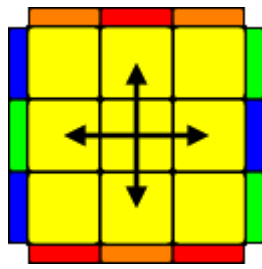


H Permutation



Name: H-PLL, X-PLL

Used in: [EPLL](#), [CPLL](#), PLL, [ELL](#), [ZBLL](#), [ZZLL](#)

Optimal moves: 10 [HTM](#)

X-PLL is H-PLL + U2.

	PLL	M2 U M2 U2 M2 U M2	 [1]
	PLL	M2 U' M2 U2 M2 U' M2	 [2]
	PLL	M2 U2 M2 U' M2 U2 M2 U	 [X]
	PLL	U' M2 U2 M2 U M2 U2 M2	 [X]
	PLL	M2 U M2 U M2 U M2 U M2 U M2 U'	 [X]
	PLL	R2 U2 R U2 R2 U2 R2 U2 R U2 R2	 [X]
	PLL	R2' U2 R' U2 R2' U2' R2' U2 R' U2 R2'	 [X]
	PLL	R2 U2 R2 U2 R2 U R2 U2 R2 U2 R2 U'	 [X]
	PLL	R U2 R' U' R' U' R2 U' R2 U2 R2 U2 R' U	 [X]
	PLL	S R U2 R2 U2 R2 U2 R S'	 [X]
	PLL	F2 M2 F2 U' F2 M2 F2 U	 [X]

	PLL	<u>(x) U2 M2 U2 B' U2 M2 U2 B (x')</u>	 [X]
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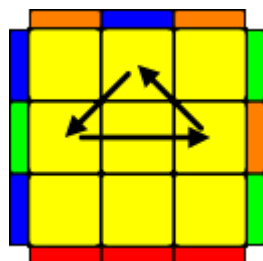
	PLL	<u>L R U2 L' R' F' B' U2 F B</u>	 [X]
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	PLL	<u>L R U2 L' R' (y) L' R' U2 L R</u>	 [X]
---	-----	--	---

	PLL	<u>(R' S R u) 6</u>	 [X]
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	PLL	<u>R' D' R D' B D B' D R' D' R U R' D R D' B D' B' D R' D R U</u>	 [X]
---	-----	---	---

U Permutation : a



Name: U-PLL a

Used in: [EPLL](#), PLL, [ELL](#), [ZBLL](#), [BLD](#)

Optimal moves: 9 [HTM](#)

	PLL	<u>R2 U' R' U' R U R U R U' R</u>	 [X]
---	-----	---	---

	PLL	<u>(y2) R U' R U R U R U' R' U' R2</u>	 [X]
---	-----	--	---

	PLL	<u>R U R' U R' U' R2 U' R' U R' U R U2</u>	 [X]
---	-----	--	---

	PLL	<u>M2 U M' U2 M U M2</u>	 [X]
---	-----	--	---

	PLL	<u>(y2) M2 U M U2 M' U M2</u>	 [X]
---	-----	---	---

	PLL	<u>(y) R2' U' S' U2 S U' R2'</u>	 [X]
---	-----	--	---

	PLL	B2 U' M U2 M' U' B2	 [X]
---	-----	-------------------------------------	---

	PLL	(y2) F2 U' L R' F2 L' R U' F2	 [X]
---	-----	---	---

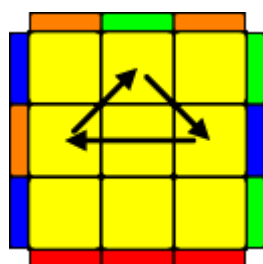
	PLL	M2 U' M' U2 M U2 M' U2 M U' M2	 [X]
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	PLL	(y) R2 U' (y) r U2 r' R U2 R' (y') U R2	 [X]
---	-----	---	---

	PLL	(y) R2 d' r U2 M U2 R' d R2	 [X]
---	-----	---	---

	PLL	R U R' U' L' U' L U2 R U' R' U' L' U L	 [X]
---	-----	--	---

U Permutation : b



Name: U-PLL b

Used in: [EPLL](#), PLL, [ELL](#), [ZBLL](#), [BLD](#)

Optimal moves: 9 [HTM](#)

	PLL	R' U R' U' R' U' R' U R U R2	 [X]
---	-----	--	---

	PLL	(y2) R2' U R U R' U' R' U' R' U R'	 [X]
---	-----	--	---

	PLL	(y2) R' U' R U' R U R2 U R U' R U' R' U2	 [X]
---	-----	--	---

	PLL	M2 U' M' U2 M U' M2	 [X]
---	-----	-------------------------------------	---

	PLL	(y2) M2 U' M U2 M' U' M2	 [X]
---	-----	--	---

	PLL	(y2) F2 U R' L F2 R L' U F2	 [X]
---	-----	---	---

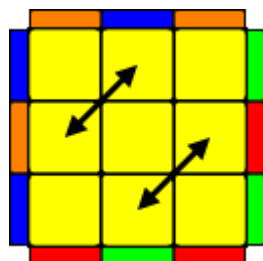
	PLL	B2 U M U2 M' U B2	 [X]
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	PLL	R U' R U R U R' U' R' U' R' U2 R'	 [X]
---	-----	---	---

