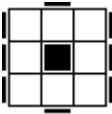
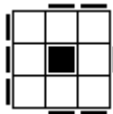
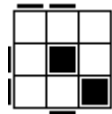
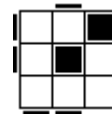
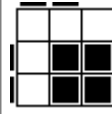
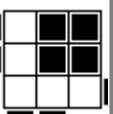
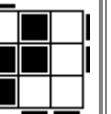
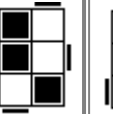
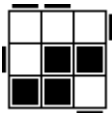
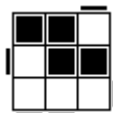
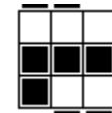
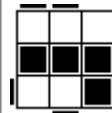
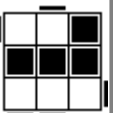
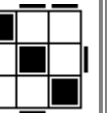
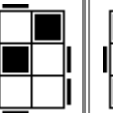
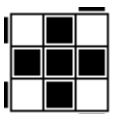
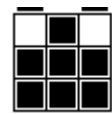
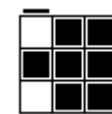
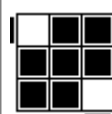
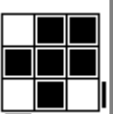
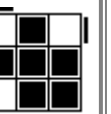
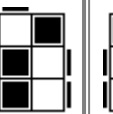
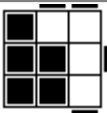
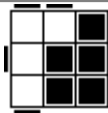
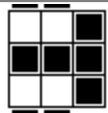
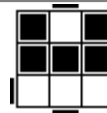
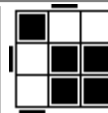
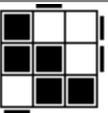
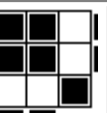
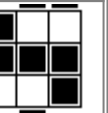
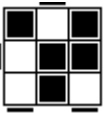
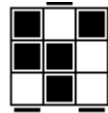
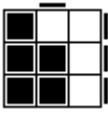
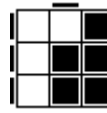
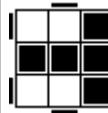
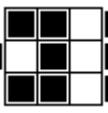
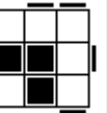
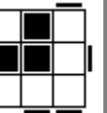
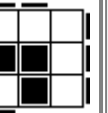
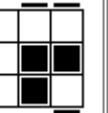
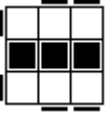
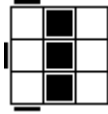
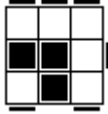
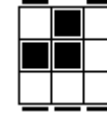
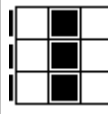
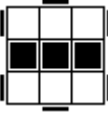
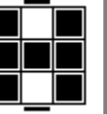
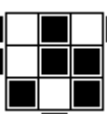
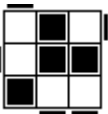
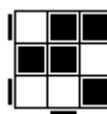


