# Supplementary Materials for Benchmarking Current RNA Folding Software and Improvements to the Current Regime

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# RNA Sequences Used in This Paper

#### 200

CCAAGGGUUUCCGGACUCAGUAUAAGUACACUUUGCUGAUAAGAGGCGUCACG UUUUGUAGAGCAGGUAGUAAAAGUAUCAUAUGGCAUAUCCUGCUUAAAUAUCC UGAUGCGACUACAAGGCAUCGUGACGCCUUGUCCGCGAGUGUCUGAGGCAGCA UAAUCCCGAUAGCCACAAAUACAGACCCCGGACGCUGACCU

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GAGGGCCUAGCGGCUACGCUAAGCCACAGCUGACGGUCAUAAUGGUUCAAGA GGCGAGGUUCAUCAAAAUCUAUUGCUCAAGGAGUUUGUGCCUAAAUCAAGGGA GGGUCUUCGUGAAGCGGUUAUGAGGACAUCUCGCACUGCCGGUCCUGAGACGU UAGGAUUUAGGGGCGUCCUGAAUGCUUGGCAUUCAACGGCAUCGACUAGCGGG AGCGGUCUCCGUGCCCAAACGUCAUUGCGGAAAACGAUUCGCACGCCUUGUC CACCGGCCGUCGUCCCGUGACAU

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AGGAGGUAACGCUGGAAAAACACCGCGGUGACCGGAAUAUACGUCAUCGUUAA
AUUUCAGUAGCUUAAGAUCAUUGUCCCUUUCGGAGAUGCAAUGCGGGGUCUAC
UCGAAUGGACUAUGUGAAUUUGCCACACCGUCAAGGGCAGAUAAAAGUGCGACC
UCGGCCGGCGGCUAAGCACUGGGAGGCGCUCCUUAUGAUAGAACAUGGACUUC
UGCCGGUUAAUACUCGUCUGCUAGGCUGUCGGGGAGAUAAGCGUCGAUAGGGC
AUUGAUUCUUGUUUCCAGCACUCCGGGGACCAGUUUAAGUUAAGAGUAGAUCA
CAUAGGAAGGGAGAUCUGGGCCCUUCCAUUGACCGGAGUUUACGGCGCGAGA
AGAUCGCGAGAUCCGAGUUCCUGUAGGCCUUGAGAAGUUGUCACUAGGAAUCU
UUUUAUCUAAAACGGUC

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GCCGGUCUCGUAGAGCCAUUCGAGGACAUUAACUAGGAGGAUAUCGGGUCACC
CAAAACUCUUUGCACUCGCUGGCUCAGUGUACUCAAAUGGAGUGCAGGAAGCG
UACUACGCCAGAGACGUAGCCAGAGACAAAUGAGGAAAGUCACACUUCUGCAU
GAUUUUCCUUACAUUUAUAUUACGACCCUGCAUAGGAGCUACGUAAAACUCGAC
UAUGCCGCCGCCACUUGUAUACCUUGAAAGGGCUGUGCUGUCGGUAUCUCUCG
UAAGAAUUGAGUUAACAUAAGCCGGCGCGCUUCUCCGACCGGCGCGAUGACGG
CACUACUAUUGAAAUUGGCACAGAUAGCCACCCCAUUACCAGUUCAGCGGCCG
CAUACAGCGUAAGGACCGAGAGGAGUUAUUGGGCAAUGUAUCACUCCCACUGG
UCGCGAGGCCGUCCGCCCCGCGUUUCAGGAGUAAACUCAGCUAGCGCCGAGAA
CUAUGCAUAAUGCUAUACAGCGAUACGUUAUAUCGAAAUUGCGCAGCUCCAUC
GGUAUCAGCGGAGAGAGAUGACCCAUAAUUUGUACGUUCCGUGAAGACCUAUUG
GUGGAGCAAUGAGCGUGAAGGCGACGCGGAAAGUUUAUCUUUUUCUUGUUGGG
AGCCAUCGAAU

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 CAACAUCGAUCAACCCGCUUCAUUUAUACCUCUUCGAGUGGAACCGCUGUGGU
CCAUCUUUGCUUGGUUAGUUAGACGGAUGAUUUUUAGCUGACAACAAUUUAAU
GGGUGGAUAGUUACGCCGACAAAGAACACCGCUGCUACUUCUAGGUGCCCUCG
AAAACAGGCACAAUUUCGGGUCAAAAUGGCUUACAAGGAUCCUCUCACAAUAU
UCACUUCGUUUAGCCGGCGCGCGCCGAGAGCUCCGAGGUCAUCGCUCCGAUCA
ACCGUGCCUUGAGCGAUUACAUAGAGUUAAAUGCACACGCCACGACAUACAAU
ACACAGUGGUUAGUCAGGCCUUCGAGGAGGCACAAAGAUAAAAAUAUCAGCUG
GUGCUCAUCGCAUGAGCGAGUGCUAGUGUGUGCCUAUUGCCCUCA
GUGUG

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GUGAUAGCUUCUCUACAGAUGCCAAAAACUAUUUCAUACUGACUCUACGAGCC UUCGAGACUACAAAAAACCGCCUAGCUACUAUUGAAUUACGUGGACGGCUGUG UGAUAGUGUUAGGCCAGGCUGACGCCCCGCUAUCUGCUUAAGCCACUGAGACA UAAUGGACCACAUCAGGUAUAUCUGGUAAAUUUUUUGCAAUACAGCGGGAGUCU GUAGCCGUACCGAGCUGCAAUACGCUAGCAUUGGCCGGUGUGCGGCCGAGUC UUGACCGUACUGUGGGAGUUAGUAGCAGGUCAUCCUCGUUGUAAUGAUCCCGG UAUUUAAAACCGAGUAAGUAGGAUUAUGUAUUCGAAACGUGGAACACGAUUUU CAGACCUUCUGGAUAUUAAAAGUCCGAGGGGCCUAUCACGACCGGAGUGAAAA AGUUCUCAUCGGUGACGCGAUAGGAGUUCCCGCUUGUUUGCAAUGCGCCUACC AUUCGGUCUUACAUUGAGUCCCGUCUCCACAUCAUCACGCCUGAUAGCAUCUCC CGGCGACCGUACCGAGAAAUGUGUUACUCGACUACGUAACUCUGGGUCCCUCU AGAAUAAAGGAACGCCAGUCGACACGGACCACGCGCACACAUGCAACAUG AGCUAGUUGGCGGGUAACGUAUGUGCCGCUUGCCAGUAGCAACAUUGCUAGCG UUUGUUGAUCUCGUACCACGCAGUUCGCUACCUGCGGAAACAGUGUACAGGG CAGUCAACCAGACAAAACGAUAUGCUACCGUUGUAUUUGAUUUACGUUGACAU CCAACCCACCAUAUUUGUUCCCCGGACAGGUCCUUCUCAUAAUAUUCCCU