	PLL	M2 U M' U2 M U2 M' U2 M U M2	 [X]
---	-----	--	---

	PLL	L' U' L U R U R' U2 L' U L U R U' R'	 [X]
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Z Permutation



Name: Z-PLL

Used in: [EPLL](#), PLL, [ELL](#), [ZBLL](#), [ZZLL](#)

Optimal moves: 12 [HTM](#), 7 [STM](#)

	PLL	M2 U M2 U M' U2 M2 U2 M' U2	 [X]
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	PLL	(y) M2 U' M2 U' M' U2 M2 U2 M' U2	 [X]
---	-----	---	---

	PLL	U R' U' R U' R U R U R' U R U R2 U' R' U	 [3]
---	-----	--	---

	PLL	M2 U M2 U' E2 M' E2 M'	 [X]
---	-----	--	---

	PLL	(y) M2 U' M2 U E2 M' E2 M'	 [X]
---	-----	--	---

	PLL	M2 U' M' U2' M2 U2' M' U M2	 [X]
---	-----	---	---

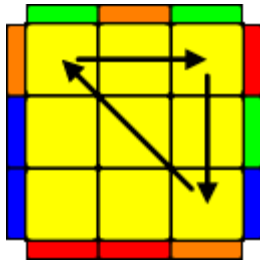
	PLL	<u>M2 U M2 U M U2 M2 U2 M U2</u>	 [X]
	PLL	<u>(y) M' U M2 U M2 U M' U2 M2 U'</u>	 [X]
	PLL	<u>(y) M2 U2 M' U M2 U M2 U M' U'</u>	 [X]
	PLL	<u>M2 U2 M' U' M2 U' M2 U' M' U</u>	 [X]
	PLL	<u>R' U' R2 U R U R' U' R U R U' R U' R' U2</u>	 [4]
	PLL	<u>R B' R' B F R' F B' R' B R F2 U</u>	 [5]
	PLL	<u>R U R' U R' U' R' U R U' R' U' R2 U R U2</u>	 [X]
	PLL	<u>(y) R U R2 U' R' U' R U R' U' R' U R' U R U2</u>	 [X]
	PLL	<u>(x') R U' R' U D R' D U' R' U R D2' F (x)</u>	 [X]
	PLL	<u>M2 D S2 D' S' M2 S</u>	 [X]
	PLL	<u>M2 u M2 D' M S2 M'</u>	 [X]
	PLL	<u>M2 U M E2 M E2 U' M2</u>	 [X]
	PLL	<u>(x2) M2 U S2 U' S' M2 S (x2)</u>	 [X]
	PLL	<u>(y) F2 M2 F2 M2 U M2 U M2 U2</u>	 [X]

	PLL	<u>(y) M2 U (F2 M2 F2 M2) U' M2</u>	 [X]
	PLL	<u>(y) R2 U R2 U' R2 F2 R2 U' F2 U R2 F2</u>	 [X]
	PLL	<u>R' U L' U2 D2 R U' L R' U L' U2 D2 R U' L</u>	 [X]
	PLL	<u>R' U L' E2 L U' R L' U R' E2 R U' L</u>	 [X]
	PLL	<u>R2 U' R2 U R2 (x') U2 R2 F U2 F' R2 U2 (x)</u>	 [X]
	PLL	<u>U' l' U R U' D' R U D' R U' R' D2 (x')</u>	 [X]
	PLL	<u>R U R' U R' U' R' U R U' R' U' R2 U R U2</u>	 [X]
	PLL	<u>(y') R U R B' R' B U' R' f R U R' U' f</u>	 [X]
	PLL	<u>R' U' R' F R F' U R F' U' L' U L F</u>	 [X]
	PLL	<u>(x') R U' R' U D R' D U' R' U R D2' F (x)</u>	 [X]
	PLL	<u>U2' R U R U' R U2 R U' R' U' R U R' U' R' U R U' R U' R U R</u> <u>U' R' U' R' U' R U' R</u>	 [6]

Permutations of Corners Only

This is also known as [CPLL](#) (Corner Permute Last Layer). There is one more case in this group, the X-PLL but that is the same alg as [H-PLL](#) + U2, see [EPLL](#).