OLL手法

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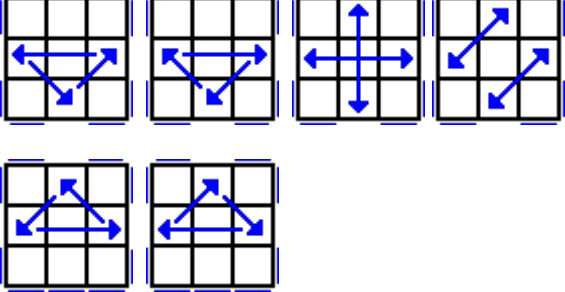
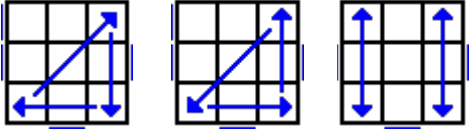
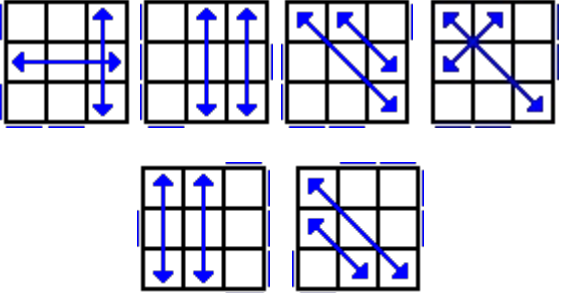
1  (R U' <u>U</u>) (R2' F R F') U2 (R' F R F')	2  (F R U R' <u>U</u>' F') (f R U R' <u>U</u>' f')	3  f(R U R' <u>U</u>')f' <u>U</u>' F(R <u>U</u> R' <u>U</u>')F'	4  f(R U R' <u>U</u>')y x(R' F)(R U R' <u>U</u>')F'	5  (r' U2) (R U R'U) r	6  (r U' <u>U</u>) (R' <u>U</u>' R <u>U</u>' r')	7  r U R' U R <u>U</u>' <u>U</u>' r'	8  r' <u>U</u>' R <u>U</u>' R' U2 r	9  (R' U' R) y' x' (R <u>U</u>) (R'F) (R U R')	10  (R U R'U)(R'F R F') (RU' <u>U</u>'R')
11  r'(R2 U R' U)(R U' <u>U</u>' R' U) (r R')	12  (r R'2 <u>U</u>' R <u>U</u>')(R' U2 R U' R)r'	13  (r <u>U</u>' r' <u>U</u>')(r U r') (F' U F)	14  R' F R U R' F'R (F <u>U</u>' F')	15  (r' <u>U</u>' r) (R' <u>U</u>'R U) (r' U r)	16  (r U r') (R U R' <u>U</u>) (r <u>U</u>' r')	17  (R U R' U) (R' F R F'U2) R' F R F'	18  F (R U R' d)(R' U2) (R' F R F')	19  R' U2 F R U R' <u>U</u>' y'R2 U' <u>U</u>' R B	20  r'(R U) (R U R' <u>U</u>' r2)(R2'U) (R <u>U</u>) r'
21  (R U' <u>U</u>) (R' <u>U</u>' R U R' U') (R <u>U</u>' R')	22  R U' <u>U</u>' (R'2 <u>U</u>) (R2 <u>U</u>) R'2 <u>U</u>' U'R	23  (R2 D') (R U' <u>U</u>) (R' D) (R U' <u>U</u>' R)	24  (r U R' <u>U</u>) (r' F R F')	25  F(r U R' <u>U</u>) (r' F R)	26  R U' <u>U</u>' R' <u>U</u>' R <u>U</u>' R'	27  R' U2 R U R' U R	28  (r U R' <u>U</u>) (r' R U) (R <u>U</u>' R')	29  x'(<u>U</u>'R'U) x (R'2U) (R' U' <u>U</u>) x' R U' <u>U</u>'	30  (R2 U R' B')(RU') (R2' U) (R B R')
31	32	33	34	35	36	37	38	39	40