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UACUUGGGAAAUCCUGUUAGCACCCGGCACUAUAGCGGAAGGUGUGUCCUAAC UAGUGUUAAGGACAAGCAUCUAAUAGCCACCAUCUACUAGAGCCCGAUAACCG UAGUGUUUGUUUAAUCAGUCUCCAGCUAGAGUGAUCACUGUUCAGUCGUG CACGACAAUUAUAGCUAAAAGCCCUGAUACGAACUUGUUGGGGACAAACAUUA ACUGACGGGCUAGACUUGGUUCCUCUAGCUUUUCUGCUGAACGUCGAGUGUU UGAAAUAACUCAGACACUCCUGCCAGGCCUACAUCAACCAGGCCGCACUCCCCG GAGUGUAGUUAUAGAGUGAAGGCUGAGAGGUGCAGGGAGAGCCGGACUAGGC CCACUCCUUUCUUGAUCGCAAUUCACAGUGAAUUCUCCCUUGAAACGCCAUGCC CUACCCUUUGACAUCAAAGCACCUUCUUAACCCACAACUCAAGGUGCCGGGUU CGCUCUCUUAAUUGCCUGCGGCCUACCCAGUACUGUCGGGAUGGCUGCUUUAA GGGUUGCGCGCGAGUCUAAAAUUUAUCGUGCCCGCCCUCAAUUAUGAUGCCAU CUGGUGCGUCAUCUCGCCGUUUACCAUCCGCACGAAAAGGCUAUUCGUUGC CAGCCAUGUGUCCACUCCAUCAUUCAAUGCAUCAAUUCGGUACCUUCGCUCCC GCUCCAUUUGGGAGUGCAUACGUCCUCACUGACUAUAAAGUGAAGGCUUCAGA GUCCUAGGUAGAUCUUCUUGCUGGUCGAGACUUGCCAAACGCUAAUAUAGCUA AGGACCGCAUUGACGAUGCUCGGGCAUGGUCCCAGGCAUAUUACCUAAGACAU GGCAGUAGAAAUAUCCAAUGAUGGCCAUGACGAACACCAGAACCCCGAGGGAU UCUGGAGCAUAGAAGAUGGAACAAAACUACCUGUAUCAGGCAUAUCAGAACCC AUCGGCUGAACCACUUCAUGGAUCACUGGUUUCAUCCUAUGGCGGCGGCUCGG CUAUAGGCCGACUGGGAUGCCGGCUCACUAGAUUUCCUGUUAGGGCAUGCCUG AGCUCCUAACAAUCCUUGUCUCGUCGUGGUAGUUCCGACCUUGGCGUAUG ACCCUGUACCUCCACGAUAGGCGUGCUUUUAGACCAGUGGUCUCAAGAUCAAU UUGGUGGGUCCCACCCACGCUAAACGUCGUGUCUGGGAAAGCAACAUACCAU CUCUCCGGGCCGAAAAGUGUGAGCAAACAUACUCUCUCGAAGAUGUAAGUGAG GACCGUAUCGAUCACCUGGCGGGGAGACCUAAAUCCAGACUAUCGUCUGGGCC ACACCAUUCUGUUUUCAGUACUCCCUAUGUGUACCGGCCUACGUGUAUUCUCA GUGAUUAGGUACAGCAAGAACACUUCAAUGAGCUCGGGAACAAGAAUUGCCG UCAGCAGUUACGUACAAGUUCCCGCAGUUUAUAGGCUCGAUGCAUCAGCGCUG CAUAGUCGACAUCCACGAUGAGUUGGCAUAUUAAUGCCUCUAACUUCAUGGAA UAUGUAUGGUUGAGUUCGUGCAUAGAGCCGUACAAUUACGUCGUAGUGCAACA CAGAAAUAUUUCGCAGGCUCAAGUUACCUACUAUGGAGUAGUACGUCUUCCGA AUAGGACAUCGAGUUUACAGCAUAUGGGUGGUUGUAACCCUGUUUAUUGACGG CCUUUGGCACGUGCAUUUACUACUCCUCAUUGGGCGCACAACUCACCUCAUAAC UGACAUAGACCGUUAGCCGACCUCGCUAGCUCCUGGAGCGGUUCAUAUCUCAC AAACUACUCUGCGAUUGAAAUACCGUUAAUUAUCUGAGGUUUUUUAGGCAAUCA UUUUCGUCUUCGCUCAAUCCUGUGGGUGACACAGC