A Permutation : a



Name: A-PLL a

Used in: [CPLL](#), [PLL](#), [L3C](#), [L4C](#), [ZBLL](#), [BLD](#)

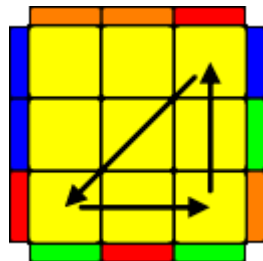
Optimal moves: 9 [HTM](#)

	PLL	R' F R' B2 R F' R' B2 R2	 [X]
	PLL	(x') R' D R' U2 R D' R' U2 R2 (x)	 [X]
	PLL	(x) R' U R' D2 R U' R' D2 R2 (x')	 [X]
	PLL	l' U R' D2 R U' R' D2 R2 (x')	 [X]
	PLL	(y) l R u2 r' F' r u2 R' U l'	 [X]
	PLL	(y' x) L2 D2 L' U' L D2 L' U L' (x')	 [X]
	PLL	(y2) (L' B L') (F2 L B' L') (F2 L2)	 [X]
	PLL	(y2 z) F2 R U2 R' U2 F2 L' U2 L U2 (z')	 [X]
	PLL	(y z') U2 R U2 R' F2 U2 L' U2 L F2 (z)	 [X]
	PLL	R' U2 R2 U' L' U R' U' L U R' U2 R	 [X]
	PLL	(y) R2 F2 (R' B' R) F2 (R' B R')	 [X]

	PLL	R U' L' U' L2 U' R2 U L2 U' R2 U2 L U R'	 [X]
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	PLL	(y') R U R' F' r U R' U' r' F R2 U' R'	 [X]
---	-----	--	---

A Permutation : b



Name: A-PLL b

Used in: [CPLL](#), [PLL](#), [L3C](#), [L4C](#), [ZBLL](#), [BLD](#)

Optimal moves: 9 [HTM](#)

	PLL	R B' R F2 R' B R F2 R2	 [X]
---	-----	--	---

	PLL	(x) R D' R U2 R' D R U2 R2 (x')	 [X]
---	-----	---	---

	PLL	(x') R U' R D2 R' U R D2 R2 (x)	 [X]
---	-----	---	---

	PLL	(y' x) R2 D2 R U R' D2 R U' R (x')	 [X]
---	-----	--	---

	PLL	(y2 x) L U' L D2 L' U L D2 L2 (x')	 [X]
---	-----	--	---

	PLL	(y z) U2 L' U2 L F2 U2 R U2 R' F2 (z')	 [X]
---	-----	--	---

	PLL	(z') F2 L' U2 L U2 F2 R U2 R' U2 (z)	 [X]
---	-----	--	---

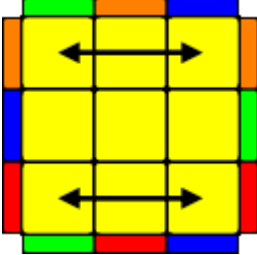
	PLL	(y') R' U2 R U' L' U R U' L U R2 U2 R	 [X]
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	PLL	(z) (U R' D r2 U') (R U r2' U') (D') (z')	 [X]
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	PLL	<u>(z' y2) (U' r x) (l2' U L U') (R' U) (L' U' L') (R' U) (z')</u>	 [X]
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	PLL	<u>(R' F l') D2 (R U' R') D2 (R l)</u>	 [X]
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E Permutation



Name: E-PLL

Used in: [CPLL](#), [PLL](#), [L4C](#), [ZBLL](#), [ZZLL](#)

Optimal moves: 14 [HTM](#)

	PLL	<u>(x') R U' R' D R U' R' D R U' R' D R U' R' D' (x)</u>	 [X]
---	-----	--	---

	PLL	<u>R2 U R' U' (y) (R U R' U')2 R U R' (y') R U' R2'</u>	 [X]
---	-----	---	---

	PLL	<u>(x) U R' U' L U R U' r2 U' R U L U' R' U (x)</u>	 [X]
---	-----	---	---

	PLL	<u>(y x') R U' R' D R U R' u2 R' U R D R' U' R (x')</u>	 [X]
---	-----	---	---

	PLL	<u>(y x') R U' R' D R U R' D2 L' U L D L' U' L (x)</u>	 [X]
---	-----	--	---

	PLL	<u>(y x') R U' R' D R U R' D' R U R' D R U' R' D' (x)</u>	 [X]
---	-----	---	---

	PLL	<u>(x) U R' U' L U R U' L' U R U' L U R' U' L' (x')</u>	 [X]
---	-----	---	---

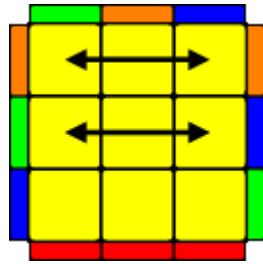
	PLL	<u>(x') U' R U L' U' R' U r2 U R' U' r' F R F'</u>	 [X]
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	PLL	<u>U' R U R' U R' U' R' F' R U R' U' R' F R2 U' R2 U R</u>	 [X]
---	-----	--	---

