & 9 & 40 \\ 33 & 24 & 28 & 34 & 27 \\ 19 & 27 & 40 & 43 & 43 \\ 6 & 34 & 9 & 15 & 43 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 41 & 27 & 42 & 45 & 21 \\ 14 & 24 & 27 & 36 & 34 \\ 35 & 34 & 21 & 44 & 4 \\ 39 & 36 & 45 & 13 & 44 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 7 & 37 & 42 & 30 \\ 0 & 1 & 7 & 23 & 14 \\ 8 & 14 & 30 & 8 & 10 \\ 9 & 23 & 42 & 16 & 8 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 14 & 19 & 31 & 37 & 8 \\ 33 & 23 & 20 & 11 & 13 \\ 19 & 20 & 17 & 23 & 39 \\ 6 & 13 & 25 & 2 & 31 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 40 & 31 & 2 & 22 \\ 0 & 46 & 40 & 24 & 33 \\ 8 & 33 & 22 & 22 & 41 \\ 9 & 24 & 2 & 39 & 22 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_3 = \{7, 14, 17, 19, 24, 27, 31, 44\}$ (length 8)

The induced group has order 8 and is generated by:

g_1 =(1, 8)(2, 3)(4, 6)(5, 7)

g_2 =(1, 4, 7, 2)(3, 5, 6, 8)

group order is small, so we list all elements a_1 =id

a_2 =(1, 8)(2, 3)(4, 6)(5, 7)

a_3 =(1, 4, 7, 2)(3, 5, 6, 8)

a_4 =(1, 3)(2, 5)(4, 8)(6, 7)

a_5 =(1, 6)(2, 8)(3, 7)(4, 5)

a_6 =(1, 7)(2, 4)(3, 6)(5, 8)

a_7 =(1, 2, 7, 4)(3, 8, 6, 5)

a_8 =(1, 5)(2, 6)(3, 4)(7, 8)

and now the elements themselves: $a_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$

$$a_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 46 & 19 & 1 & 19 \\ 0 & 0 & 46 & 0 & 0 \\ 0 & 0 & 19 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 41 & 20 & 31 & 25 & 17 \\ 14 & 23 & 19 & 13 & 20 \\ 35 & 13 & 8 & 31 & 39 \\ 39 & 11 & 37 & 2 & 23 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 14 & 28 & 7 & 9 & 40 \\ 33 & 24 & 28 & 34 & 27 \\ 19 & 27 & 40 & 43 & 43 \\ 6 & 34 & 9 & 15 & 43 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 41 & 27 & 42 & 45 & 21 \\ 14 & 24 & 27 & 36 & 34 \\ 35 & 34 & 21 & 44 & 4 \\ 39 & 36 & 45 & 13 & 44 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 7 & 37 & 42 & 30 \\ 0 & 1 & 7 & 23 & 14 \\ 8 & 14 & 30 & 8 & 10 \\ 9 & 23 & 42 & 16 & 8 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 14 & 19 & 31 & 37 & 8 \\ 33 & 23 & 20 & 11 & 13 \\ 19 & 20 & 17 & 23 & 39 \\ 6 & 13 & 25 & 2 & 31 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 40 & 31 & 2 & 22 \\ 0 & 46 & 40 & 24 & 33 \\ 8 & 33 & 22 & 22 & 41 \\ 9 & 24 & 2 & 39 & 22 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_4 = \{11, 12, 13, 25, 28, 30, 32, 45\}$ (length 8)

The induced group has order 8 and is generated by:

g_1 =(1, 8)(2, 3)(4, 7)(5, 6)

g_2 =(1, 6, 7, 3)(2, 4, 5, 8)

group order is small, so we list all elements a_1 =id

a_2 =(1, 8)(2, 3)(4, 7)(5, 6)

a_3 =(1, 6, 7, 3)(2, 4, 5, 8)

a_4 =(1, 2)(3, 4)(5, 7)(6, 8)

a_5 =(1, 5)(2, 7)(3, 8)(4, 6)

a_6 =(1, 7)(2, 5)(3, 6)(4, 8)

a_7 =(1, 3, 7, 6)(2, 8, 5, 4)

a_8 =(1, 4)(2, 6)(3, 5)(7, 8)

and now the elements themselves: $a_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$

$$a_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 46 & 19 & 1 & 19 \\ 0 & 0 & 46 & 0 & 0 \\ 0 & 0 & 19 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 41 & 20 & 31 & 25 & 17 \\ 14 & 23 & 19 & 13 & 20 \\ 35 & 13 & 8 & 31 & 39 \\ 39 & 11 & 37 & 2 & 23 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 14 & 28 & 7 & 9 & 40 \\ 33 & 24 & 28 & 34 & 27 \\ 19 & 27 & 40 & 43 & 43 \\ 6 & 34 & 9 & 15 & 43 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 41 & 27 & 42 & 45 & 21 \\ 14 & 24 & 27 & 36 & 34 \\ 35 & 34 & 21 & 44 & 4 \\ 39 & 36 & 45 & 13 & 44 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 7 & 37 & 42 & 30 \\ 0 & 1 & 7 & 23 & 14 \\ 8 & 14 & 30 & 8 & 10 \\ 9 & 23 & 42 & 16 & 8 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 14 & 19 & 31 & 37 & 8 \\ 33 & 23 & 20 & 11 & 13 \\ 19 & 20 & 17 & 23 & 39 \\ 6 & 13 & 25 & 2 & 31 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 40 & 31 & 2 & 22 \\ 0 & 46 & 40 & 24 & 33 \\ 8 & 33 & 22 & 22 & 41 \\ 9 & 24 & 2 & 39 & 22 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_5 = \{18, 23, 26, 39, 40, 41, 46, 48\}$ (length 8)