AAUUUCGACCGUGGUGGGCAUUUAAGACGACUUCGUGGAUGUCCGGUGUGAAG ACUCCGCUAGCUACCGGCCUUCGUACUCAAGGAGUAGAGUCCAGACGUUCCUC GACUAGGAUUCGAGAAGAGCAAUUUCCGCACCGGCGGCGAGCUGAGUUUGCAA AUGGCGAGACCUGUCCGCGGGAUGCUUAGCAUAGUUUACUUAAGUCAUCGCUG AUAUCGGCUGGUGGGCUAACGGAACUAUCAGAGCGGUGAACUUUGCUCCCUUC GUACGUGUAGUACUUCCCAGAAACUUUGUUGUUAGGCCAACUUGUAUGGGCGC UGGCAGCAUGACGUAGCGCUGGGCUCUUAACGUCUGCGCACCAAUAUACGUUG UUUCGUGGGUUAACAACCCCAUAGACGUCGGAUCUGGCGGACUUCUAGUUGAA CGUAUGUAUCACGCGGUGGAACCGACGAUAUUCCCAAAUGGCUAAUGCAAGAC AGGCAUUACGGCGGUCGAUGUACUCUCCAUGACACAUUUCUCCAUGCGCCUGC AACAUUGUGCGCUAGCUUAGUUUUUUGUCGCAAUUGAUUUGGCAUUAGCACCC ACAAUCUCAGUACCGAGUGUAACAAUGAUUGCAUGGUGUGAUUGUCUGGUCAA AGGAAAGUGUGUAUUGGUGCACAAUACGGCGCGUCAUGACAUAACUACUCCGU AAACGCAACCUACAUUCAGUACGUCCGAAUACCAAAUGGGCACGCUUAGGUCG AUGCCUUCACAGGUACCCUCCCUAAUGAAUUCAAGUUCGUACCACUCAAUCCUU AGGCACCCGUCGCGCAACCCUAGGGCCGUUACUCACGCCUUCCGAAAAGGAG GGACUCUAUAGUACACGGUCGGCCCGGUGAUAAACACUAACGAAAGCAGUACA UGCGACGGUAGCCUUUCUAACUCAGCGUCGUGCUUAAACCACACAAAACGUAU AUCAAUUUCGAAGGAGGAUUGACCACAGAGCGACAGUUUAUGCGCCCUUAAUC  ${
m CUCUCGGAGUGUAAGGGCGACGUCUACUAGGAGGAGGCCGACCACCAGUAC}$ GGUAACUGUUGCGCACAGAGAACUUAAGGAUAAUCCUUGCAGAGGGAUAGUCU UCGAAUGCUCGAGCAACUGAAACGCCUGGACGGCCCCACGGCUGAUGCACCGC GCGUCACAACUGGACGACAGCGCACCACUGUCAGGCAGCUACAGCGGCGCGAA AUUUUAGAGUUGGGUUUGUUCUUAAGAAUAGGCAGGUAGGCUCCGUAGUUCGC CGAGCUACCGAAAGCAAUUUCCUGUGAACUGCAAAACUUAAGUGAGGGGCUGA ACGCAAUCCUAAGAGGAUAUGUUCUGUCGCCGAGCAGGAUUGGUCCCUGACCC AAUCCGCUUGUCGAUGUCUUUAUGUGUUCCCACUAUUUAAUGCCAUGAUAGGA GCCCUCCGUCGCCUCUUCGGAUAGCCGGUCGGGUAGGACCUAGACACGCUAU AUGAUGGCUCAACAUUACUGUCGUCUUUAGAUGAUGCAGGCCCAUUUGAAUUG AGAUGUCGAUCGCCAAGUUUUUGGGAAUGCUGCUAGGCCGAAAUGAGCAGGGC AGCAUCGCUACAGCAUUUAAUGUGGCUGGCGCAUGGAUAGAGUUCUUAGGUAU UACCCGAGGAUAUUCUUACGAGCGGUUUUAAUCUACUUACACCCGAUGGCACC GACAGUUGGUCGGAUUAUCGCCUGAUAGUCAGCCCAGUUCGAUCCGCCUUGUA UCGGCGAUUCCUUGGGACUCAACGAGCUAUUUUCUAACAGUGAGAACAUAUCG UUUGGGAGAACUCCACCGCCAUUAGCGGUCGGGAAUGUUACGUAUCGGUCUU GAUGUUUGGGCCAAAAAUUGUUCUUAGCGUGUCUCCACAAUCCUUUAAGAUUA CAUGGAGGCCUCUGGCUUAGUCGGCAAAGGAAGGUCGUCCACGCGCAGAACGA AACUACCGUUCCCGAGAUCGUAUCGGGUUAGAUCUUUGUAUACAUGUAGUCGC UUUCGUAGCAGGCCGACUAAUCUGGUAAAUUUGCGUCACUACGGUCUAAUGU GGAAAUAGCGAUGGUAUCCGUAGUUAAGCAGGUGAGCGUCGUUCUAGUAAAAU CCGGCUGUCCUUCUUGGGCAUGCAUAGCUAGCCAACUUGUGGGCUGCAAGUG CACACAGUGAAUCAGCCCUAUCGUCCGGUAAUCUAUUAUCUGCGUGCAGCAGA AGAUUCCUCUUCUCUACUACGCGUCCAAUUUGCCAUAGUCCGGCUGAGAUGC

#### 4000

ACGUGGCGCAAAUGAUUGACACUCUAAAGGUAUCAGUGGGAUGAUAAGACUCA UCAGCACCAACCCCUGAACACUCUCUUCGCCUAGGUGUAAGAUAUCUAGUCU GACAAUUACGAUAUCUUACCGCAGACGCUAUCGUGUAUGUUCCCCCUCAGCUA GCGGGAAGGCGUCUGAGUGAAGCGGAAACUGACUCCAAAUCCGUACUGCUAAC GGUUUUACUCAACUUCACAUAAUAACAAAAGAGUGUUAACGUCCGCGGGGCGC  ${\tt CGGGGGACUCAGAUAUUACCUAAGAAGGCUUGCGUGGAGCAGACUCAUACCCA}$ CCGAAGCCAGGAAAAGCCGAGAGAAAUCUCAUUAUCUAACGCGGCGUGCAUGG UACCGACCGCCGCAAGUACAAUAACGCUGUCGAUGGUUCCGGUGACUGUGU AACUCACACCAGUCUGCUAUGCCCUAAAAGUAAGUUCGUAUUUCCCGCUUGUC CUUUGAUUACAUAUAAUGAGGCAAAUAUCGGCUAAAGGCUGAAUUUUUGGGUC CGGCGGAAAGCUUCAAUCUACCGAUGCGUUGCGAUGGCUCCAAUCUGUUUGCU UAGCGGAGGACACUAUAAGCGGCGUGUUCCAGGACAAGUGGUCGCUGGUAGCC AGAGAGACAGGCUGGUAAGGUUAUUAAUUCACGAUACGGGACCGGGCUUACUU AUUUUCUAUGAAUUCAUUCCGCGUGCAUCCUCGAACACCUUAGACUCUUAGUC GAGGGUUAAAGAUGCCUGGCAUGACAGAGGUGUUCCCCCAGUACAAAAUCCAU AGAGUCGCUUGUCUAUUCAAGUUUGAAUGCAAUGGAGCUACUUCUUGCUACUG AUUACAAGUAUUCACUGAGCGAACGUGUUUACGACAGGAUGGGCUAAUUACUG CUAUACGGCAUUACAGGGCAUUGACACUGAUCUUUAACCAGCCACUCUAUUUA GCCUCAUGAAACUCGUCCCACGCUUGGCCUGGGAAUUUAUGCCGCACCAAGGC GUCGGCCUCCAGAGACCGUUUAUGUUCCAGAUUAAAGUAGGACGAGACGACUG GGGAAUGGGUUCCCGUCGCCUGUACGACGACGAGUGCAUCUGUUGUUUCAUCA CAGCCAUAACUGGCUAACACGUCUCAUACCAUAGCUGCACCUGAAUGGACCGC UGUAGGCGGAGGACGAAACAGCAAGGCGCAGACAAGGAUGUCUUCUUCGAUGC CGCAUACACCUUUUGACAGCUCCAUGCGUUCAGGGACCUGUUGCAGUCCGUU CUGCACUAGAAAAGGUAAUGUCUCCAAAAACUUUGGGCACGACCUAGACCCAG GCUGAUAUAGCUAUGAUCGCUUUACCGUGACGCAAUCUCAUUAGAAGCUUUGG GGAAGUUUAGAGACCCAUUAAGUGCACACCUAUGUGCUCGAAAGAGAUAGUCG UUUAGCACCAAACGCCGCUGCUCUAAAUUACGGACGCGCUUAUCAAGAUUGAU

AUCUACUCGUCCACCUACGUCGGUGGUCAGUUCUUCGAGUAUCGCUUGGUUCA UGCAUCGGUCCGAUAAUGGACUUGCAGCGUCGUGAACCGUUGUCCUGUAACGC CCGUACGUUACGCGAUUUUUUAGGUUUCUCCCAAUGAAUUGCUACCCGACCG GAGUUGGACUAACUUGGUCAAAGUGGGUUUAUCGCUAUCCUUACUGCUUUCAC UCGUACCCGAGGGCCUUCUGCUUGAGCCGCGAGUACCAUUGCGCGUUGGUCC GAAUCCCAUCGUUCUCGUGCUCAACGCUACUCGCCAUAGAUUUACGCAUGAUU AUACACAGCGUGAGUGUCGUCAUUGGUGAGGUCGUGAAGAGGGAUGGAGGAU GAAGUUCGAAGACAUGCGACCGUAGGGCGACUGGCCUUUCGCCUGGACCGUCC UAACACCAGAACUGCUCCAAUUGCCUGUGACCUUCUGUUAUACACUGCAGAAA AAAAUUCGCCAACUUCUUCGGGUGGAGUAACCGCGCGCAUAACGUAUGUAAGA CACAAAUGAGACCUAGCUGGAUGCGAUGGUGCCAAUGUGAGGUCGCUACCCCG UCAUGAGAAUACAUGCGGUCUACAAUAGUAGCAUCUCACAUUGGGUAAUCUUC UGUGUGGGCUUAUGGGUCGGUCACGCCCAAUCUAUGCUUCUAGCAACUAUGAU GGAUGUUGCAUACCCUGCCAUGUGUGACUAGACAUUGUUUUGAAUGGGCGCAA CCUGUCACCUAUGAUUUGAACCAUUCGUUGAUACACCUAACAAGUACCGAUCA GUCUCAUCAGUGACUCCCGAGUAUCAUGAACGUCAUCUGCUUGAGAGAUAGC GUUUCACACCCACCGAUUCGGUUCUAAGACCUUGUUUUUGAUGCUCUUGACC AGCUCGCUCCAGUAUGGGGCUCUAGCUCAUCUAUGAAACGGCACACCUCGCAU ACUCAGGCGUGUAAAAUCAUUAAGCCUGGCGGCACAUGCUCUUAUUUCCUAAG CGUGCAGGUGUUACUUUGAGAGCCAUAACAUCGGCGUACAGAAGGAUUUUCUU AUAAAAGCAAAGAAAGCACCCGGCAGAAUCGCGCCACAAAGCGUUCUACGCG CCACUAUCGGCUUUUCAAUCGGCACAUAGACACUGAACCUCGGAUGCCCUGGG CCUGACACCCACUUUCCGACCAGUUGGUGUUAUUCUUUUCUAAAAGAAUGC AGUCACAAAUUGGAGUUCUGGUCGCGCGAACGGUGUUAAGCAUAAUGAGCAGG AAAAAUUUCAACCCGAAUACACACUGCCAGACGAUGACUAUGCGUCACCGCAG GCGCACCGGCUCGCUGCGAAGAAAUGGUUUACUAGUCCAUCACAUUAAGGCCC UUCGCUAUGGCUAUCCUGAAAAGCUGAUUAGAUACGUCUGAGGUUUGCCGUGG GAGUCACUGACGAAAUCUACAACGUCCUGUAAGCUUUCGUGGGCGUGAUUUGG UUACAGUCGGCGAAUUAUCACCUUGGCUAACUCCGAAUAGAUACAAUGCGGUA ACUGCUGACGCCUAGUAUAACCAAGUCCACGCAUCCCCAUUCUGGCCCUAACAU GUUAAGAUUUUGGACCUCCGGACCAGCACGAAUUAGAGGCGCGUCUAUCUUGG GCUCAUAAAUUACCGUUGGACGCAUCACUUCGGUGGAGCCUUGCCGCCUUGAU AACCAAGUCGGACUCGUAGUCCCAGGAGUAUCUAGUCUGUGACCCAAGUCGUG GCUAGGAGGGAUGGCCCAUCGGGUGGGUAAUUUAAUGCCGUUAGAAUUGUC CCCGUGAUAAUGGUAUGUAAUAUACUCCAGUGACAGAGAUCUGAGUUGCCUGC GCGGUCUGGCUGCGAAUAUGGAAUAUCGACAGAAUAGUAUGUCAUAGCACCGU GACAGGUUUAGGGUACACCACGGUGGGGGUUCGUAGGAACGAGGUCUUUGCGA CCUCCAGUUGUGCACUGGUUGCAGUCUAUCUACAAUAGGUCCGAUAUUCACCC GAGACAGGUUAAAAACCGUGGCUAAUAGCCUCAUUUAUUCUUUGGCUGCACCU AGGAAGAGGACCGAGGCAGCAAUGCUCGUGGCGUUCCUACAGAAUGGUUACC CAUGCUACCUAAUUUCAUCACCCGCUCCCUAGGCACCAGCCCAUCGGAUAGUAC

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AGCGUACGCCAAACGCCCAAAUACAUCUAGGCAUUAGUGACCCCUCUGUCGCC AUACCAAGUCCGCACUCGGGGCAAAGGCGAUGCCCACAAACGACAACUGUAGU UAAUGUCACGAGGUUCGCCUGCAACCCUUCUAUCUGUCACACACUCGCACUGG UGUAAUUUUGGCGAGGUGCCAUUUCGAGUGAAGGCGACUUUCUCGGGCCUCUU CUUUUGAGUCACAAAUGCCGCUCGCAAAAUAAACAAUUAGUGGCAUGUCAUGC UAAUCUGUGUGAUUGAGUUCAACUAGCCUAAUCUACAAUAGCAGGGUGGCAAU UAUGAUCUACCAUACUUAGUAGGCCACAACGAAGCCUAACAUGAUCGAUACGA UAGCUAGUUCUUUUGCACGAUAGAUCUGAAUUCUGCUGGUUGCCUGACAAU UUCCGUCUGCUGAUUUAGAUAAAGCUCCUCUGUUUAUUUGCCCCGGGUGAUU CUAUAGCCUAUAGCCGAACUCAUCAUGCGAAUAGCCUUCCAAUGGCCCUCUUG CCAAUUCGUGUCUAUGGGCCUGCAACUCUAUACUCAUAUACCGACAGACCGGC GCCUUCCAGAUUUCCCGCUUAUAGGACUGAGACGGUCAAACCCUGAAACUCGA ACAUCCAUUUCGGAAUGAUCGGUUUUUCUUUUCGCGGAGUGAGCCAUUUAUAU CUUUUGAGUAAUGACCUGAGCCUCAGCCUGAAUCUAGCCGUCUGGGGCCGUC CUACUAAUAGGAGCGUGAAUGGAUGUUAAAAAGGCCUGAAGAGACCCUUCUUC UCGUCGAUGAUUAGCCGCCCAAAGCGGCUGGUUGGUCUGGCUAGAUUUCCAG ACUAGGGAGCCCUGUCAAUCGAGGUAUUAGCGGGCCUGGUAUUAGCAAAUCCU  ${\tt CCGACCCUCUCUGAUUUCCUGCGUAGGCUGGAUUCGCCGUUGCAAUAUCUACC}$ UAUGUACGCGGGACUACAUUAGGAAGGCUCAACACUAUUCCCGGGCUUUGCUA GACAUACAUUUCAUGAGUGAUGUAUCUCUUGCCUCACAAUGGUAUUCGGCGCG GGAAAGAGUCGCUUAGACGGUGAUUAUUCAGAGGAACUACCUCACCCAUUAUC GAAAAGUAAGACCAGGUCUUGGCAUGCCGCUUGAAUAAGGCCUAGAGACAACA GGCGCGAGCGACUAUCCCCCCCUUAAGGGAUUCAGUACAGACUAAGUAGGG CACUGUUAGGUACUUCAAGCGCUCUAAGCCAUGAGUCAUUUUGAUAGGUAAAG AAAUGCCAACCUGAGCAGAUUACCGGACGCCACGCCAUGAAGGAGGUGAUGGC GUAUCAUGAGGUUCGAUGGAUGCGACAUUGUGCUGAAUAGGGUUAAUUCAUAA CGACUACUUUCCGAGCUACACUACGGUUCGGUGCGUCGAUUUUCGCUUGUUCU CAUCCUACGCACAACGGUGUGUAGGUGACUAACAGCUUCGGCUUUAGGUUGUA AUACAUACUUGCGUCAGAGCAGCAACAUCGCGACUUAUUUACACAUAACGUAU CGUUGCCGGUUUAUAUUAUCGUCGGAAUAUAUCAUGAUGACUAGUUGGCUACG  ${\sf CAGGUUCUCGUCUGGGUCUGGAACGCAGAGACGCUGCACAAGGCUAGAAGCG}$  ${
m AGACAACCGAGUAGGUUGGGGUAUUACUUUGGGACGGAUUCAGCCUACGAGAA}$ GCAUAGGGUCAUUAUCCGCUAGUCAACAUUCGGGUGCCGCUCGGUACGGACGA AGGAAAAACACCCGUCAUGACGUCGAUAACACUUUGUAGAGAGGUUUCUUACG CGUAUCUUUCUGUCAUUCUGGGAAGAGUCCGUAAGCGAUGCCAUGCCCGAGAG AUCGUCUAUUAUAAAUGCGCAGGGGAGUCUAGAAUUUCUAUCACUAUAAUUCU GUGUCCGCCUAAACCGCCCGUGACAGUUGCGUUUGCUGGCAUAGCUGUGGCGG AUGACCACGAUUUGACAAAUUUCGAGGACGCUUCUACGGUGAAAGCAAGUUUU CCCGCGGAAACAAGCUCACGGCUACAGGAAAAUCAGAGCAUAACUCUCACAC AUCUAUCGGUCCCUUCCGAUGCCUAUCGAGCUACUCCCGGGGUUUUAGAUGCC UACACCGUAUGAUUGGUAAAGACGGUCUGUUAGAUUCUUCCCUUUGAGAGCAU GAGCAUCGAUGUUCACGUAAUCUACGGCUGUUGUGGGGCGUCCCACGUCUCCG UAUCCAAUUUAUGACCUAGAUCUGUCGAGGUGUGCAUAAGCCCAGCUACAUCC GGGCUAACGCUCGGACGGUCUCUCUAGAGGUACCGCCUGCACACAGCGCUAUA CAGGCAUCGCCAACUAAUGCUCAGUUAGUUUUACCCCUCUAGUCUCGGUAGCC UUUGUUGGACUGGACAUGACCUGACGAUUAUCAACCUAGACCUUGUGGGGCUG GUGCCAGUCCCAAACCGUUCGUGCCAAUACUUUGACAAUAGCUUAGUAAAGGC UAAAGAUGUUUGAUGUACGCUGGUGGCUGGUGAGUCGGGAUGGGACGUUGGU GCAAGGAGCUGACUGGUAUAAAUCUCUCUUCAGGGGGUUAUCCUCGAGGACUU UGGUCUGUCUCAGACGAAGUUGGCAAAUCACUUUGGGUUCUAAAAACAUGUUA UUUUGCCGCCGUGUGAGCUGAUUGCCCGUUGGGACGCCCUCUAAAACACUAC AAGGGAAUUGCUAUGACACUCAGCCUUCGUCGAUUAGCACGGGUGGUCCGUGA CGUCUGAUUCUGUUAUCAGGAAGUCCCCCUGAUCCCGGCUUGGAAGAAACAC CGGUUGCACCUAUCCGUUGGGAUUCCCAGCCUGUGGGAUCGAAUACGACUUUU CACAAGGUCUGAAGCGGACGCAUGAGCCACUCAGACAUCAGUCAUGUCAUCGA CUGCAUUUAAUGGCUCUCACUGCGUCUGGGCUUUUGAGCGAAUCUAAUUGUAA UGUGAUAAAUGACCGACGAGGUGUCUUCUUGGUAGUGAUCCGUGAUCACGUCC CCACACAGUUCGGAUCUUACGGUGGGACACUUUGCUCUGUCAUCAGUGUACUA CCAAUGUUUUGUAAAUUCUACGGUAUGACCACGGCCGCUGUUGGGAUAUGGUA  $\operatorname{CGUGAUUAAGCUGCAAGGAAACUUACAAAUUACGGUGAGGACACGGAAAGUAA$ AGUCUCCUAGUCACAGUACAGUAUGGUGGAGGUGACCUACGUCCACUUAUGUA  $\operatorname{CGGCUGACAAGGCACGGACGCUACACUUGUCUAGGACUCGGCCCUAACACAGC$ AGAACAUAUUCUCGGGUGAUUGGGGUCGGGCCUCCUUACGACGCCGAACGCCA GUUACCGCGGUGGAGUAUUUCACUUGACCGUACCAUAGACUCACAGUUGGGC AUUCCGUCAAACUUUUGCGCCAACGGGAUUGUCCCAUAGAGGAUUUGGGCAUU UACUGGGCACCGAGAUCCGCCCUUACCCAGAAUGCUCAUGAUGCGUCCCGUA UGGAUGAUGGCGCUCUGGAGACUCACCUCUGGAACCUCGCCGACCGCUACUAA UAUAGCCUUUACUAGUCUCAUAUUCGCGAUUGUCCACACAACAGUGGAAUCUU UCUGCCGUGUGCCGACCCGGGCCUCAAACAUUGAACCCAGAAAGUCGGGCUCA AGAGGUAUGGAACUCUCGUGGGAUGGUUGAAGAGCUGAUGAGAGUCAGCGCCU UGCGCGACCUGAUCAUUCCAGACUUUAACAAAGGAUCGCGGUAACUCUACGUA GGAACGCACAGCGCCUGACUCGCAUCCCUAGUGCCUAACAACGCGUCGCACGG  ${\tt CCGAACGCGUUGGUGGAAGAGUAGGAUCGCACGUGACAGGCAUAAUGACAGGU}$ CAUUGCAAAAGCGCUCUUCUUCAGGCAUCAGAAUGCGUAUUGCGACUACAUUU UUGCGCGCACCCCAAAGAGCAGAAACGGCUCAUCCGUUUGGCGCGUUGGUAAU AUGUCUGGAUGCUGGCUAGCCGCCGGUUAGUGCAAAUUGCGAGGGAAUAGAA  ${
m AUAGUGGACGACCAUGACCCGACCUAGCCCGACCCAAUAAACGGAAGGUUC}$ CAUACCGUGAACUGUCGCGUAGAGAGUUACAGGGAAAUAGUUCACUAAUCUUA GUUAGUCGCGGACCCACGUAUGCACGGGAGCGUGACGAUAGGGGGCCCU UUGGGAACCUUCCAAUUCCCAGAUCAACGGAUGGGGGUUUGAUGGGCAUUUUC ACGUGCGUCACUGUUAUUUAAGACCAUGGCUACCCCUGUACUUCAGCGGUAAA GUCCAUUCGGCGGCCUAGUCGAGGUAUGGGACACACUACCGGGCCACCCUAAU CCAUUUAUAAAAGAAUACGGAGAGCAACCAUACGCAACCUAUGUGCUUGACAG AGUAAUUCCCUAAACUUGACUACGCAGUAGGUUUAAGGGCCAAUGUGAUACUG CGAGUGGUUCUCUGCGAAGGCUCGUAGGCAGUGAUUCUAAAACCCUAGUAGUCACCAAGGCGAUAAGCGGUUUCCCAGCGCCCUAAUUGCGACUUUUACACUGGCG