	PLL	<u>LR' U' R U L' U' R' U R r U R' U' r' F R F'</u>	 [X]
	PLL	<u>l' U' L' U R U' l U R' U' L U R U' l' U (x')</u>	 [X]
	PLL	<u>(y) r' R' U' L D' L' U L R U' R' D R U (x)</u>	 [X]
	PLL	<u>r2 U r2 D (x') (R U' R' U)3 (x) D' r2 U' r2</u>	 [X]
	PLL	<u>R2 U R' (y) (R U' R' U)3 (y') R U' R2</u>	 [X]
	PLL	<u>(y' z') R' F R2 U R' B' R U' R2 F' R (z) R B R'</u>	 [X]
	PLL	<u>R' U L' D2 L U' R L' U R' D2 R U' L</u>	 [X]
	PLL	<u>R B L B' R' (y) R L (y) L B' R' B L' (y') R' L'</u>	 [X]
	PLL	<u>l' U' r' F R F' R U R' U' L U R U' R' F</u>	 [X]
	PLL	<u>F' R U R' U' L' U R U' l' U R' U' r B R (x2)</u>	 [X]
	PLL	<u>U2 R L' U' L U R' U' L' U L U2 r U R' U' L' U R U' (x')</u>	 [X]
	PLL	<u>(z) U2 R2 F (R U R' U')3 F' R2 U2 (z')</u>	 [X]
	PLL	<u>U2 F R U R' U' F' U R U R' U' R' F R2 U' R' U' R U R2' F' R U R U' R'</u>	 [X]
	PLL	<u>R' D' R U' R' D R U R' D' R U2 R' D R U' R' D' R U R' D R U2</u>	 [X]

Permutations of Edges and Corners

F Permutation



Name: F-PLL

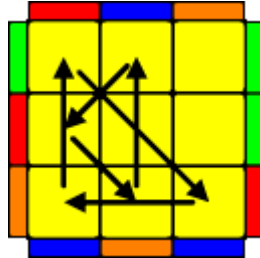
Used in: PLL, [ZBLL](#), [ZZLL](#)

Optimal moves: 14 [HTM](#)

	PLL	R' U R U' R2 (y') R' U' R U (y x) R U R' U' R2 (x') U'	 [X]
	PLL	(y2) R' U2 R' d' R' F' R2 U' R' U R' F R U' F	 [7]
	PLL	(y) R' U' F' R U R' U' R' F R2 U' R' U' R U R' U R	 [X]
	PLL	(y2) R U' R' U R2 y R U R' U' x U' R' U R U2 (x') U	 [X]
	PLL	(y z) R U R' U' R U2 (z' y') R U R' U' (y x) L' U' L U L2 (x')	 [X]
	PLL	R' U2 R' U2 L U' R' U' R' U R U2 L' U2 R U R	 [X]
	PLL	L U2 L U2 R' U L U L U' L' U2 R U2 L' U' L'	 [X]
	PLL	(y2) M U2 r' U l' U2 r U' R2 r U2 R2 (x') U	 [X]
	PLL	(r U R' U') z U' (l' U2 r' U') (r U2 l' U l2) (x')	 [X]
	PLL	(y) F (x) R2 F R2 U' R' U l' U2 L F' L' U (x') R2 U' (x')	 [X]
	PLL	(y) R U R' U R U2 R2 U' R U' R' U2 R U r U R' U' L' U R U' (x')	 [X]

	PLL	(y) M2 U M2 (y') (R U R' U' R' F R2 U' R' U' R U R' F') (y) M2 U' M2	 [X]
---	-----	--	---

G Permutation : a



Name: G-PLL a

Used in: PLL, [ZBLL](#)

Optimal moves: 12 [HTM](#)

	PLL	(y) R2' u R' U R' U' R u' R2 (y') R' U R	 [X]
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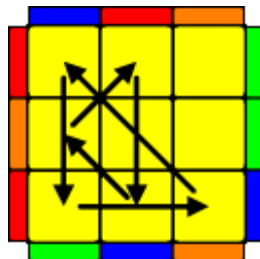
	PLL	(y) R2 D B' U B' U' B D' R2 F' U F	 [X]
---	-----	--	---

	PLL	(y2) F2' D R' U R' U' R D' F2 L' U L	 [X]
---	-----	--	---

	PLL	R L U2 R' L' (y') R' U L' U2 R U' L U2	 [X]
---	-----	--	---

	PLL	(y) d' L U' R' U L' U' L U L' U L U2 L' U R U' R' U R U' R' U2 R	 [X]
---	-----	--	---

G Permutation : b



Name: G-PLL b

Used in: PLL, [ZBLL](#)

Optimal moves: 12 [HTM](#)

	PLL	R' U' R (y) R2 u R' U R U' R u' R2	 [X]
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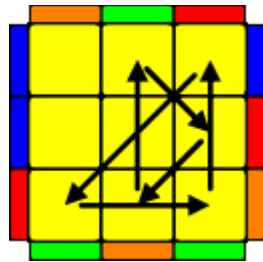
	PLL	R' U' R B2 D L' U L U' L D' B2	 [X]
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	PLL	(y2) L' U' L (y') R2' u R' U R U' R u' R2	 [X]
---	-----	---	---