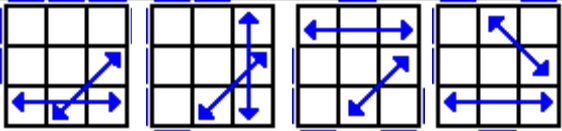
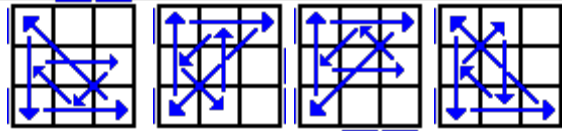
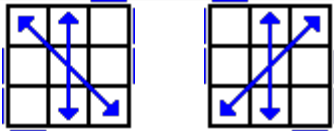
 $(r' F U F)$ $(L F')$ $L' U' r)$	 $(R U)(B' U')$ $(R' U R B)$ $R')$	 $(R U R' \underline{U}')$ $(R' F R F')$ 	 $(R' \underline{U}' R U)$ $y(r U R' \underline{U}')r' R$	 $R U' \underline{U}' R 2'$ $F R F'(R U' \underline{U}' R')$	 $R' \underline{U}' R U'$ $I \underline{U}' R' U$	 $F (R \underline{U}')$ $R' \underline{U}' R U)$ $(R' F')$	 $(R U R' U)$ $(R \underline{U}' R' \underline{U}')$ $(R' F R F')$	 $(r \underline{U}' r' \underline{U}')$ $r)y(R U R' f)$	 $(R' F R U R' \underline{U}')$ $(F U R)$
41  $R U' R' U 2$ $R U y R \underline{U}'$ $R' \underline{U}' F'$	42  $(r' R 2)y$ $(R U R' \underline{U}')$ $(R' U R')r$	43  $(B' \underline{U}')$ $(R' U R B)$	44  $f (R U R' \underline{U}')f'$	45  $F (R U R' \underline{U}') F'$	46  $(R' \underline{U}')$ $R' F R F'$ $(U R)$	47  $B'(R' \underline{U}')$ $R U) 2 B$	48  $F (R U R' \underline{U}') 2 F'$	49  $R B'(R 2 F)$ $(R 2 B)$ $R 2 F' R$	50  $L' B (L 2 F')$ $(L 2 B')$ $L 2 F L'$
51  $f (R U R' \underline{U}') 2 f'$	52  $R' \underline{U}' R \underline{U}'$ $R' d$ $R' U I U$	53  $(r' U 2)$ $(R U R' \underline{U}')$ $(R U R' U)$ r	54  $(r U' \underline{U}')$ $(R' \underline{U}' R U R' \underline{U}')$ $R' \underline{U}'$ $(R U' r')$	55  $(R U' \underline{U}')$ $(R' 2 \underline{U}')$ $R U' R' U 2$ $(F R F')$	56  $F (R U R' \underline{U}')(R F')(r U R' \underline{U}')r'$	$= (r' U' r U')(R' U R U' R' U)(R' U' r U r) = (r U r')(U R U' R') 2 (r U' r')$	57  $(R U R' \underline{U}')$ $r)(R' U)$ $(R U' r')$		
29'  $(R 2 U R) F'$ $(R' U) (R 2$	47  $b' \underline{U}'$ $(R' U R \underline{U}'$	10  $(L U L')$ y'	42  $(R' U 2)(R U R' U$ $R' U$						

$\underline{U}'(R'F$	$R'UR)b$	$(R'FRF')$	$R2y(RU$						
$R)$		$(RU2R')$	$R'U')F'$						

