```
 ********** Model Condition -model.10.5400000.0.000000037/ Replicate 1/ **********
 original tree (for debugging)
(5,((((6,(7,8)),1),(4,(10,2))),(3,9)),0)


quintet ['1', '3', '5', '7', '8']
U =  [955, 23, 22, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
 5 - taxon tree
/-------------------------------------------------------------------------------------------------------------------------------------------------------------------- 5/1
|
|                                                                                                                                        /--------------------------- 7/0
@                                                                                   /---------------------------0---------------------------0
|                           /---------------------------0---------------------------0                                                    \--------------------------- 8/0
|                           |                                                       |
\---------------------------1                                                       \-------------------------------------------------------------------------------- 1/0
                            |
                            \-------------------------------------------------------------------------------------------------------------0--------------------------- 3/0


 Newick of the above 5 - taxon tree
('5/1',(((('7/0','8/0')0)0,'1/0')0)0,('3/0')0)1)

 Analysis:-
 1)best score on the dataset -  0
 2) # edges that have the best score -  9


 ********** Model Condition -model.10.5400000.0.000000037/ Replicate 2/ **********
 original tree (for debugging)
((((10,3),(1,8)),(5,2)),(((9,6),4),7),0)


quintet ['1', '3', '5', '7', '8']
U =  [409, 304, 287, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
 5 - taxon tree
                                                                                /----------------------------------------0---------------------------------------- 3/0
                                        /---------------------------------------0
                                        |                                       |                                        /---------------------------------------- 1/0
/---------------------------------------17                                      \----------------------------------------0
|                                       |                                                                                \---------------------------------------- 8/0
@                                       |
|                                       \--------------------------------------------------------------------------------0---------------------------------------- 5/0
|
\----------------------------------------------------------------------------------------------------------------------17---------------------------------------- 7/17


 Newick of the above 5 - taxon tree
(((('3/0')0,('1/0','8/0')0)0,('5/0')0)17,('7/17')17)

 Analysis:-
 1)best score on the dataset -  0
 2) # edges that have the best score -  8


 ********** Model Condition -model.10.5400000.0.000000037/ Replicate 3/ **********
 original tree (for debugging)
(((9,1),6),((8,(((7,10),(3,4)),2)),5),0)


quintet ['1', '3', '5', '7', '8']
U =  [799, 83, 92, 14, 0, 2, 0, 0, 2, 0, 0, 2, 6, 0, 0]
 5 - taxon tree
/--------------------------------------------------------------------------------------------------------0--------------------------0--------------------------- 1/0
|
@                                                    /---------------------------------------------------------------------------------------------------------- 8/11
|                         /--------------------------0
|                         |                          |                                                    /--------------------------10------------------------- 7/10
\-------------------------0                          \--------------------------2--------------------------2
                          |                                                                               \--------------------------2-------------------------- 3/2
                          |
                          \----------------------------------------------------------------------------------------------------------------------------------------- 5/11


 Newick of the above 5 - taxon tree
((('1/0')0)0,(('8/11',((('7/10')10,('3/2')2)2)2)0,'5/11')0)

 Analysis:-
 1)best score on the dataset -  0
 2) # edges that have the best score -  5


 ********** Model Condition -model.10.1800000.0.000000111/ Replicate 1/ **********
 original tree (for debugging)
(5,((((6,(7,8)),1),(4,(10,2))),(3,9)),0)


quintet ['1', '3', '5', '7', '8']
U =  [681, 155, 153, 2, 3, 1, 0, 0, 1, 0, 0, 0, 4, 0, 0]
 5 - taxon tree
/-------------------------------------------------------------------------------------------------------------------------------------------------------------------- 5/5
|
|                                                                                                                                        /--------------------------- 7/1
@                                                                                   /---------------------------1---------------------------1
|                           /---------------------------1---------------------------1                                                    \--------------------------- 8/3
|                           |                                                       |
\---------------------------5                                                       \-------------------------------------------------------------------------------- 1/0
                            |
                            \-------------------------------------------------------------------------------------------------------------0--------------------------- 3/0


 Newick of the above 5 - taxon tree
('5/5',(((('7/1','8/3')1)1,'1/0')1)1,('3/0')0)5)

 Analysis:-
 1)best score on the dataset -  0
 2) # edges that have the best score -  3


 ********** Model Condition -model.10.1800000.0.000000111/ Replicate 2/ **********
 original tree (for debugging)
((((7,1),((9,6),(2,8))),5),(10,(3,4)),0)


quintet ['1', '3', '5', '7', '8']
U =  [302, 93, 92, 131, 55, 63, 1, 3, 59, 2, 4, 45, 136, 7, 7]
 5 - taxon tree
                                                                                                                                /--------------------------------- 7/61
                                                                /---------------------------------------------------------------52
                                /-------------------------------0                                                               \--------------------------------- 1/62
                                |                               |
/-------------------------------1                               \--------------------------------0--------------------------------0--------------------------------- 8/0
|                               |
@                               \---------------------------------------------------------------------------------------------------------------------------------- 5/8
|
\------------------------------------------------------------------------------------------------1--------------------------------1--------------------------------- 3/1


 Newick of the above 5 - taxon tree
(((('7/61','1/62')52,(('8/0')0)0,'5/8')1,(('3/1')1)1)
```

