

# Letterblock Diceware Passwords

I wanted to give my son a diceware list and realized that giving him a printout of 5 pages in fine print would just not work out.

Diceware passwords use wordlists, but those are hard to type, because they have lots of letters. I've been using [Letterblock passwords](#) as shorter alternative for a while, but wanted a version that works offline. This is it.<sup>1</sup>

Aaron Toponce contributed many improvements to the [javascript implementation](#) (via his [gist](#)). Thank you!

To use Letterblock Diceware Passwords offline with dice, print business-cards with the following template. Deepest thank you goes to [Karol Koziol](#) who allowed me to use the business-card template under free licenses (see [letterblock-diceware-card.tex](#) for details).

|  |    |    |    |    |     |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
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| <p><b>Letterblock Diceware</b><br/>www.draketo.de/software/letterblock-diceware</p> <table border="1"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr><td>1</td><td>A</td><td>J</td><td>a</td><td>h</td><td>px</td></tr> <tr><td>2</td><td>26</td><td>BC</td><td>LR</td><td>bc</td><td>l r</td></tr> <tr><td>3</td><td>37</td><td>DH</td><td>N</td><td>d</td><td>j t</td></tr> <tr><td>4</td><td>48</td><td>E</td><td>PX</td><td>e</td><td>k u</td></tr> <tr><td>5</td><td>59</td><td>FK</td><td>U</td><td>f</td><td>m v</td></tr> <tr><td>6</td><td>0</td><td>QM</td><td>VW</td><td>gq</td><td>o w</td></tr> </table> <p>Example: NafuclupDwlt</p> | 1  | 2  | 3  | 4  | 5   | 6 | 1 | A | J | a | h | px | 2 | 26 | BC | LR | bc | l r | 3 | 37 | DH | N | d | j t | 4 | 48 | E | PX | e | k u | 5 | 59 | FK | U | f | m v | 6 | 0 | QM | VW | gq | o w | <p><b>Letterblock Diceware</b><br/>www.draketo.de/software/letterblock-diceware</p> <table border="1"> <tr><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td></tr> <tr><td>1</td><td>A</td><td>J</td><td>a</td><td>h</td><td>px</td></tr> <tr><td>2</td><td>26</td><td>BC</td><td>LR</td><td>bc</td><td>l r</td></tr> <tr><td>3</td><td>37</td><td>DH</td><td>N</td><td>d</td><td>j t</td></tr> <tr><td>4</td><td>48</td><td>E</td><td>PX</td><td>e</td><td>k u</td></tr> <tr><td>5</td><td>59</td><td>FK</td><td>U</td><td>f</td><td>m v</td></tr> <tr><td>6</td><td>0</td><td>QM</td><td>VW</td><td>gq</td><td>o w</td></tr> </table> <p>Example: NafuclupDwlt</p> | 1 | 2 | 3 | 4 | 5 | 6 | 1 | A | J | a | h | px | 2 | 26 | BC | LR | bc | l r | 3 | 37 | DH | N | d | j t | 4 | 48 | E | PX | e | k u | 5 | 59 | FK | U | f | m v | 6 | 0 | QM | VW | gq | o w |
| 1  | 2  | 3  | 4  | 5  | 6   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | A  | J  | a  | h  | px  |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 2  | 26 | BC | LR | bc | l r |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 3  | 37 | DH | N  | d  | j t |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 4  | 48 | E  | PX | e  | k u |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 5  | 59 | FK | U  | f  | m v |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 6  | 0  | QM | VW | gq | o w |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | 2  | 3  | 4  | 5  | 6   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | A  | J  | a  | h  | px  |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 2  | 26 | BC | LR | bc | l r |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 3  | 37 | DH | N  | d  | j t |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 4  | 48 | E  | PX | e  | k u |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
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| 6  | 0  | QM | VW | gq | o w |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
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| 1  | 2  | 3  | 4  | 5  | 6   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | A  | J  | a  | h  | px  |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 2  | 26 | BC | LR | bc | l r |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 3  | 37 | DH | N  | d  | j t |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 4  | 48 | E  | PX | e  | k u |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 5  | 59 | FK | U  | f  | m v |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 6  | 0  | QM | VW | gq | o w |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | 2  | 3  | 4  | 5  | 6   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | A  | J  | a  | h  | px  |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 2  | 26 | BC | LR | bc | l r |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 3  | 37 | DH | N  | d  | j t |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 4  | 48 | E  | PX | e  | k u |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 5  | 59 | FK | U  | f  | m v |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 6  | 0  | QM | VW | gq | o w |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
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| 1  | 2  | 3  | 4  | 5  | 6   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | A  | J  | a  | h  | px  |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 2  | 26 | BC | LR | bc | l r |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 3  | 37 | DH | N  | d  | j t |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 4  | 48 | E  | PX | e  | k u |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 5  | 59 | FK | U  | f  | m v |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 6  | 0  | QM | VW | gq | o w |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | 2  | 3  | 4  | 5  | 6   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | A  | J  | a  | h  | px  |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 2  | 26 | BC | LR | bc | l r |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 3  | 37 | DH | N  | d  | j t |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 4  | 48 | E  | PX | e  | k u |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 5  | 59 | FK | U  | f  | m v |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 6  | 0  | QM | VW | gq | o w |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
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| 1  | 2  | 3  | 4  | 5  | 6   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | A  | J  | a  | h  | px  |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 2  | 26 | BC | LR | bc | l r |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 3  | 37 | DH | N  | d  | j t |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 4  | 48 | E  | PX | e  | k u |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 5  | 59 | FK | U  | f  | m v |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 6  | 0  | QM | VW | gq | o w |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | 2  | 3  | 4  | 5  | 6   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | A  | J  | a  | h  | px  |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 2  | 26 | BC | LR | bc | l r |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 3  | 37 | DH | N  | d  | j t |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 4  | 48 | E  | PX | e  | k u |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 5  | 59 | FK | U  | f  | m v |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 6  | 0  | QM | VW | gq | o w |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
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| 1  | 2  | 3  | 4  | 5  | 6   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | A  | J  | a  | h  | px  |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 2  | 26 | BC | LR | bc | l r |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 3  | 37 | DH | N  | d  | j t |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 4  | 48 | E  | PX | e  | k u |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 5  | 59 | FK | U  | f  | m v |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 6  | 0  | QM | VW | gq | o w |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | 2  | 3  | 4  | 5  | 6   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 1  | A  | J  | a  | h  | px  |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 2  | 26 | BC | LR | bc | l r |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 3  | 37 | DH | N  | d  | j t |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 4  | 48 | E  | PX | e  | k u |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 5  | 59 | FK | U  | f  | m v |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |
| 6  | 0  | QM | VW | gq | o w |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |  |   |   |   |   |   |   |   |   |   |   |   |    |   |    |    |    |    |     |   |    |    |   |   |     |   |    |   |    |   |     |   |    |    |   |   |     |   |   |    |    |    |     |