PLL手法

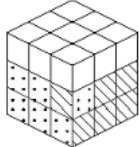
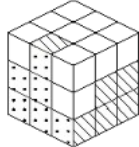
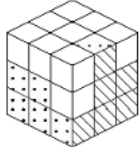
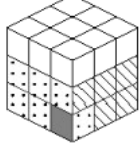
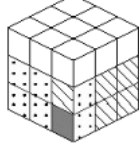
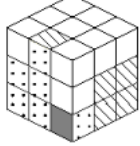
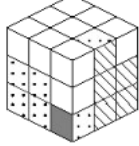
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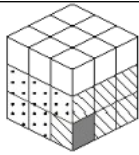
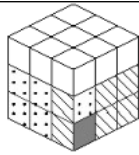
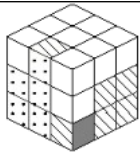
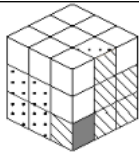
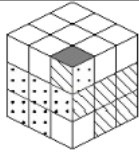
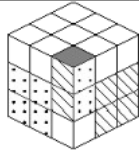
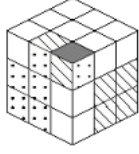
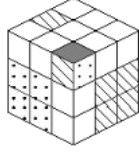
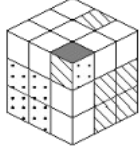
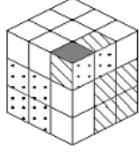
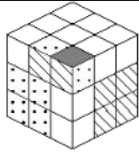
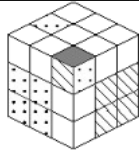
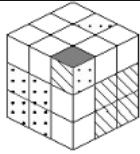
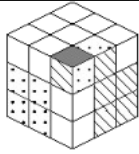
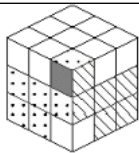
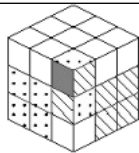
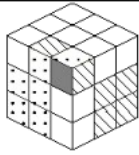
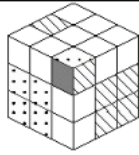
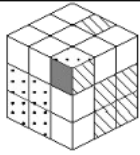
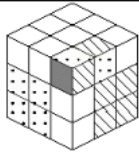
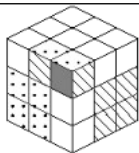
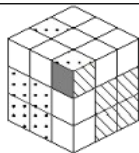
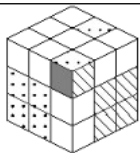
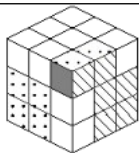
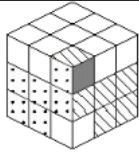
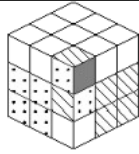
棱换		01. $(RUR)(URUR)(\underline{U}'R'\underline{U}'R2)$ 02. $(R2'U)(RU R'\underline{U}')(R'\underline{U}')(R'UR')$ 03. $M2U M2U2 M2U M2$ 04. $(UR'\underline{U}')(R'\underline{U}'R)(UR'\underline{U}')(R'URU)(R2'\underline{U}')(R'U)$ 01'. $(R2\textit{'}) (R'\underline{U}'RURU)(R\textit{'}) (R\textit{'})$ 02'. $(R'UR'\underline{U}')(R'\underline{U}')(R'U)(RU R'2)$
角换		05. $x'R2D2(R'\underline{U}'R)D2(R'UR')$ 06. $x'(RUR)z'(R'2'\underline{U}'LUR2'xyR2)$ 上式中的 $R2'xy$ 是同时进行的 07. $x'(RUR'R'D)(RU R')u2'(R'UR)D(R'\underline{U}'R)$
邻角 对棱 对角 邻棱		08. $(RU R'\underline{U}')(R'F)(R2'\underline{U}'R'\underline{U}')(RU R'F')$ 09. $\underline{U}'(R'UR'\underline{U}'R'2'b)x(R'UR)y'(RU R'\underline{U}'R2)$ 10. $(R'UR'\underline{U}')yx2(R'UR'\underline{U}'R2)xz'(R'\underline{U}'RUR)$ 11. $F(R'\underline{U}'R'\underline{U}')(RU R'F')(RU R'\underline{U}')(R'FRF')$ 09'. $z(RUR'\underline{U}'R\textit{'}) (x'z')(RU R'\underline{U}')$ $x(\underline{U}'R'UR\textit{'}) (\underline{U}')$ 10'. $z(U'RUI')z(R'UR'U')(I R)$ $(U'R'URU)$

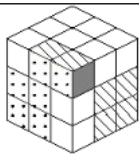
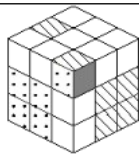
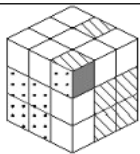
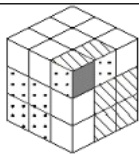
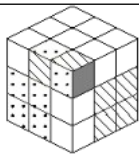
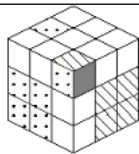
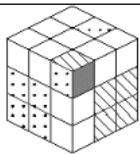
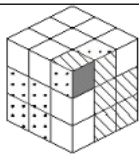
邻角 邻棱 换		12. $z(\underline{U}' R D')(R^2 U R' \underline{U}' R^2 U)z'(R U')$ 13. $(R U R' F')(R U R' \underline{U}')(R' F R^2 \underline{U}' R' U')$ 14. $(R' U^2)(R U' \underline{U}')(R' F R U R' \underline{U}')(R' F' R^2 \underline{U})$ 15. $(R U' \underline{U}')(R' U^2)(R \mathcal{B}' R' \underline{U}')(R U R \mathcal{B} R^2' U)$
三角 三棱 换		16. $(R^2' \underline{u}' R U' R)(U R' u)(R^2 f R' f)$ 17. $(R U R')y'(R^2' u' R U')(R' U R' u R^2)$ 18. $(R^2 u)(R' U R' \underline{U}')(R u')(R^2' F U \mathcal{A})$ 19. $(R' d' F)(R^2 u)(R' U)(R U' R \underline{u}' R^2)$
对角 对棱 换		20. $z(R' U R')z'(R U^2 \underline{L}' U R')$ $z(U R')z'(R U^2 \underline{L}' U R')$ 21. $z(\underline{U}' R D')(R^2 U R' \underline{U}')z'(R U R')$ $z(R^2 U R')z'(R U')$
说明	符号系统：RLUDBF, rludfb(转两层) 如 u 就是上两层顺时针转 90 度 x(整个魔方以 R 的方向转动), y(整个魔方以 U 的方向转动), z(整个魔方以 F 的方向转动), 斜体是用右拇指 下划线用左食指	

-*F2l 手法

Gan

			
$(R U' \underline{U}' R' U)^2 y'(R' \underline{U}' R)$	$(U R \underline{U}' R' \underline{U}') y'(R' U R)$	$(R' \mathcal{F} RU)(R U' R' F)$ $U'(F' R U R' U')(R' F R)$	
			

$(R\ U\ R'\ U')(R\ U'\underline{U}\ R'\ U')(R\ U\ R')$	$(R\ U'\ R\ U)y(R\ U'\ R'\ F2)$	$y'(R'\ \underline{U}'\ R\ U)(R'\ \underline{U}'\ R)$	$(R\ U'\ R'\ U)(R\ U'\ R')$
 $(RU'R'U)(R\ U'\underline{U}\ R'U)(RU'R')$	 $R2\ y(R\ U\ R'\ \underline{U}')y'(R'\ U\ R')$	 $y'\ (R'\ U)(R\ \underline{U}')(R'\ U\ R)$	 $(R\ U\ R'\ \underline{U}')\ (R\ U\ R')$
 $(R\ U\ R'\ \underline{U}')2\ (R\ U\ R')$	 $(R\ \underline{U}'\ R')\ y'\ (R'\ U2\ R)$		
 $y'\ (R'\ U2)(R\ U\ R'\ \underline{U}')R$	 $y'\ \underline{U}'(R'\ U2)(R\ \underline{U}'\ R'\ U)R$	 $y'(R'\ U\ R\ U'\underline{U}')(R'\ \underline{U}'\ R)$	 $y'\ (U2\ R2'\ U2)(R\ U\ R'\ U\ R2)$ $(R\ U\ R'U)(R\ U'\underline{U}\ R'd)(R'U\ R)$
 $(R\ U\ R')U2(R\ U\ R'\ \underline{U}')(R\ U\ R')$	 $(R\ U'\ R'\ U2)(R\ U\ R')$	 $U(R\ U'\underline{U}')(R'\ U\ R\ U')R'$	 $(R\ U'\underline{U}')(R'\ \underline{U}'\ R\ U)R'$
 $\underline{U}'(R\ \underline{U}')(R'\ U2)(R\ U'\ R')$	 $\underline{U}'\ (R\ U\ R')\ d\ (R'\ \underline{U}'\ R)$		
 $d\ (R'\ U\ R\ U')(R'\ \underline{U}'\ R)$	 $y'\ (R'\ \underline{U}'\ R)$	 $(d\ R'\ \underline{U}'\ R\ U')(R'\ \underline{U}'\ R)$	 $y'\ (R\ U'\underline{U}')R'2\ \underline{U}'\ R2\ \underline{U}'\ R'$ $U'(R\ U'\underline{U}\ R'\ d)(R'U'R)$
 $y'\ (R'\ U)(R\ d'\ \underline{U}')(R\ U\ R')$	 $U'\ (R\ U'\underline{U}')(R'\ U2)(R\ U'\ R')$	 $U'(R\ U\ R'\ U')(R\ U'\underline{U}\ R')$	 $U\ R\ U'\ R'$
 $\underline{U}'\ (R\ U'\underline{U}\ R'\ U)(R\ U\ R')$	 $d\ (R'\ U'\ R)\ d'\ (R\ U\ R')$		

 $y' \underline{U}' (R' U R)$	 $(d R' \underline{U}' R \underline{U' U'}) (R' U R)$	 $d (R' U^2) (R \underline{U' U'}) (R' U R)$	 $(R U' R' U) (d R' \underline{U}' R)$
 $(R U') (R' U) (R U') (R' U^2) (R U' R')$	 $\underline{U}' (R U R' U) (R U R')$	 $(R U R')$	 $\underline{U}' (R \underline{U}' R' U) (R U R')$

加下划线的是用左食指完成，斜体是用右拇指

浅蓝色的是最少步数版本

红色是新增的多解

新修正