## OLL Algorithms (Orientation of Last Layer)

*Developed by Feliks Zemdegs and Andy Klise*

### Algorithm Presentation Format

<table>
<thead>
<tr>
<th>Suggested algorithm here</th>
<th>Alternative algorithms here</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OLL Case Name</strong> - Probability = 1/x</td>
<td></td>
</tr>
</tbody>
</table>

Round brackets are used to segment algorithms to assist memorisation and group move triggers.

It is recommended to learn the algorithms in the order presented.

### All Edges Oriented Correctly

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>R U2 R' U R U' R' y' R' U R' U' R' U2 R</td>
<td>1/54</td>
</tr>
<tr>
<td>(R U2 R') (U' R U R') (U' R U R') y (R U R' U) (R U' R' U) (R U2' R')</td>
<td>1/108</td>
</tr>
<tr>
<td>(r U R' U') (r' F R F') y (R U R D) (R' U' R D') R2</td>
<td>1/54</td>
</tr>
<tr>
<td>R2 D (R' U2 R) D' (R' U2 R') y2 R2' D' (R U2 R') D (R U2 R)</td>
<td>1/54</td>
</tr>
</tbody>
</table>

### T-Shapes

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>(R U R' U') (R' F R F')</td>
<td>1/54</td>
</tr>
<tr>
<td>F (R U R' U') F'</td>
<td>1/54</td>
</tr>
</tbody>
</table>
Squares

(r' U2' R U R' U r) (r U2 R' U R U' r')
S1 - 5 - Probability = 1/54
S2 - 6 - Probability = 1/54

C-Shapes

(R U R2' U') (R' F R U) R U' F'
(R' U' (R' F R F') U R)
C1 - 34 - Probability = 1/54
C2 - 46 - Probability = 1/54

W-Shapes

(R' U' R U') (R' U R U) u' R' U x
y2 (R U R' F') (R U R' U') (R' F R U') (R' F R F')
(R U R' U) (R U' R U') (R' F R F')
W1 - 36 - Probability = 1/54
W2 - 38 - Probability = 1/54

Corners Correct, Edges Flipped

(r U R' U') M (U R U' R')
(R U R' U') M' (U R U' r')
E1 - 28 - Probability = 1/54
E2 - 57 - Probability = 1/108

P-Shapes

(R' U' F) (U R U' R') F' R
R U B' (U' R' U) (R B R')
P1 - 31 - Probability = 1/54
S (R U R' U') (R' F R f)
P2 - 32 - Probability = 1/54
f (R U R' U') f'
y2 F (U R U' R') F'
P3 - 43 - Probability = 1/54
P4 - 44 - Probability = 1/54
**I-Shapes**

I1 - 51 - Probability = 1/54

I2 - 52 - Probability = 1/54

**Fish Shapes**

F1 - 9 - Probability = 1/54

F2 - 10 - Probability = 1/54

F3 - 35 - Probability = 1/54

F4 - 37 - Probability = 1/54

**Knight Move Shapes**

K1 - 13 - Probability = 1/54

K2 - 14 - Probability = 1/54

K4 - 16 - Probability = 1/54

K3 - 15 - Probability = 1/54

**Awkward Shapes**

A1 - 29 - Probability = 1/54

A2 - 30 - Probability = 1/54

A3 - 41 - Probability = 1/54

A4 - 42 - Probability = 1/54
L-Shapes

L2 - 48 - Probability = 1/54
F (R U R' U') (R U R' U') F'
F' (L' U' L) (L' U' L) F
R' U' (R' F R F') (R' F R F') U R
L1 - 47 - Probability = 1/54

L3 - 49 - Probability = 1/54
r U' r2' U r2 U r2' U' r
r' U r2' U r2 U r2' U' r
y' (R U2 U' R U' R') F (R U R' U') F'
L5 - 53 - Probability = 1/54
L4 - 50 - Probability = 1/54

Lightning Bolts

B1 - 7 - Probability = 1/54
(r U R' U R U2' r')
y2 l' U' L U' L' U2 l
B2 - 8 - Probability = 1/54
(r' U' R U' R' U2) U M'
y F (R U R' U) F' U F (R U R' U) F'
B4 - 12 - Probability = 1/54
B3 - 11 - Probability = 1/54
(r' 2 R U' R U R2' U) U M'
y F (R U R' U) F' U F (R U R' U) F'
B5 - 39 - Probability = 1/54
B6 - 40 - Probability = 1/54

No Edges Flipped Correctly

O1 - 1 - Probability = 1/108
(R U2') (R2' F R F') U2' (R' F R F')
y (r U r') U2 R U2' R' U2 (r U r')
O2 - 2 - Probability = 1/54
O3 - 3 - Probability = 1/54
f (R U R' U') f' U' F (R U R' U') F'
f (R U R' U') f' U F (R U R' U') F'
O4 - 4 - Probability = 1/54
O5 - 17 - Probability = 1/54
y R U2' (R2' F R F') U2' M' (U R U' r')
(y R U2' (R2' F R F') U2' M' (U R U' r'))
O6 - 18 - Probability = 1/54
O7 - 19 - Probability = 1/54
M U (R U R' U') M' (R' F R F')
M U (R U R' U') M' (U R U' R' U2 r)
O8 - 20 - Probability = 1/216
(R U R' U) (R' F R F') U2' (R' F R F')
(R U R' U) (R F R F') U2' (R' F R F')