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AAUCCUUCCACAGAACUAGAUCAGAUCGACGCACACACGUGGGCUAGAACAC GUGGUCGGAGGAGUAGCAUCUCGUGAUCCUAAUUUAGGUCAGUAGCUCAAAG GGAGAUUAGUGAAGUCCUCCGCCUUAAAGGGAUUGCUCGAUCUAUACUUUCUC UGCCUCGCCGUGAUCUAAAUAAGGGGCCUAAUUUAGACGCAGGUACGCGGAAG AGCCUACUCGUCCGACCACCCUCCGCCUGGUCCGUCAUAUAAACACAUGAGAG AGGCAUGACCUAUGUCUGUUAGCUAGAUAUCCUUACGACACCUUCAGGUAUCU UAAUCCCGCAAGAUAAACCACGGACCCGGGAAAACUCGGACUUACCCGGGGG GUUGGGACCCAUUUAGGACGAUGGAGGGUUAUAACUCGGCGAUACCUUCGCUG AGAGCCCUGCCGCGAAUCCACUAGUGGCUCCCCCCUAAGGGAGAGGAGUUCAGUCAGUGUGACUCACUUGCGCCCACUUUCGCUCGGUUUUCUCUUACUCCCCUU GAGAGCAUGCUGUCUUGAGGCCUUCCUUGAUUCUAAAUGUCUCGCAUAGUCCC GUCGCUGGGAUACUUUUCACAUACCUACGAGUUUUGCUUUUAAAAAACCGGCGA GUCAUGAUCUCAGCCAUUGGACUACCGACCACCUACUCACGCGAUGUGUUCAC CGGGCGAAUGUUGAGCGAGCGGCGUUCUGGGGAAGGAUUCAAUCGAUCCAGUG AGAUUACAUCGAACAGUGAACACGAUGUUCGCGGUAAGCACCCAUCUCAAGCA UAUGAUCCACUGAUGAUCCGUGUCCGGGGUGUAAGCAUAUUUACCCAAUUGCG GUUAAUCGCCUAGUCGUAUUUGUGUCUUAUACAAAUGUUACCAGAACCUGCUC UCGGCUUUAACGAAAGACGCAUGAAGCUGGGGGUGGCAGUACUUGCCACUGAA CUCUCCGCGAGCGAGGUGGGCAUUUGAGUCGCGCGCCCUUAGACUCAAUUCGG UUGGGCUGCGCGUCCGUGGACAGAGGGGGGGCACCUUCCAGUCUCCAAUGUC CGGCGCACUUCCAAAGGUGUCGCAAUGCACCUCGACGAUCCAUGCAGGAGAU UGGCGAGUAGGAAAGUGAUAUUUGAAUUGACAAUAGUGUGGCACAACGCCUU UCCACAAGGAUUUACGGUUUCCUAUCCACUCAUCGUUGGCGAGAAUGCCCCUC CAGGCAUGUGUGCACCAGCUACGCAAAUUUGCACUGGUCGUAGCAGCGCAUGG UGAACACCAAUUUGAGAGCCGGUUAAGCAUCCGAUCUACGUCUCCUUCGAC CGGCUAUGGUAAUACACGGAAUUAGGGUUCUAAAUUAUGUCCUAAGCUCCGCG ACUGGCGAGCAACUCGGUUUGGGCUUCCCGAUACUCUCCAUCUAUAAGGGCUA GGAGAUCGUGUAUAGGUAGGGCUGUGCCAUGCCCGUUUUGAACACUGGGGGU ACAAGGCAACUGGGCUAUGGGCCGUCGUCUAGUUAGUCUUACAGAUCUGUUGU CACUUCGCUGUUGAAGGUUCACACCGUUUCAAAGGAUCAUGUGAGGGGAACGA UGGGUGCAAGACAUUACAAAUGGUGAGGUCUCUGAAAGGUGCGCUGAUGGUUA UAUUAGUGAAUCCGGGCUAGUUGAAAAUUCAUCCGUCCCGGCGCGGAGGCUUG UGGCUUUCGUGACGAUAUGGCACCUCUCCGGGGCAAACGGUGGCGCACCUUUU CGCAUCUGUAUCUCCCUGCUAUCAGUCCGGCUACGAAGAUCGCUAGUUCUU