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<sup>1</sup>Diceware also has [tables for random characters](#), but these do not create easy to memorize passwords.

# Contents

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## 1 Create a letterblock diceware password

Roll two dice per letter. If the result has multiple letters, choose the one which makes the password easiest to pronounce.

Roll up at least two blocks of four letters each. Each block has slightly more than 20 bits of entropy.

|   | 1  | 2  | 3  | 4  | 5 | 6  |
|---|----|----|----|----|---|----|
| 1 | 1  | A  | J  | a  | h | px |
| 2 | 26 | BC | LR | bc | i | r  |
| 3 | 37 | DH | N  | d  | j | t  |
| 4 | 48 | E  | PX | e  | k | u  |
| 5 | 59 | FK | U  | f  | m | v  |
| 6 | 0  | QM | VW | gq | o | w  |

After rolling the blocks, add the row-numbers (vertical) of the results of two consecutive blocks, take modulo 6, and choose from the following list:

| 0 | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| . | + | - | = | @ | % |

- 0, 6, 12, 18, 24, 30 = 0 ⇒ .
- 1, 7, 13, 19, 25, 31 = 1 ⇒ +
- 2, 8, 14, 20, 26, 32 = 2 ⇒ -
- 3, 9, 15, 21, 27, 33 = 3 ⇒ =
- 4, 10, 16, 22, 28, 34 = 4 ⇒ @
- 5, 11, 17, 23, 29, 35 = 5 ⇒ %

## 2 Example with 2 blocks, entropy 40: Niru=13J5

|          |    |    |    |    |
|----------|----|----|----|----|
| rolled:  | 33 | 52 | 62 | 64 |
| letters: | N  | i  | r  | u  |
| rolled:  | 11 | 13 | 31 | 15 |
| letters: | 1  | 37 | J  | 59 |

Separator: Add rows and take modulo:

rows: 3+2+2+4+1+3+1+5 = 21

modulo: 21 modulo 6 = 3 ⇒ =.

### 3 Background

This is an evolution of the older [Letterblock passwords](#) which use 55 letters that are unambiguous in **handwriting** and safe to use in URLs, grouped in **blocks** of four letters to make them easier to **remember**, with separators that work as weak **checksum** to catch many **typing errors** before even sending the password to the server, with weak optimization for legibility by creating 8 passwords and choosing the one with bigrams that are closest to regular prose.

This **letterblock diceware** uses **51** letters that are unambiguous to write by hand. Compared to regular letterblocks, n and G were removed, because unclear n often looks like a u and unclear G looks like 6, and s was removed because it often looks like 5:

```
define base51 "0123456789ABCDEFHJKLMNPQRTUVWXabcdefghijklmnopqrtuvwx"
```

As delimiters it only uses symbols that are available on every keyboard and are safe to use in most contexts:

```
define base51-delimiters ".+ -=@%"
```

To recover from common reading errors, use the following lookup table:

```
define base51-correct-reading-errors
  ' ; e . c: e = error, c = corrected
    G . 6
    I . 1
    O . 0
    S . 5
    Y . X
    Z . 2
    l . 1
    n . u
    s . 5
    y . x
    z . 2
```

The letters ordered by the probability of the most common bigram in which they are second letter in prose:

```
define letters-by-probability
  . "rheidtcguamobfkpxw0v981526437qBEjTDRANLPUWHFMCVKXQJ"
```

The 51 symbols are collapsed into 36 die-roll-results using four principles:

- Do not collapse vowels. They make for easier pronouncability.
- Do not collapse 1 and 0. They make for simpler compound numbers.

- Prefer collapsing uppercase letters. These are harder to type (you must hold down shift).
- Prefer collapsing rare consonants to make it less likely to hit uncommon sounds.

The entropy of these passwords is 5.17 per letter, without counting the delimiters. So you get roughly 20 bits of entropy per block. For details, see the [article about the previous version](#) (the math still applies, just with slightly changed parameters).

## 4 Comparison

A diceware password delivers 12.92 bits of entropy per word. 6 words of 3 to 6 letters provide 77 bits of entropy, while 4 blocks of a letterblock password provide 80 bits of entropy.

Diceware using the [eff memorable short word list](#) with only 4 rolls per word delivers 10.34 bits of entropy per word, so you need 8 words to have more than 80 bits of entropy. Since these words are 3-5 characters, a short **diceware** password will require typing roughly **twice as many characters** compared to a **letterblock diceware** password. It is easier to memorize, though (if you speak english).

I prefer letterblock diceware passwords, because I made too many typing errors with diceware.