	PLL	(y') R' U L' U2 R U' L (y) R L U2 L' R' U2	 [X]
---	-----	--	---

	PLL	(y2) d R' U2 R U R' U' R U R' U' L U2 L' U' L U' L' U L U' R U L'	 [X]
---	-----	---	---

G Permutation : c



Name: G-PLL c

Used in: PLL, [ZBLL](#)

Optimal moves: 12 [HTM](#)

	PLL	(y) R2' u' R U' R U R' u R2 (y) R U' R'	 [X]
---	-----	---	---

	PLL	(y) R2' u' R U' R U R' u R2 B U' B'	 [X]
---	-----	---	---

	PLL	(y) R2' U' R U' R U R' U R2 D' U R U' R' D	 [X]
---	-----	--	---

	PLL	(y) R2' D' F U' F U F' D R2 B U' B'	 [X]
---	-----	---	---

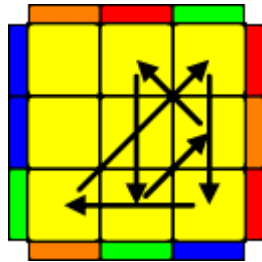
	PLL	(y2) F2' D' L U' L U L' D F2 R U' R'	 [X]
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	PLL	L' R' U2 L R (y) L U' R U2 L' U R' U2	 [X]
---	-----	---	---

	PLL	(y') l' U2' L' U l F' U' L U F R' F R	 [X]
---	-----	---	---

	PLL	(y') d R' U L U' R U R' U' R U' R' U2 R U' L' U L U' L' U L U2 L'	 [X]
---	-----	---	---

G Permutation : d



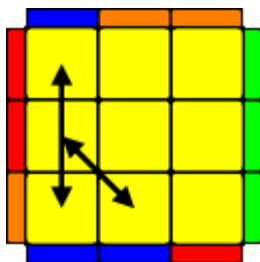
Name: G-PLL d

Used in: PLL, [ZBLL](#)

Optimal moves: 12 [HTM](#)

	PLL	(y2) R U R' (y') R2 u' R U' R' U R' u R2	 [X]
	PLL	(y2) R U R' F (y') R u' R U' R' U R' u R2	 [X]
	PLL	(y2) R U R' F2 D' L U' L' U L' D F2	 [X]
	PLL	(y2) (R U R' F2) D' (L U' L' U L') u L2	 [X]
	PLL	U2 l2 U' L2 U' F2 L' U' R U2 L' U1 (x')	 [X]
	PLL	(y) L U' R U2 L' U R' (y) R' L' U2 R L U2	 [X]
	PLL	(y) L U' R U2 L' U R' (y') L' R' U2 L R U2	 [X]
	PLL	(y') R' F' R F' U' L' U F R' F' L F2 R	 [X]
	PLL	(y2) d' L U2 L' U' L U L' U' L U R' U2 R U R' U R U' R' U L' U' R	 [X]

J Permutation : a



Name: J-PLL a

Used in: PLL, [ZBLL](#), [BLD](#)

Optimal moves: 10 [HTM](#)

	PLL	(y) R' U L' U2 R U' R' U2 L R U'	 [X]
	PLL	(y2) R' U2 R U R' U2' L U' R U L'	 [X]
	PLL	(y2 x) U2 r' U' r U2 l' U R' U' l2	 [X]
	PLL	U' L' U R' (z) R2 U R' U' R2 U D (z')	 [X]
	PLL	(y2) R' U2 R U R' (z) R2' U R' D R U' (z')	 [X]
	PLL	(y2) L U' R' U L' U2 R U' R' U2 R	 [8]
	PLL	(y2) L' R' U2 R U R' U2 L U' R U	 [X]
	PLL	R U' L' U R' U2 L U' L' U2' L	 [X]
	PLL	L' U R' U2 L U' R U L' U R' U2 L U' R	 [X]
	PLL	L' U2 L U L' U2 R U' L U R'	 [X]
	PLL	R' L' d2 R U R' d2 R U' L U	 [X]

	PLL	<u>L' U' L F L' U' L U L F' L2 U L U</u>	 [X]
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	PLL	<u>B2' R2 U' R2' u R2 D' R2' U R2 U'</u>	 [X]
---	-----	--	---

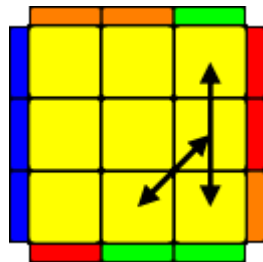
	PLL	<u>(y) R2 (U' D) R2' U' R2 U R2' D' R2 U R2' U'</u>	 [X]
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	PLL	<u>(y') L' U R' U2 L U' L' U2 R L U'</u>	 [X]
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	PLL	<u>(z) D R' U' R D' R (R U R' U') R2 U</u>	 [X]
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	PLL	<u>R' U2' R U R' z R2 U R' D R U'</u>	 [X]
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J Permutation : b