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 4

********** Model Condition -model.10.1800000.0.000000111/ Replicate 3/ **********
original tree (for debugging)
(((5,((7,6),((2,9),1))),(3,10)),(8,4),0)

quintet ['1', '3', '5', '7', '8']
U = [711, 39, 27, 102, 10, 8, 0, 0, 3, 0, 0, 4, 96, 0, 0]
5 - taxon tree

```
                                                              /-------------------------------------------------------------------------------------------- 5/3
                               /------------------------------0
                               |                              |                              /------------------------------14------------------------------ 7/14
/------------------------------14                             \------------------------------3
|                              |                                                             \------------------------------3------------------------------- 1/3
@                              |
|                              \--------------------------------------------------------------------------------------------0------------------------------- 3/0
|
\---------------------------------------------------------------------------------------------------------------------------14------------------------------ 8/14
```

Newick of the above 5 - taxon tree
((('5/3',(('7/14')14,('1/3')3)3)0,('3/0')0)14,('8/14')14)

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 3

********** Model Condition -model.10.600000.0.000000333/ Replicate 1/ **********
original tree (for debugging)
(5,((((6,(7,8)),1),(4,(10,2))),(3,9)),0)

quintet ['1', '3', '5', '7', '8']
U = [362, 203, 202, 28, 24, 32, 10, 12, 28, 6, 10, 29, 38, 7, 9]
5 - taxon tree

```
/----------------------------------------------------------------------------------------------------------------------------------------------------------- 5/1
|
|                                                                                                                                 /------------------------- 7/26
@                                                                             /-------------------------19-------------------------19
|                        /-------------------------0-------------------------0                                                    \------------------------- 8/32
|                        |                                                    |
\------------------------1                                                    \---------------------------------------------------------------------------- 1/3
                         |
                         \--------------------------------------------------------------------------------------------------------12------------------------- 3/12
```

Newick of the above 5 - taxon tree
('5/1',((((('7/26','8/32')19)19,'1/3')0)0,('3/12')12)1)

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 2

********** Model Condition -model.10.600000.0.000000333/ Replicate 2/ **********
original tree (for debugging)
(((2,6),((3,(4,((8,9),7))),10)),(5,1),0)

quintet ['1', '3', '5', '7', '8']
U = [470, 70, 85, 129, 28, 31, 0, 4, 26, 5, 1, 32, 111, 3, 5]
5 - taxon tree

```
                                                                   /------------------------------------------------------------------------------------------ 3/41
/----------------------0----------------------0---------------------0
|                                                                   |                                           /----------------------44--------------------- 8/44
|                                                                   \---------------------21---------------------21
@                                                                                                               \--------------------------------------------- 7/21
|
|                                                                                                                                     /---------------------- 5/18
\-------------------------------------------------------------------------------------------------------------------------------------0
                                                                                                                                      \---------------------- 1/0
```

Newick of the above 5 - taxon tree
(((('3/41',((('8/44')44,'7/21')21)21)0)0)0,('5/18','1/0')0)

Analysis:-
1)best score on the dataset - 0
2) # edges that have the best score - 5

********** Model Condition -model.10.600000.0.000000333/ Replicate 3/ **********
original tree (for debugging)
(((1,5),(2,(8,(4,3)))),(9,((10,6),7)),0)

quintet ['1', '3', '5', '7', '8']
U = [94, 86, 145, 51, 47, 80, 51, 41, 71, 64, 39, 60, 54, 41, 76]
5 - taxon tree

```
                                                                                                                            /------------------------------- 1/19
                               /--------------------------------------------------------------------------------------------6
                               |                                                                                            \------------------------------- 5/18
/------------------------------6
|                              |                              /-------------------------------------------------------------------------------------------- 8/21
@                              \------------------------------12------------------------------12
|                                                                                             \------------------------------20------------------------------ 3/20
|
\---------------------------------------------------------------------------------------------6------------------------------6------------------------------- 7/6
```

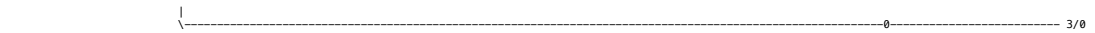
Newick of the above 5 - taxon tree
((('1/19','5/18')6,(('8/21',('3/20')20)12)12)6,(('7/6')6)6)

Analysis:-
1)best score on the dataset - 6
2) # edges that have the best score - 5

********** Model Condition -model.10.200000.0.000001000/ Replicate 1/ **********
original tree (for debugging)
(5,((((6,(7,8)),1),(4,(10,2))),(3,9)),0)

quintet ['1', '3', '5', '7', '8']
U = [182, 167, 161, 57, 43, 43, 30, 24, 43, 39, 48, 40, 48, 31, 44]
5 - taxon tree

```
/----------------------------------------------------------------------------------------------------------------------------------------------------------- 5/6
|
|                                                                                                                                 /------------------------- 7/13
@                                                                             /-------------------------0--------------------------0
|                        /-------------------------0-------------------------0                                                    \------------------------- 8/5
|                        |                                                    |
\------------------------6                                                    \---------------------------------------------------------------------------- 1/9
```

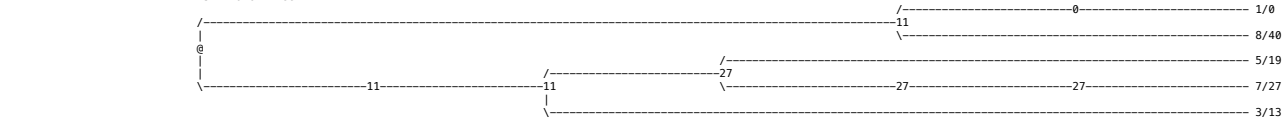


Newick of the above 5 – taxon tree
('5/6',(((((‘7/13','8/5')0)0,'1/9')0)0,('3/0')0)6)

Analysis:–
1)best score on the dataset – 0
2) # edges that have the best score – 6

********** Model Condition –model.10.200000.0.000001000/ Replicate 2/ **********
original tree (for debugging)
(((1,9),8),(((5,(10,(4,7))),3),(6,2)),0)

quintet ['1', '3', '5', '7', '8']
U = [152, 92, 91, 74, 85, 57, 41, 29, 72, 50, 37, 68, 67, 40, 45]
5 – taxon tree



Newick of the above 5 – taxon tree
((((‘1/0')0,'8/40')11,((('5/19',(('7/27')27)27)27,'3/13')11)11)

Analysis:–
1)best score on the dataset – 0
2) # edges that have the best score – 2

****
****

till ow we had the fixed quintet ['1', '3', '5', '7', '8']
for the following we will be analyzing the same tree with the quintet [‘0', '3', '5', '7', '8']
where 0 is the outgroup in the 10–taxon dataset

****

********** Model Condition –model.10.5400000.0.000000037/ Replicate 1/ **********
original tree (for debugging)
(5,((((6,(7,8)),1),(4,(10,2))),(3,9)),0)

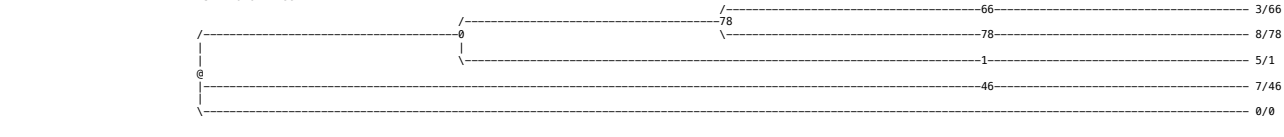
quintet ['0', '3', '5', '7', '8']
U = [499, 249, 252, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0]
5 – taxon tree

Newick of the above 5 – taxon tree
('5/3',(((((‘7/0','8/0')0)0)0)0,('3/0')0)0,'0/0')

Analysis:–
1)best score on the dataset – 0
2) # edges that have the best score – 10

********** Model Condition –model.10.5400000.0.000000037/ Replicate 2/ **********
original tree (for debugging)
((((10,3),(1,8)),(5,2)),(((9,6),4),7),0)

quintet ['0', '3', '5', '7', '8']
U = [149, 98, 127, 96, 63, 80, 22, 33, 93, 20, 22, 61, 95, 26, 15]
5 – taxon tree

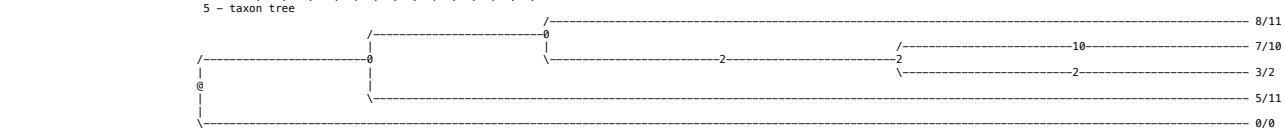


Newick of the above 5 – taxon tree
((((‘3/66')66,('8/78')78)78,('5/1')1)0,('7/46')46,'0/0')

Analysis:–
1)best score on the dataset – 0
2) # edges that have the best score – 2

********** Model Condition –model.10.5400000.0.000000037/ Replicate 3/ **********
original tree (for debugging)
(((9,1),6),((8,(((7,10),(3,4)),2)),5),0)

quintet ['0', '3', '5', '7', '8']
U = [799, 83, 92, 14, 0, 2, 0, 0, 2, 0, 0, 2, 6, 0, 0]
5 – taxon tree



Newick of the above 5 – taxon tree
((('8/11',((('7/10')10,('3/2')2)2)2)0,'5/11')0,'0/0')

Analysis:–
1)best score on the dataset – 0
2) # edges that have the best score – 3

```
 ********** Model Condition -model.10.1800000.0.000000111/ Replicate 1/ **********
 original tree (for debugging)
(5,((((6,(7,8)),1),(4,(10,2))),(3,9)),0)


quintet ['0', '3', '5', '7', '8']
U =  [399, 301, 295, 1, 1, 1, 1, 0, 0, 0, 1, 0, 0, 0, 0]
 5 - taxon tree
/------------------------------------------------------------------------------------------------------------------------------------------------------------------ 5/0
|
|                                                                                                                                       /-------------------------- 7/2
|                          /--------------------------0--------------------------0--------------------------0--------------------------0
@--------------------------0                                                                                                            \-------------------------- 8/0
|                          |
|                          \-----------------------------------------------------------------------------------------------------------1-------------------------- 3/1
|
\------------------------------------------------------------------------------------------------------------------------------------------------------------------ 0/6


 Newick of the above 5 - taxon tree
('5/0',((((('7/2','8/0')0)0)0)0,('3/1')1)0,'0/6')

 Analysis:-
 1)best score on the dataset -  0
 2) # edges that have the best score -  7


 ********** Model Condition -model.10.1800000.0.000000111/ Replicate 2/ **********
 original tree (for debugging)
((((7,1),((9,6),(2,8))),5),(10,(3,4)),0)


quintet ['0', '3', '5', '7', '8']
U =  [534, 80, 71, 115, 16, 32, 0, 1, 20, 2, 0, 25, 104, 0, 0]
 5 - taxon tree
                                                               /---------------------------------------------------------------43-------------------------------- 7/43
                               /-------------------------------20
/------------------------------0                               \-------------------------------20------------------------------20-------------------------------- 8/20
|                              |
|                              \------------------------------------------------------------------------------------------------------------------------------ 5/11
@
|----------------------------------------------------------------------------------------------16------------------------------16-------------------------------- 3/16
|
\----------------------------------------------------------------------------------------------------------------------------------------------------------------- 0/9


 Newick of the above 5 - taxon tree
(((('7/43')43,(('8/20')20)20)20,'5/11')0,(('3/16')16)16,'0/9')

 Analysis:-
 1)best score on the dataset -  0
 2) # edges that have the best score -  1


 ********** Model Condition -model.10.1800000.0.000000111/ Replicate 3/ **********
 original tree (for debugging)
(((5,((7,6),((2,9),1))),(3,10)),(8,4),0)


quintet ['0', '3', '5', '7', '8']
U =  [592, 161, 172, 17, 6, 8, 2, 0, 14, 1, 0, 13, 13, 0, 1]
 5 - taxon tree
                                                               /------------------------------------------------------------------------------------------------ 5/11
                               /-------------------------------13
/------------------------------0                               \-------------------------------13------------------------------13-------------------------------- 7/13
|                              |
|                              \---------------------------------------------------------------------------------------------7-------------------------------- 3/7
@
|----------------------------------------------------------------------------------------------------------------------------13-------------------------------- 8/13
|
\----------------------------------------------------------------------------------------------------------------------------------------------------------------- 0/0


 Newick of the above 5 - taxon tree
((('5/11',(('7/13')13)13)13,('3/7')7)0,('8/13')13,'0/0')

 Analysis:-
 1)best score on the dataset -  0
 2) # edges that have the best score -  2


 ********** Model Condition -model.10.600000.0.000000333/ Replicate 1/ **********
 original tree (for debugging)
(5,((((6,(7,8)),1),(4,(10,2))),(3,9)),0)


quintet ['0', '3', '5', '7', '8']
U =  [285, 244, 281, 19, 12, 30, 11, 11, 34, 10, 12, 15, 13, 10, 13]
 5 - taxon tree
/----------------------------------------------------------------------------------------------------------------------------------------------------------------- 5/66
|
|                                                                                                                                     /-------------------------- 7/8
|                         /--------------------------5--------------------------5--------------------------5--------------------------5
@-------------------------11                                                                                                          \-------------------------- 8/5
|                         |
|                         \-----------------------------------------------------------------------------------------------------------8-------------------------- 3/8
|
\----------------------------------------------------------------------------------------------------------------------------------------------------------------- 0/0


 Newick of the above 5 - taxon tree
('5/66',((((('7/8','8/5')5)5)5)5,('3/8')8)11,'0/0')

 Analysis:-
 1)best score on the dataset -  0
 2) # edges that have the best score -  1


 ********** Model Condition -model.10.600000.0.000000333/ Replicate 2/ **********
 original tree (for debugging)
(((2,6),((3,(4,((8,9),7))),10)),(5,1),0)


quintet ['0', '3', '5', '7', '8']
U =  [410, 107, 109, 99, 44, 44, 3, 3, 32, 7, 3, 36, 99, 2, 2]
 5 - taxon tree
                                                                    /------------------------------------------------------------------------------------------ 3/31
/----------------------0----------------------0---------------------0
|                                                                   |                                             /----------------------42---------------------- 8/42
|                                                                   \----------------------30---------------------30
@                                                                                                                 \---------------------------------------------- 7/30
|
|-----------------------------------------------------------------------------------------------------------------------------------2---------------------------- 5/2
|
\----------------------------------------------------------------------------------------------------------------------------------------------------------------- 0/0


 Newick of the above 5 - taxon tree
(((('3/31',((('8/42')42,'7/30')30)30)0)0)0,('5/2')2,'0/0')
```

```
 Analysis:-
 1)best score on the dataset -  0
 2) # edges that have the best score -  4


 ********** Model Condition -model.10.600000.0.000000333/ Replicate 3/ **********
 original tree (for debugging)
(((1,5),(2,(8,(4,3)))),(9,((10,6),7)),0)


quintet ['0', '3', '5', '7', '8']
U =  [112, 93, 117, 82, 71, 108, 32, 28, 106, 19, 32, 69, 62, 37, 32]
 5 - taxon tree
                                /------------------------------------------------------------------------------------------------135----------------------------- 5/135
/-------------------------------0
|                               |                                                                /--------------------------------------------------------------- 8/114
|                               \-------------------------------79-------------------------------79
@                                                                                                \-------------------------------92------------------------------ 3/92
|
|------------------------------------------------------------------------------------------------92------------------------------92------------------------------ 7/92
|
\---------------------------------------------------------------------------------------------------------------------------------------------------------------- 0/0


 Newick of the above 5 - taxon tree
((('5/135')135,(('8/114',('3/92')92)79)79)0,(('7/92')92)92,'0/0')

 Analysis:-
 1)best score on the dataset -  0
 2) # edges that have the best score -  2


 ********** Model Condition -model.10.200000.0.000001000/ Replicate 1/ **********
 original tree (for debugging)
(5,((((6,(7,8)),1),(4,(10,2))),(3,9)),0)


quintet ['0', '3', '5', '7', '8']
U =  [170, 179, 194, 29, 38, 53, 25, 35, 69, 38, 32, 35, 37, 32, 34]
 5 - taxon tree
/------------------------------------------------------------------------------------------------------------------------------------------------------------------ 5/78
|
|                                                                                                                                      /-------------------------- 7/22
|                         /--------------------------12-------------------------12--------------------------12-------------------------12
@-------------------------48                                                                                                           \-------------------------- 8/27
|                         |
|                         \------------------------------------------------------------------------------------------------------------16------------------------- 3/16
|
\------------------------------------------------------------------------------------------------------------------------------------------------------------------ 0/18


 Newick of the above 5 - taxon tree
('5/78',((((('7/22','8/27')12)12)12)12,('3/16')16)48,'0/18')

 Analysis:-
 1)best score on the dataset -  12
 2) # edges that have the best score -  4


 ********** Model Condition -model.10.200000.0.000001000/ Replicate 2/ **********
 original tree (for debugging)
(((1,9),8),(((5,(10,(4,7))),3),(6,2)),0)


quintet ['0', '3', '5', '7', '8']
U =  [123, 89, 132, 57, 57, 101, 40, 38, 76, 37, 32, 76, 64, 43, 35]
 5 - taxon tree
/-------------------------------------------------------------------------------------------------------------------------------------140------------------------ 8/140
|
|                                                                               /-------------------------------------------------------------------------------- 5/17
|                                                    /--------------------------33
@-------------------------53-------------------------53                         \--------------------------43-------------------------43------------------------- 7/43
|                                                    |
|                                                    \----------------------------------------------------------------------------------------------------------- 3/14
|
\---------------------------------------------------------------------------------------------------------------------------------------------------------------- 0/0


 Newick of the above 5 - taxon tree
(('8/140')140,((('5/17',(('7/43')43)43)33,'3/14')53)53,'0/0')

 Analysis:-
 1)best score on the dataset -  0
 2) # edges that have the best score -  1


 ********** Model Condition -model.10.200000.0.000001000/ Replicate 3/ **********
 original tree (for debugging)
(((10,9),(4,2)),((7,((3,6),(1,5))),8),0)


quintet ['0', '3', '5', '7', '8']
U =  [80, 88, 123, 64, 61, 96, 51, 36, 111, 55, 38, 48, 71, 33, 45]
 5 - taxon tree
                                                                /------------------------------------------------------------------------------------------------ 7/158
                                /-------------------------------8
                                |                               |                                /-------------------------------94------------------------------ 3/94
/-------------------------------8                               \--------------------------------109
|                               |                                                                \-------------------------------116----------------------------- 5/116
@                               |
|                               \-------------------------------------------------------------------------------------------------------------------------------- 8/145
|
\---------------------------------------------------------------------------------------------------------------------------------------------------------------- 0/8


 Newick of the above 5 - taxon tree
((('7/158',(('3/94')94,('5/116')116)109)8,'8/145')8,'0/8')

 Analysis:-
 1)best score on the dataset -  8
 2) # edges that have the best score -  3
```