Training step: 10k, Validation Perplexity: 7.84 out of 13 LEU ILE VAL MET Amino acid group ALA ASP 3 LYS GLU ARG PYL THR SER GLN ASN GLY THR SER GLN 2 TYR PHE LEU ILE VAL MET LYS GLU ARG PYL CYS SEC 1 **TRP** TRP HIS GLY XAA ASX GLX **PRO** 0 ASP PRO XAA ASX GLX HIS -1 CYS SEC TYR PHE -2 ALA -3 2 -2 0 4

Training step: 20k, Validation Perplexity: 7.59 out of 13 LEU ILE VAL MET Amino acid group ALA **ASP** 3 LYS GLU ARG PYL THR SER GLN ASN GLY THR SER GLN 2 TYR PHE LEU ILE VAL MET LYS GLU ARG PYL CYS SEC ASN 1 **TRP** HIS **GLY** XAA ASX GLX **PRO** 0 ASP PRO XAA ASX GLX -1 HIS CYS SEC TYR PHE -2 ALA -3 -2 0 3

Training step: 30k, Validation Perplexity: 7.4 out of 13 LEU ILE VAL MET Amino acid group ALA ASP 3 LYS GLU ARG PYL THR SER GLN ASN GLY THR SER GLN 2 TYR PHE LEU ILE VAL MET LYS GLU ARG PYL CYS SEC ASN 1 **TRP** HIS XAA ASX GLX **GLY PRO** 0 ASP PRO XAA ASX GLX -1 HIS CYS SEC TYR PHE -2 -3 0 -2 3 4

Training step: 40k, Validation Perplexity: 7.27 out of 13 LEU ILE VAL MET Amino acid group ALA ASP 3 LYS GLU ARG PYL THR SER GLN ASN GLY THR SER GLN 2 TYR PHE LEU ILE VAL MET LYS GLU ARG PYL CYS SEC ASN 1 **TRP** HIS XAA ASX GLX **GLY PRO** 0 ASP PRO XAA ASX GLX -1 HIS CYS \$EC TYR PHE -2 -3 -20 2

Training step: 50k, Validation Perplexity: 7.17 out of 13 LEU ILE VAL MET Amino acid group ALA ASP 3 LYS GLU ARG PYL THR SER GLN ASN **GLY** THR SER GLN 2 TYR PHE LEU ILE VAL MET LYS GLU ARG PYL CYS SEC ASN 1 **TRP** HIS XAA ASX GLX **GLY PRO** 0 PRO ASP XAA ASX GLX -1 HIS CYS \$EC TYR PHE -2 -3 2 -2 0 4

Training step: 60k, Validation Perplexity: 7.09 out of 13 LEU ILE VAL MET Amino acid group ALA 3 **ASP** LYS GLU ARG PYL THR SER GLN ASN GLY THR SER GLN 2 TYR PHE LEU ILE VAL MET LYS GLU ARG PYL CYS SEC ASN 1 **TRP** HIS XAA ASX GLX **GLY PRO** 0 PRO ASP XAA ASX GLX -1 CYS SEC HIS TYR PHE -2 -3-2 0 4

Training step: 70k, Validation Perplexity: 7.01 out of 13 LEU ILE VAL MET Amino acid group ALA 3 ASP LYS GLU ARG PYL THR SER GLN ASN GLY THR SER GLN 2 TYR PHE LEU ILE VAL MET LYS GLU ARG PYL CYS SEC 1 **TRP** HIS XAA ASX GLX **GLY PRO** 0 PRO XAA ASX GLX ASP -1 CYS \$EC HIS TYR PHE -2 -2 0 4

Training step: 80k, Validation Perplexity: 6.96 out of 13 LEU ILE VAL MET Amino acid group ALA 3 **ASP** LYS GLU ARG PYL THR SER GLN ASN **GLY** THR SER GLN 2 TYR PHE LEU ILE VAL MET LYS GLU ARG PYL CYS SEC 1 **TRP** HIS XAA ASX GLX **GLY PRO** 0 PRO XAA ASX GLX ASP -1 CYS \$EC HIS TYR PHE -2 3 -2 0 4

Training step: 90k, Validation Perplexity: 6.91 out of 13 LEU ILE VAL MET Amino acid group ALA 3 ASP LYS GLU ARG PYL ASN THR SER GLN GLY THR SER GLN 2 TYR PHE LEU ILE VAL MET LYS GLU ARG PYL CYS SEC 1 **TRP** HIS XAA ASX GLX GLY **PRO** 0 PRO XAA ASX GLX -1 CYS \$EC HIS TYR PHE -2 3 -2 0 4

Training step: 100k, Validation Perplexity: 6.85 out of 13 LEU ILE VAL MET Amino acid group ALA 3 **ASP** LYS GLU ARG PYL ASN GLY THR SER GLN 2 THR SER GLN TYR PHE LEU ILE VAL MET LYS GLU ARG PYL CYS SEC 1 **TRP** HIS XAA ASX GLX **GLY PRO** 0 PRO XAA ASX GLX -1 CYS \$EC HIS TYR PHE -2 3 -2 0 4