The induced group has order 8 and is generated by:

g_1 =(1, 2)(3, 8)(4, 6)(5, 7)

g_2 =(1, 8, 4, 7)(2, 5, 6, 3)

group order is small, so we list all elements a_1 =id

a_2 =(1, 2)(3, 8)(4, 6)(5, 7)

a_3 =(1, 8, 4, 7)(2, 5, 6, 3)

a_4 =(1, 5)(2, 8)(3, 4)(6, 7)

a_5 =(1, 3)(2, 7)(4, 5)(6, 8)

a_6 =(1, 4)(2, 6)(3, 5)(7, 8)

a_7 =(1, 7, 4, 8)(2, 3, 6, 5)

a_8 =(1, 6)(2, 4)(3, 7)(5, 8)

and now the elements themselves: $a_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$

$$a_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 46 & 19 & 1 & 19 \\ 0 & 0 & 46 & 0 & 0 \\ 0 & 0 & 19 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 41 & 20 & 31 & 25 & 17 \\ 14 & 23 & 19 & 13 & 20 \\ 35 & 13 & 8 & 31 & 39 \\ 39 & 11 & 37 & 2 & 23 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 14 & 28 & 7 & 9 & 40 \\ 33 & 24 & 28 & 34 & 27 \\ 19 & 27 & 40 & 43 & 43 \\ 6 & 34 & 9 & 15 & 43 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 41 & 27 & 42 & 45 & 21 \\ 14 & 24 & 27 & 36 & 34 \\ 35 & 34 & 21 & 44 & 4 \\ 39 & 36 & 45 & 13 & 44 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 7 & 37 & 42 & 30 \\ 0 & 1 & 7 & 23 & 14 \\ 8 & 14 & 30 & 8 & 10 \\ 9 & 23 & 42 & 16 & 8 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 14 & 19 & 31 & 37 & 8 \\ 33 & 23 & 20 & 11 & 13 \\ 19 & 20 & 17 & 23 & 39 \\ 6 & 13 & 25 & 2 & 31 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 40 & 31 & 2 & 22 \\ 0 & 46 & 40 & 24 & 33 \\ 8 & 33 & 22 & 22 & 41 \\ 9 & 24 & 2 & 39 & 22 \end{pmatrix}$$

Kernel has order 1 and is generated by:

Induced action on orbit $O_6 = \{22, 33, 36, 43\}$ (length 4)

The induced group has order 8 and is generated by:

g_1 =(1, 2)(3, 4)

g_2 =(1, 3, 4, 2)

group order is small, so we list all elements a_1 =id

a_2 =(1, 2)(3, 4)

a_3 =(1, 3, 4, 2)

a_4 =(2, 3)

a_5 =(1, 4)

a_6 =(1, 4)(2, 3)

a_7 =(1, 2, 4, 3)

a_8 =(1, 3)(2, 4)

and now the elements themselves: $a_1 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 0 & 1 \end{pmatrix}$

$$a_2 = \begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 46 & 19 & 1 & 19 \\ 0 & 0 & 46 & 0 & 0 \\ 0 & 0 & 19 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 \end{pmatrix}$$

$$a_3 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 41 & 20 & 31 & 25 & 17 \\ 14 & 23 & 19 & 13 & 20 \\ 35 & 13 & 8 & 31 & 39 \\ 39 & 11 & 37 & 2 & 23 \end{pmatrix}$$

$$a_4 = \begin{pmatrix} 0 & 19 & 28 & 12 & 38 \\ 14 & 28 & 7 & 9 & 40 \\ 33 & 24 & 28 & 34 & 27 \\ 19 & 27 & 40 & 43 & 43 \\ 6 & 34 & 9 & 15 & 43 \end{pmatrix}$$

$$a_5 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 41 & 27 & 42 & 45 & 21 \\ 14 & 24 & 27 & 36 & 34 \\ 35 & 34 & 21 & 44 & 4 \\ 39 & 36 & 45 & 13 & 44 \end{pmatrix}$$

$$a_6 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 7 & 37 & 42 & 30 \\ 0 & 1 & 7 & 23 & 14 \\ 8 & 14 & 30 & 8 & 10 \\ 9 & 23 & 42 & 16 & 8 \end{pmatrix}$$

$$a_7 = \begin{pmatrix} 0 & 28 & 35 & 31 & 23 \\ 14 & 19 & 31 & 37 & 8 \\ 33 & 23 & 20 & 11 & 13 \\ 19 & 20 & 17 & 23 & 39 \\ 6 & 13 & 25 & 2 & 31 \end{pmatrix}$$

$$a_8 = \begin{pmatrix} 18 & 0 & 38 & 18 & 16 \\ 19 & 40 & 31 & 2 & 22 \\ 0 & 46 & 40 & 24 & 33 \\ 8 & 33 & 22 & 22 & 41 \\ 9 & 24 & 2 & 39 & 22 \end{pmatrix}$$

Kernel has order 1 and is generated by: