CHALMERS UNIVERSITY OF TECHNOLOGY

Examination in Bioinformatics, MVE360
Monday 14 March 2016, 08:30-12:30

Solutions

Updated 2017-02-20

Question 1.
4 p

Question 2. Optimal local alignment score is 6. Two alignments have this score.
4 p

```
CTC
CTC

CCT
CCT
```

Score matrix should be given in full.

Question 3. a)
6 p
         b) gt$aag

Question 4. a) CCUCCC
3 p   b) CCUCC
           c) CC,U,UC
           d) CUUCC
           e) CCTCCC
           f) CCUTCCUTCCCT

Question 5.
13 p

a)
```perl
#!/usr/bin/perl

$sequence = "";

while ( <> ) {
        chomp;
        if ( /^[^>]/ ) {
                $sequence .= $_;
        }
}

if ( $sequence =~ /CCUCCUCCC/ ) {
    print "CCUCCUCCC found\n";
}
```

b,c)
```perl
$count = 0;

while ( $sequence =~ /(.{10})CCUCCUCCC(.{10})(.*)/ ) {
    print "$1  $2\n";
    $sequence = $3;
    $before = $1;
    $after = reverse($2);
    $after =~ tr/ACGU/UGCA/;
    $test_me = $before . "X" . $after;
    print "Testing: $test_me\n";
    if ( $test_me =~ /(.{5}).*X.*\1/ ) {
        ++$count;
        print "$1\n";
    }
}

print "$count\n";
```

Question 6.
8 p

Question 7.
8 p

Question 8.
14 p