Training step: 110k, Validation Perplexity: 6.82 out of 13 LEU ILE VAL MET Amino acid group ALA 3 **ASP** LYS GLU ARG PYL ASN **GLY** THR SER GLN 2 THR SER GLN TYR PHE LEU ILE VAL MET LYS GLU ARG PYL CYS SEC 1 **TRP** HIS XAA ASX GLX **GLY PRO** 0 PRO XAA ASX GLX -1 CYS \$EC HIS TYR PHE -2 3 -2 0 4

Training step: 120k, Validation Perplexity: 6.79 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP** LYS GLU ARG PYL GLY ASN THR SER GLN 2 THR SER GLN TYR PHE LEU ILE VAL MET LYS GLU ARG PYL CYS SEC 1 **TRP** HIS XAA ASX GLX **GLY PRO** 0 PRO XAA ASX GLX -1 CYS \$EC HIS TYR PHE -2 3 -2 0 4

Training step: 130k, Validation Perplexity: 6.77 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP** LYS GLU ARG PYL GLY ASN THR SER GLN 2 THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX -1 CYS \$EC HIS TYR PHE -2 3 -2 0 4

Training step: 140k, Validation Perplexity: 6.72 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP** LYS GLU ARG PYL **GLY** ASN THR SER GLN 2 THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 TRP **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX CYS \$EC HIS TYR PHE -2 3 -2 0 4

Training step: 150k, Validation Perplexity: 6.69 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP** LYS GLU ARG PYL **GLY** ASN 2 THR SER GLN THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 TRP **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX -1 CYS SEC HIS TYR PHE -2 3 -2 0 4

Training step: 160k, Validation Perplexity: 6.67 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP** LYS GLU ARG PYL GLY ASN 2 THR SER GLN THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 TRP **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX -1 CYS SEC HIS TYR PHE -2 3 -2 0 4

Training step: 170k, Validation Perplexity: 6.64 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP** LYS GLU ARG PYL GLY ASN 2 THR SER GLN THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 TRP **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX -1 CYS SEC HIS TYR PHE -2 3 -2 0 4

Training step: 180k, Validation Perplexity: 6.62 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP** LYS GLU ARG PYL GLY ASN 2 THR SER GLN THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX -1 CYS SEC HIS TYR PHE -2 -2 0

Training step: 190k, Validation Perplexity: 6.62 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP** LYS GLU ARG PYL GLY ASN 2 THR SER GLN THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 TRP **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX -1 CYS SEC HIS TYR PHE -2 -20

Training step: 200k, Validation Perplexity: 6.59 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP** LYS GLU ARG PYL **GLY** ASN 2 THR SER GLN THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX -1 CYS SEC HIS TYR PHE -2 3 -2 0

Training step: 210k, Validation Perplexity: 6.56 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP** LYS GLU ARG PYL **GLY** ASN 2 THR SER GLN THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX -1 CYS SEC HIS TYR PHE -2 -20 4

Training step: 220k, Validation Perplexity: 6.56 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP** LYS GLU ARG PYL GLY ASN 2 THR SER GLN THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 TRP **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX -1 CYS SEC HIS TYR PHE -2 3 -24

Training step: 230k, Validation Perplexity: 6.55 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP** LYS GLU ARG PYL **GLY** ASN 2 THR SER GLN THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 TRP **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX -1 CYS SEC HIS TYR PHE -2 3 -2 0 4

Training step: 240k, Validation Perplexity: 6.54 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP GLY** LYS GLU ARG PYL ASN 2 THR SER GLN THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 TRP **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX CYS SEC -1 HIS TYR PHE -2 2 -20 4

Training step: 250k, Validation Perplexity: 6.52 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP** GLY LYS GLU ARG PYL ASN 2 THR SER GLN THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX CYS SEC -1 HIS TYR PHE -2 2 -2 4

Training step: 260k, Validation Perplexity: 6.5 out of 13 LEU ILE VAL MET Amino acid group 3 ALA **ASP GLY** LYS GLU ARG PYL ASN 2 THR SER GLN THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX CYS SEC -1 HIS TYR PHE -2 2 -2 0 4

Training step: 270k, Validation Perplexity: 6.5 out of 13 LEU ILE VAL MET 3 Amino acid group ALA **ASP** GLY LYS GLU ARG PYL ASN 2 THR SER GLN THR SER GLN TYR PHE LYS GLU ARG PYL LEU ILE VAL MET CYS SEC 1 **TRP** XAA ASX GLX HIS **GLY PRO** 0 PRO XAA ASX GLX CYS SEC -1 HIS TYR PHE -2 2 -2 4