Name: J-PLL b
Used in: PLL, [ZBLL](#), [BLD](#)
Optimal moves: 10 [HTM](#)

	PLL	<u>R U R' F' R U R' U' R' F R2 U' R' U'</u>	 [X]
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	PLL	<u>R U2 R' U' R U2 L' U R' U' L</u>	 [X]
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	PLL	<u>R U' L U2 R' U L' U' R U' L U2 R' U L'</u>	 [X]
---	-----	---	---

	PLL	<u>(y') L U' R U2 L' U L U2 (R' L') U</u>	 [X]
---	-----	---	---

	PLL	<u>L' U R U' L U2 R' U R U2' R'</u>	 [X]
---	-----	---	---

	PLL	<u>(y2) R L U2 L' U' L U2 R' U L' U'</u>	 [X]
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	PLL	<u>(y') L U' r U2 l' U R' U' l2 F2 L2</u>	 [X]
---	-----	---	---

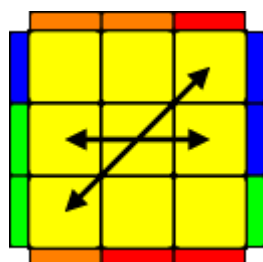
	PLL	<u>(y2) r2 U' L' U r' U2 R B' R' U2 (x')</u>	 [X]
---	-----	--	---

	PLL	<u>(y2) F2 R U R' F2 L D' L D L2</u>	 [X]
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	PLL	<u>(y2) F2 R U R' b2 R U' R U l2'</u>	 [X]
---	-----	---	---

	PLL	<u>(y) R U' L U2 R' U R U2 L' R'</u>	 [X]
---	-----	--	---

N Permutation : a



Name: N-PLL a
Used in: PLL, [ZBLL](#), [ZZLL](#)
Optimal moves: 14 [HTM](#)

	PLL	<u>(z) D R' U R2 D' R (U' D) R' U R2 D' R U' R' (z')</u>	 [X]
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	PLL	<u>(z) U R' D R2 U' R (D' U) R' D R2 U' R D' R' (z')</u>	 [X]
---	-----	--	---

	PLL	<u>R' U R2 B2 U R' B2' R U' B2 R2' U' R U'</u>	 [X]
---	-----	--	---

	PLL	<u>R U' L d2 L' U L R' U' R U2 r' F l' U' (y2)</u>	 [X]
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	PLL	<u>F' R U R' U' R' F R2 F U' R' U' R U F' R'</u>	 [X]
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	PLL	<u>R U R' U (R U R' F' R U R' U' R' F R2 U' R') U2 R U' R'</u>	 [X]
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	PLL	<u>L U L' (y') (R U R' F' R U R' U' R' F R2 U' R') (y') U' R U' R'</u>	 [X]
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	PLL	<u>(z) U R' U' R U F R F' U' R' U F' U F U' R U' (z')</u>	 [X]
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	PLL	<u>(y z) R' U R' D R2 U' R (U D') R' D R2 U' R D' (z')</u>	 [X]
---	-----	--	---

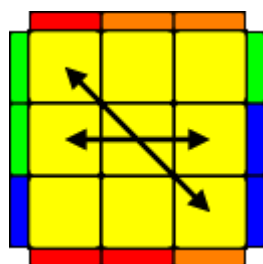
	PLL	<u>L U' R U2 L' U R' L U' R U2 L' U R' U'</u>	 [X]
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	PLL	<u>R U' R' U' U F U' R' F' R U' R U' U R'</u>	 [X]
---	-----	---	---

	PLL	<u>L U' L' U L F U F' L' U' L F' L F L' U L'</u>	 [X]
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	PLL	<u>(z) U2 R2 U' R2 (y') R2 U2 R2 U R2 (y) R2 U2 R2 d R2 (x' y)</u>	 [X]
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N Permutation : b



Name: N-PLL b

Used in: PLL, [ZBLL](#), [ZZLL](#)

Optimal moves: 14 [HTM](#)

	PLL	<u>(z) U' R D' R2' U R' (U' D) R D' R2 U R' D R (z')</u>	 [X]
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	PLL	<u>(z) U' R D' R2 U R' U' (z') R U R' (z) R2 U R' (z') R U</u>	 [X]
---	-----	--	---

	PLL	<u>(z) (D' R U' R2' D R' U)2 R (z')</u>	 [X]
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	PLL	<u>R' U R U' R' F' U' F R U R' F R' F' R U' R</u>	 [X]
---	-----	---	---