AGGUUGAGCACUCUAGUUCUAUAGGGACUGUCAGGCAUAAAGCGUCGGUACGU UUACCUCAAUGGGGAACGCAUCCGAAGGAGAGGGAAGUGGCUAGGGGUGGUG ACGUCAUCCCAAAAACAUACGCGCUUUGUAAAUUGCGCAAUGUCCAAUUAUAU GUCGGGUUGGCUACCAAUCAGGCAGGUCCUACAGGCUUGUACAAUGUGGCACG ACGCAAGCUUGUAUAUCAAGUCCUCGCGGUGUUACCAACAAAAGCAUGGCGCU GGGACCGUCUGGCUUCGCAUAGCAUAUUAAUACUGUUUACCUUACCUAGGAUC CUGCUACGCUCUGCACUGGACAUGCCACCCGUACUCAGCCCUCUUAUAAUGAG GUAUUGGUACGUAGCUACCCACAAAUAAUUCACCGAUUUUCGUUCUUCCAGC AAUGGAGAAAUUGGACUCCUGGUGGUCUCUAUCUUGUGACCAUGCAACCAGCU CGGUCUGCUAAACUGUAGGUUUAUUCAUUCGCUAGCCACCGUCACCUUCUUUU AGUUGCGAAGACACUAACAACGCUCCCUCAAAGAUGUCUGGACGGAGUUCA UGCUAGGGGGGGGUUCGAACAACCUAAAGCAGGGAGGUAUGCUGUCUUGGCG AUCCCGUUCGUGCCUUCGUGCUCAAUCAAAUACCGAGGCCAAGGUUUAUGCCA CAUUCUUCGUAAGUUGACCAUGGUAAAGAAAGGACUUAUAAUAGGUUGAGAGU GCCCGGAGUGACACCCCGCACUUGGUGGUAUGGGACUGCACCUUAGACCGCGG GUCAUUCUAGGGUUGCGGGGCAAUUCGAUAGGAGCCUGGAAUUUACGUUCAAG CGGCCGCCGAGACAGAAGGCGAGGUGAGCAGUCCUUAGUUCGUAUUACGCCAC AUAUACUAUGAUGCGGUUCGCCCUGAUUUCCCAUACGGCGCCUCGGAAACCC CAUUUUUAGUGAACCUUGGAUAUCUAUCGAAAGUAAUAGGUUCGUCAAGUCGC GGACACCACCCCAAAAUGAGAUGCCGUGCACGCGCUGCUGCCCUGUUAGGUC UUUUCUCGGCGGGACCAGUUCCUUGUUCCCGGUCUUCUAUUUAAAAUUAAGCC GCUUAGAUUUACGUCACACCUGUCUUGCUUAUCAAUAUUUCAGCUUCGUUUCA GAUACCGCGUCGGAUGGAAGGCAAAAACCGCGGAGCGUAGGGCGAACCUGC  ${\tt CGGCCCAACUAGCCAAGGGGUACAAAGGCUUCUCGUGCGCAUGGCGGGUCU}$ UGAACCCAUUUCCUCGAGGAGGCCUAUCUGAGUAACCUGCUGUUUGUCCCCG GGGUCUGAGGAAUUCUAAGUAGGGGAUCUUGAUAAGAUUAGUCGACUCGCGC UCAGCCUGCACUGAAGCUCAGCCUAAUAGGAUCGUUAACCCUUACUAACUGCA CCGACAGGCGUGGUAUUGACGUGAGGUCAUUUAUAAUACUGUCGGCGAGUGGG GGAUACUAGAUGUGGUCCCCGGGGGUUUGCAAUAUUCCGACCGUGCUUGAUUG GUCACCCUUCGAAUUGCAUGAAUGGCUUAGUCUCGAUGAAGCUAUUCGAGAAA UGCAUACAUAUUAGUCUCGUUCCUUUAACAGCGCCUCGACAGGGGGGCUCA UUUGAGCUAUGUGCGCCUCUAAGCUCACAGCAUCUCAGGGGCUAACCGUAAAA GUCAAAGAACCAUCUUCAGGCUGCACCCAAAAAUAGUCGUAAGCCGGUACCU AAGGUCUGCAGGGCAUUGGACAGUGAGUAAACAGAGCUCGCAGGUCUAGGUUG AGUUUGGGCGAGUGAUACGAGCCGGCAAACCCUCAGCUUCCGUCCCCGAUAAG UUUCUUCCCUAAUGCGCAGCGGAAUGUCUACCGCAAUCCGGUAGUCUACAUUU UUUUUUAGAGGCCCAUAACCGCAUGAUCCACAGUAUAGGUGCGCGCCUCUGGG UACGUUAGGAGGCUGCUACUGUUCUCAGUCGCAAACAGAUGGGGUAGCGUCAU CGUGGCGGCUAAAUCAAAUGGCGUGCUAGAAUGCUACUGUCUAAUAAAUCGGC CGACAGGGCUCUAGAAAAGGCAUAUACGGAAAUCGGGCGGCCUCUUUUCUAAC GUUCGGUCUUAAAUCUCUACGCGGGCCUGACUUAAUUUGGCACGCGGCAAGAC UGGAGGUUUCCUGAGGCCGCUUUAAUAUCAGACACAGCCUAGUUGGGGAUUU AAACUUUGUCGCGGUUCCCGCACAUGUUAGGCUUGUGGAGUCCAAGGAUAGGC UUGAGAAAUCUCCGUGUUGGCUCUUGUUAUUUGGAGAGCCAUACCUUUGCUAA UCACUAUGUGUCCUGCCCAGCACGUCACAGGACAGCGCUUGUUUACCCUAAGC UACUUCAAAUUAGAAUCGAGUUAGACGCAUUAGACGGACACAGCGCCCUCCC UCGCAACGAUGCAAACUGAAGGCCUUGGAUUGCGAACGACAGCGUUGGCAGUU  ${
m AAGGGUCAUAACGUGAUGUCACGCACCCGUGUAGAGACUGCACGCCUGGUUCC}$ GCAGAGUGGAACAGAAUGUUGCGCCUGAGCUCCGGGGUUCAGCAAUAGUUAUA CAUGCACCGGACCGUUGUACCACGUCAGGCCCAAACAAGAACUGCGAAUGUG UUUACAGAUGCUCUCCAUUUGGCUCCCGGGCGGUUGACUUUCAGAACUCAGCG CGUCAGUAUCCCCGAGUUCGUACCACCGCGUACAUAACCUGUUGGGACCCGAA CGCCACGAUGACGUGAGUAUGCCUAGGUCGCAUAUUCAUACUAUAACAUCCUG GAGGCCUCGGGAAGCAAUGCGCUAUCGGUCCAAAAAUAAACCGAACGCGGAUG UCUUAUGCUGCGGGCUCGUAGGCUAGUGUGAUUGUCGCUUGGCGGUGAUGACU UGAAUGACUGAACGGGACUUGGCUCCGUAUCUCCAGGCAUUUCGGUGA ACUAGGUAUUCCCGAGUGAUCUCACGUCUGAUGGAGGGUUAACAUAGUCUACG CAGCGCUUUUAGAUUACUUUAUUCAAGUUAGAAGCGGCUCUCGCGUUCUCAGG CACCAUGAAAGGCAACCGGCGCGUAGGAAUGACGAUGGACUCUACCCGUGAGG CGUAACCAGAGCCUGUGGAUAUUGUCUACUGAAUGGAUCUGAAGGAGUUUCAU CGUUCGUAGUGAGUAUAAGAAGUGUUUUGAAGGAGCCGAUACUACACCUCGAU UAUAAUGUUCUAUUACCAUAUCAAGCAGAGGCGAUGAAGACCCCAUCACACUU UAUAGUUUGCAUAAGCCACGCUUGGAUAACCCGGUGACAUUAGAGACCGUCGU AAUUCACUCUCCCAGGCGUGAACGCGUAAACCGAGUAGAUUUGUGCUUGCAUC UCCACUCCUUGCGUCUAGAUUAGACAAGCAGCCCUGUGACUAUUUGCCGUGC AGCUAACCUCGGAAUUCAACGAACGUAGCGAUAUCCCGAUUUAUGAUAGAGCC UAAUUAAUUACCAAGGGCGCUGUUUUAGAGUCAUCGCUAGCAAAAUCACUCUU CGGGGACGCUCGGCGCUCCAAGUCAUGGCAUGUGGCGAUAGCGUAAAGAGAAU AACGGACGGACACGAUUGCCGGUAUUUGGCAGACUUGACGCGAGCGGGAGUAU AAGGUUGCAAUACAAAUCAAGAGUUAACACUUAUGCUCGUGACCUCGUAUUCA UGCGAGGAGAUGGCCACUGUAUCUGCAUGAGCGGGUGCUGGUGAUUGCCUCCU UCUGAUUAUUCUAGUGGGAAAUCGAUUUUGCUACGUGUAAGACGCUUUUGAG CGACCCUGGAACAGCGUCUACCUAGCGCCGGUUACUAUCGGGCUUGAUAAGA AUUCUUCGUCGCCGCAAACUGACGCUCUGUGUAGUUAUAUCCGUCUGCUCAAG CUCACUUUCCCA