```
                                 ((((((((((((........))))))).(((((.......)))))).....(((((.....
chr-5.trna63-Val-TAC     GUUGCUGUGGUGUAG-UGGUCAUCACGUUAGUUUUACACACUAAAGGUCCCAGUUCGAU 59
chr-11.trna92-Val-TAC    GUUGCUGUGGUGUAG-UGGUCAUCACGUUAGUUUUACACACUAAAGGUCCCAGUUCGAU 59
chr-6.trna69-Val-TAC     GUUGCUGUGGUGUAG-UGGUCAUCACGUUAGUCUUACACACUAAAGGUCCCAGUUCGAU 59
chr-11.trna91-Val-TAC    GUUGCUGUGGUGUAG-UGGUUAUCACGUUAGUCUUACACACUAAAGGUCCCAGUUCGAU 59
chr-5.trna61-Val-TAC     GUUGCUGUGGUGUAG-UGGUUAUCACGUUAGUCUUACACACUAAAGGUCCCAGUUCGAU 59
chr-3.trna182-Val-TAC    GUUGUUGUGGUGUAG-UGGUUAUCACGUUAGUCUUACACACUAAAGGUCCCAGUUCGAU 59
chr-3.trna183-Val-TAC    GUUGUUGUGGUGUAG-UGGUUAUCACGUUAGUCUUACACACUAAAGGUCCCAGUUCGAU 59
chr-1.trna35-Val-TAC     GUUGUUGUGGUGUAG-UGGUUAUCACGUUAGUCUUACACACUAAAGGUCCCAGUUCGAU 59
chr-3.trna192-Val-TAC    GUUGCUGUGGUGUAG-UGGUUAUCAUGUUAGUCUUACACACUAAAGGUCCCAGUUCGAU 59
chr-5.trna37-Val-TAC     GUUGCUGUGGUGUAG-UGGUUAUCACGUCAGUCUUACACACUGAAGGUCCUCAGUUCGAU 59
chr-11.trna82-Val-TAC    GUUGCUGUGGUGUAG-UGGUUAUCACGUCAGUCUUACACACUGAAGGUCCCAGUUCGAU 59
chr-3.trna185-Val-TAC    GUUGUUGUGGUGUAG-UGGUUAUCACGUUAGUUUUACACACUAAAGGUCCCAGUUCAAA 59
chr-5.trna38-Val-TAC     GUUGCUGUGGUGUAG-UGGUUAUCACGUCAGUUUUACACACUGAAGGU-CCCAGUUCGAU 58
chr-3.trna184-Val-TAC    GUUGUUGUGGUGUAG-UGGUUAUCACAUUAGUCUUACACACUAGAGGUUCCCAUUUCGAU 59
chr-3.trna186-Val-TAC    GUUGUUAUGGUGCAG-UGAUUAUCACUUUAGUCUUACACACUAAAGGUCCCAGUUUGAU 59
chr-3.trna180-Val-TAC    GUUGUGGUGGUGUAG-UGGUUAUCACAUUAGUCUUACACACUAAAGGUCCCAGUUCGAU 59
chr-2.trna98-Val-CAC     GUUUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCCAGUUCAAA 60
chr-4.trna89-Val-CAC     GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCCGGUUCAAA 60
chr-2.trna39-Val-CAC     GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCCUAGUUCGAA 60
chr-1.trna79-Val-CAC     GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCCGGUUCGAA 60
chr-10.trna71-Val-CAC    GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCCGGUUCGAA 60
chr-4.trna88-Val-CAC     GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCCGGUUCGAA 60
chr-4.trna90-Val-CAC     GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCCGGUUCGAA 60
chr-5.trna11-Val-CAC     GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCCGGUUCGAA 60
chr-6.trna62-Val-CAC     GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCCGGUUCGAA 60
chr-10.trna73-Val-CAC    GUUUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCCGGUUCGAA 60
chr-8.trna72-Val-CAC     GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCCGGUUCGAA 60
chr-5.trna6-Val-CAC      GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCCAGUUCGAA 60
chr-5.trna5-Val-CAC      GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCUCAGUUCGAA 60
chr-5.trna41-Val-CAC     GUCUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACAUUAGAGGUCCCGGUUCGAA 60
chr-10.trna74-Val-CAC    GUCCGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCCGGUUUGAA 60
chr-5.trna3-Val-CAC      GUCUGGGUGGUGUAGUUGGUUAUCACGUUAGUCUCACACACUAGAGGUCCCAGUUCGAA 60
chr-5.trna4-Val-CAC      GUUUGGGUGGUGUAGUUGGUUAUCACGUUAGUCUCACACACUAGAGGUCCCAGUUCGAA 60
chr-5.trna116-Val-CAC    GUCUGGGUGGUGUAGUUGGUUAUCACAUUAGUCUCACACACUAAAGGUCUCGGUUCGAA 60
chr-5.trna39-Val-CAC     GUCUGGGUGGUAUAGUUGGUUAUCACGCUAAUCUCACACACUAGAGGUCCCGGUUUGAA 60
chr-10.trna75-Val-CAC    GUUUGGGUUGUGUAGUUGGUUAUCACGCUAGUUUCACACACUAGAAGUUCCCGGUUCGAA 60
chr-1.trna46-Val-AAC     GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUUUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-1.trna98-Val-AAC     GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-10.trna2-Val-AAC     GGUGUCGUGGUGUAGUUGGUUAUCACGUCAAUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-2.trna40-Val-AAC     GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-2.trna105-Val-AAC    GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-3.trna74-Val-AAC     GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-3.trna91-Val-AAC     GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-3.trna133-Val-AAC    GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-10.trna89-Val-AAC    GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-4.trna53-Val-AAC     GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-10.trna87-Val-AAC    GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-10.trna85-Val-AAC    GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-6.trna67-Val-AAC     GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-10.trna3-Val-AAC     GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-10.trna82-Val-AAC    GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-10.trna48-Val-AAC    GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-10.trna69-Val-AAC    GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-3.trna92-Val-AAC     GGUGUCGUGGUGUAGUUGGUUAUCACGUUAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-10.trna147-Val-AAC   GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCGAG 60
chr-7.trna87-Val-AAC     GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCGAG 60
chr-10.trna81-Val-AAC    GGUUUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCGAG 60
chr-10.trna47-Val-AAC    GGUGUCGUGGUGUAGUUGGUUAUCACGUCCGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-10.trna88-Val-AAC    AGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-10.trna90-Val-AAC    GGUGUCGUAGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-10.trna83-Val-AAC    GGUGUCGUGGUGUAGUUGGUUAUCAUGUCAGUCUAACAUACUGAAGGUUUCCGGUUCAAG 60
chr-10.trna84-Val-AAC    GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACAUACUA-AGGUCUCCGGUUCAAG 59
chr-10.trna46-Val-AAC    GGUAUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCGGUUCAAG 60
chr-1.trna59-Val-AAC     GGUGUCGUGGUGUAGUUGGUUAUCACGUCAGUCUAACACACUGAAGGUCUCCAGUUCAAG 60
chr-10.trna72-Val-CAC    GUUUGGGUGGUGUAGUUGGUUAUCACGCUAGUCUCACACACUAGAGGUCCUCAAUUCGAA 60
chr-1.trna60-Val-TAC     GGUGUAGUGGUGUAGUUGGUUAUCACGUCAGUUUUACACACCGAAGGUAUCCGGUUCGAA 60
chr-11.trna98-Val-GAC    GGGGUGGUGGCGCAGUUGGCUAGCGCGUAGGUCUGACAAUCCUGAGGUCGAGAGUUCGAG 60
chr-2.trna99-Val-TAC     GUUUGGGUGGUGUAGUUGGUUAUCAUGCUAGUCUUACACGCUAGAGGUCCCAGUUUGAA 60
chr-9.trna76-Val-CAC     GUCUGGGUGAUGUAGUUGGUUAUCACAUUAGUUUCACACACUAGAUGUCCUCGAAUUGAA 60
chr-2.trna28-Val-TAC     GCCUUUGUAGUCCAA-CGGUUAGGAUAAUUGCCUUACAAGCAAUAGA-CCCGGGUUUAAC 58
chr-5.trna89-Val-GAC     AGGGAUGUAACUUAGCGG--UAGAGUGUCACCUUGACGUGGUGGAAGUUAUCAGUUCGAG 58
chr-5.trna12-Val-GAC     AGGGAUAUAACUCAGCGG--UAGAGUGUCACCUUGACGUGGUGGAAGUUAUCAGUUCGAG 58
chr-9.trna94-Val-GAC     AGAGAUAUAACUCAGCGG--UAGAGUGUCACCUUGACGUGGUGGAAGUUAUCAGUUCGAG 58
                                 .........10........20........30........40........50.........
```



```
                                 ......))))).)))))).
chr-5.trna63-Val-TAC     C-----CUGGGCAGUAACA 73
chr-11.trna92-Val-TAC    C-----CUGGGCAGCAACA 73
chr-6.trna69-Val-TAC     C-----CUGGGCAGCAACA 73
chr-11.trna91-Val-TAC    C-----CUGGGCAGCAACA 73
chr-5.trna61-Val-TAC     C-----CUGGGCAGCAACA 73
chr-3.trna182-Val-TAC    C-----CUGGGCAACAACA 73
chr-3.trna183-Val-TAC    C-----CUGGGCAACAACA 73
chr-1.trna35-Val-TAC     C-----CUGGGCAGCAAUA 73
chr-3.trna192-Val-TAC    C-----CUGGGCAGCAACA 73
chr-5.trna37-Val-TAC     C-----CUGGGCAGUAACA 73
chr-11.trna82-Val-TAC    C-----CUGGGCAGCAACA 73
chr-3.trna185-Val-TAC    C-----UUGGGCAACAAUA 73
chr-5.trna38-Val-TAC     C-----CUGGGCAGCAACA 72
chr-3.trna184-Val-TAC    C-----UUGGGCAACAACA 73
chr-3.trna186-Val-TAC    C-----CUGGGCAACAACA 73
chr-3.trna180-Val-TAC    C-----CUGAGCAACAAUA 73
chr-2.trna98-Val-CAC     C-----CUGGGCUCAGACA 74
chr-4.trna89-Val-CAC     C-----CCGGGCUCAGACA 74
chr-2.trna39-Val-CAC     C-----CUGGGCUCAGACA 74
chr-1.trna79-Val-CAC     C-----CCGGGCUCAGACA 74
chr-10.trna71-Val-CAC    C-----CCGGGCUCAGACA 74
chr-4.trna88-Val-CAC     C-----CCGGGCUCAGACA 74
chr-4.trna90-Val-CAC     C-----CCGGGCUCAGACA 74
chr-5.trna11-Val-CAC     C-----CCGGGCUCAGACA 74
chr-6.trna62-Val-CAC     C-----CCGGGCUCAGACA 74
chr-10.trna73-Val-CAC    C-----CCGGGCUCAGACA 74
chr-8.trna72-Val-CAC     C-----CCGGGCUCAGACA 74
chr-5.trna6-Val-CAC      C-----CUGGGCUCAGACA 74
chr-5.trna5-Val-CAC      C-----CUGGGCUCAGACA 74
chr-5.trna41-Val-CAC     C-----CCGGGCUCAGACA 74
chr-10.trna74-Val-CAC    C-----CUGGGCUCAGACA 74
chr-5.trna3-Val-CAC      C-----CUGGGCUCAGACA 74
chr-5.trna4-Val-CAC      C-----CUGGGCUCAGACA 74
chr-5.trna116-Val-CAC    C-----CCGGGCUCAGACA 74
chr-5.trna39-Val-CAC     C-----CCGGGCUCAGACA 74
chr-10.trna75-Val-CAC    C-----CUGGGCUUAGACA 74
chr-1.trna46-Val-AAC     U-----CCGGGCGACGCCA 74
chr-1.trna98-Val-AAC     U-----CCGGGCGACGCCA 74
chr-10.trna2-Val-AAC     U-----CCGGGCGACGCCA 74
chr-2.trna40-Val-AAC     U-----CCGGGCGACGCCA 74
chr-2.trna105-Val-AAC    U-----CCGGGCGACGCCA 74
chr-3.trna74-Val-AAC     U-----CCGGGCGACGCCA 74
chr-3.trna91-Val-AAC     U-----CCGGGCGACGCCA 74
chr-3.trna133-Val-AAC    U-----CCGGGCGACGCCA 74
chr-10.trna89-Val-AAC    U-----CCGGGCGACGCCA 74
chr-4.trna53-Val-AAC     U-----CCGGGCGACGCCA 74
chr-10.trna87-Val-AAC    U-----CCGGGCGACGCCA 74
chr-10.trna85-Val-AAC    U-----CCGGGCGACGCCA 74
chr-6.trna67-Val-AAC     U-----CCGGGCGACGCCA 74
chr-10.trna3-Val-AAC     U-----CCGGGCGACGCCA 74
chr-10.trna82-Val-AAC    U-----CCGGGCGACGCCA 74
chr-10.trna48-Val-AAC    U-----CCGGGCGACGCCA 74
chr-10.trna69-Val-AAC    U-----CCGGGCGACGCCA 74
chr-3.trna92-Val-AAC     U-----CCGGGCGACGCCA 74
chr-10.trna147-Val-AAC   U-----CCGGGCGACGCCA 74
chr-7.trna87-Val-AAC     U-----CCGGGCGACGCCA 74
chr-10.trna81-Val-AAC    U-----CCGGGCGAAGCCA 74
chr-10.trna47-Val-AAC    U-----CCGGGCGACGCCA 74
chr-10.trna88-Val-AAC    U-----CCGGGCGACGCCA 74
chr-10.trna90-Val-AAC    U-----CCGGGCGACGCCA 74
chr-10.trna83-Val-AAC    U-----UCGGGCGACGCCA 74
chr-10.trna84-Val-AAC    U-----CCGGUCGACGCCA 73
chr-10.trna46-Val-AAC    U-----CCGGGCGACGCCA 74
chr-1.trna59-Val-AAC     U-----CCGGGCGACGCCA 74
chr-10.trna72-Val-CAC    C-----CCGGGCUCAGACA 74
chr-1.trna60-Val-TAC     U-----CUGGGCGACGCCA 74
chr-11.trna98-Val-GAC    C-----CUCUCUCACCCCA 74
chr-2.trna99-Val-TAC     CCUAGGCUGGGCUCAGACA 79
chr-9.trna76-Val-CAC     C-----UCAGGCUCAAACA 74
chr-2.trna28-Val-TAC     U-----CCCGGCAAACGCA 72
chr-5.trna89-Val-GAC     C-----CUGAUUAUCCCUA 72
chr-5.trna12-Val-GAC     C-----CUAAUUAUCCCUA 72
chr-9.trna94-Val-GAC     C-----CUGAUUAUCCCUA 72
                                 .........70........
```