	PLL	<u>R U' R2' F2 U' R F2' R' U F2 R2 U R' U</u>	 [X]
---	-----	---	---

	PLL	<u>R' U L' U2 R U' L R' U L' U2 R U' L U</u>	 [X]
---	-----	--	---

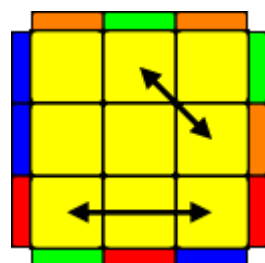
	PLL	<u>L' U R' U2' L U' (R L') U R' U2' L U' R U</u>	 [X]
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	PLL	<u>L' U L U' r' U' F' U L F L' U L' U' r U' L</u>	 [X]
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	PLL	<u>R2 F2 U2 F2 U F2 R2 U2 R2 U F2 U2 R2 U</u>	 [X]
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	PLL	<u>(R' U' R U') (L U' R' U) L' U2 (R U' R' U2) R (U R' U R)</u>	 [X]
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R Permutation : a



Name: R-PLL a

Used in: PLL, [ZBLL](#)

Optimal moves: 14 [HTM](#)

	PLL	<u>(y') R U R' F' R U2 R' U2 R' F R U R U2 R' U'</u>	 [X]
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	PLL	<u>R U2 R' U2 R B' R' U' R U1 U R2 F (x)</u>	 [X]
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	PLL	<u>R U' R F2 U R U R U' R' U' F2 R2 U</u>	 [X]
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	PLL	<u>R U2 R' U' R' F' R U2 R U2 R' F R U' R' U</u>	 [X]
---	-----	--	---

	PLL	(y2 z) U R2 U' R2 U F' U' R' U R U F U2 R (z')	 [X]
---	-----	--	---

	PLL	(y') R2 B' R' U' R' U R B R' U2 R U2 R' U'	 [X]
---	-----	--	---

	PLL	(y2) R' U' R U2 R U2 L' R2 U R U' R L U2 R' U2	 [X]
---	-----	--	---

	PLL	R U2 R D R' U R D' R' U' R' U R U R' U	 [X]
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	PLL	(y2) L U2 L' U2 L F' L' U' L U L F L2 U	 [X]
---	-----	---	---

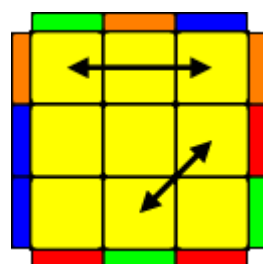
	PLL	(y') R U' R' U' R U R D R' U' R D' R' U2 R' U'	 [X]
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	PLL	(y') R1 U'1 U' R' U1 U'1 U2 R U2' R' U'	 [X]
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	PLL	(y2) U' L2 F' L' U' L' U L F L' U2 L U2 L'	 [X]
---	-----	--	---

	PLL	(y x') R' U' F' U R' U' (x) U R' U' R' U R B R2	 [X]
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R Permutation : b



Name: R-PLL b

Used in: PLL, [ZBLL](#)

Optimal moves: 14 [HTM](#)

	PLL	R' U2 R U2 R' F R U R' U' R' F' R2' U'	 [X]
---	-----	--	---

	PLL	(y) R2 B2 U' R' U' R U R U B2 R U' R U	 [X]
---	-----	--	---

	PLL	<u>R' U2 R U' (y') R' F R B' R' F' R (z x') R' U R' (x z')</u>	 [X]
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	PLL	<u>(y2) R' U2 l R U' R' U l' U2' R F R U' R' U' R U R' F'</u>	 [X]
---	-----	---	---

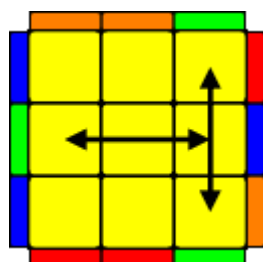
	PLL	<u>R' U2 R' D' R U' R' D R U R U' R' U' R U'</u>	 [X]
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	PLL	<u>(y x) R2 U l U R U' l' U' l U2 R' U2 R U</u>	 [X]
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	PLL	<u>(y') r' L' U r U L U' r' U' r U2 L' U2 L U</u>	 [X]
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	PLL	<u>U R2 F R U R U' R' F' R U2 R' U2 R</u>	 [X]
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T Permutation



Name: T-PLL

Used in: PLL, [ZBLL](#), [ZZLL](#), [BLD](#)

Optimal moves: 11 [HTM](#)

	PLL	<u>R U R' U' R' F R2 U' R' U' R U R' F'</u>	 [X]
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	PLL	<u>(y2) L' U' L U L F' L2 U L U L' U' L F</u>	 [X]
---	-----	---	---

	PLL	<u>F R U' R' U R U R2 F' R U R' U' R'</u>	 [X]
---	-----	---	---

	PLL	<u>(y2) B L U' L' U L U L2 B' L U L U' L'</u>	 [X]
---	-----	---	---

	PLL	<u>(y2) L2 U' L2 D F2 R2 U R2 D' F2 U</u>	 [X]
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	PLL	<u>R2 U' R2 D B2 L2 U L2 D' B2 U</u>	 [X]
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	PLL	<u>R2' u' R2 U R2' (y) R2 u R2' U' R2 U</u>	 [X]
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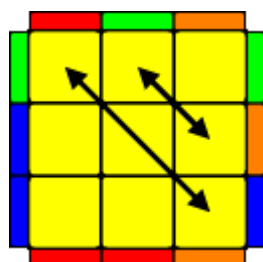
	PLL	<u>R2 U R2' U' R2 U' D R2' U' R2 U R2' D'</u>	 [X]
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	PLL	<u>(y2 z) U2 r' U2 r U2 (x) U2 r U2 r' U2 R (z')</u>	 [X]
---	-----	--	---

	PLL	<u>R U R' U' R2 D R' U' R' U' R U (z') U2 R' U (z)</u>	 [X]
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	PLL	<u>R2 U R2 U' R2 F2 U' F2 D R2 D'</u>	 [X]
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V Permutation



Name: V-PLL

Used in: PLL, [ZBLL](#)

Optimal moves: 14 [HTM](#)

	PLL	<u>R' U R' U' (y x) R' F R' F' R2 U' R' U R U (x')</u>	 [X]
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	PLL	<u>R' U R' U' (y x) R' U' R2 B' R' B R' U R U (x')</u>	 [X]
---	-----	--	---

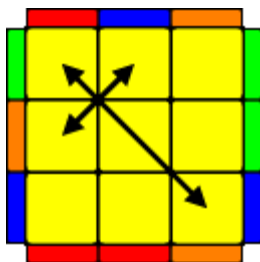
	PLL	<u>R' U R' U' (y x) R' U' R2 (x') U' R' U R' F R F</u>	 [X]
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	PLL	<u>R' U R' U' B' D B' D' B2 R' B' R B R</u>	 [X]
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	PLL	<u>R' U R' U' (x2 y') R' U R' U' 1 R U' R' U R U (x')</u>	 [X]
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	PLL	<u>$R' U R' U' (x' y) U' R U' R' U^2 (y') R' U' R U R (x)$</u>	 [X]
	PLL	<u>$R' U R' U' (y) R' F' R^2 U' R' U R' F R F$</u>	 [X]
	PLL	<u>$R' U R' U' (y) R' D R' D' R^2 F' R' F R F$</u>	 [X]
	PLL	<u>$R' U R' d' R' F' R^2 U' R' U R' F R F$</u>	 [X]
	PLL	<u>$R' U^2 R U^2 L U' R' U L' U L U' R U L'$</u>	 [X]
	PLL	<u>$R' U^2 R U^2 L U' R' U r' F r U' R U L'$</u>	 [X]
	PLL	<u>$R^2 U' (B^2 U B^2) (R D') (R D) R' U R U' R$</u>	 [X]
	PLL	<u>$(y') R' U L U' R U R' U L' U' R U^2 L U^2 L'$</u>	 [X]
	PLL	<u>$(y^2) R U' L' U R' U' R U' L U R' U^2 L' U^2 L$</u>	 [X]
	PLL	<u>$L U' R' U L' U' L U' R U L' U^2 R' U^2 R$</u>	 [X]
	PLL	<u>$(y) L' U R U' L U L' U R' U' L U^2 R U^2 R'$</u>	 [X]
	PLL	<u>$R U^2 R' D R U' R U' R U R^2 D R' U' R D^2$</u>	 [X]
	PLL	<u>$(y z) U' R D R' U R U' R D' R' U R^2 D R^2 D' z'$</u>	 [X]

Y Permutation



Name: Y-PLL

Used in: PLL, [ZBLL](#), [BLD](#)

Optimal moves: 13 [HTM](#)

	PLL	F R U' R' U' R U R' F' R U R' U' R' F R F'	 [9]
	PLL	R' U' R F2 R' U R d R2 U' R2' U' R2	 [X]
	PLL	R2 U' R2 U' R2 d R U R' B2 R U' R'	 [X]
	PLL	(y') R2 u R2' U R2 D' R' U' R F2' R' U R	 [X]
	PLL	F R' F R2 U' R' U' R U R' F' R U R' U' F'	 [X]
	PLL	F R' F' R U R U' R2 U' R U1 U' R' U F (x)	 [X]
	PLL	F R U' R' U' R d R U R' B' R U' R2	 [X]
	PLL	R' F R F' (y') U' R' U R2 U R' U' R' F R F' U'	 [X]
	PLL	(y) F' L' U L U L' U' L F L' U' L U L F' L' F	 [X]
	PLL	(y z) U2 R U R' U' R (y) R U L' U L U R' U' (x)	 [X]
	PLL	(z') U2 L' U' L U L' (y') L' U' R U' R' U' L U (x)	 [X]

	PLL	<u>$(y^2 z) U^2 R' U^2 R' U^2 R B R B' U^2 B R' B' (z')$</u>	 [X]
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	PLL	<u>$R^2 U' R' U R U' (z' y') L' U' R U' R' U' L U (y z)$</u>	 [X]
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	PLL	<u>$F R U' R' F D R' (y x) R' U' R (z) R^2 (y) L' d^2 (z)$</u>	 [X]
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