Output For chorddemo.fish file

```
------------------- Network Topology -------------------
Node 0: started
Node 1: started
Node 2: started
Node 3: started
Node 4: started
Node 5: started
Node 6: started
Node 7: started
Node 8: started
Node 9: started
Node 10: started
Node 11: started
Node 12: started
Node 13: started
Node 14: started
Node 15: started
Node 16: started
Node 17: started
Node 18: started
Node 19: started
------------------- Build Chord Ring ---------------------
```

@ Creating the Ring

```
Node 0: I am:0, my key:3315427148.Joining 0
Node 0: create ring
Node 1: I am:1, my key:1194991458.Joining 0
Node 0: Only one node in ring and hence accept the joining msg of Node: 1
Node 2: I am:2, my key:1461312673.Joining 1
Node 3: I am:3, my key:998890467.Joining 2
Node 4: I am:4, my key:464336328.Joining 3
Node 5: I am:5, my key:2242526248.Joining 4
Node 6: I am:6, my key:3070643798.Joining 5
Node 7: I am:7, my key:658957974.Joining 0
Node 8: I am:8, my key:3224635303.Joining 1
Node 9: I am:9, my key:130236365.Joining 2
Node 10: I am:10, my key:2550696437.Joining 3
Node 11: I am:11, my key:111242462.Joining 8
Node 12: I am:12, my key:2801629341.Joining 9
Node 13: I am:13, my key:887973871.Joining 10
Node 14: I am:14, my key:3222236509.Joining 11
Node 15: I am:15, my key:3940518378.Joining 12
Node 16: I am:16, my key:105081023.Joining 0
Node 17: I am:17, my key:1645877774.Joining 1
Node 18: I am:18, my key:554958111.Joining 16
Node 19: I am:19, my key:3287313792.Joining 17
```

@ Printing the current status of the Ring

```
Node 0: RingState<0, 3315427148>: Pred<19, 3287313792>, Succ<15, 3940518378>
Node 15: RingState<15, 3940518378>: Pred<0, 3315427148>, Succ<16, 105081023>
Node 16: RingState<16, 105081023>: Pred<15, 3940518378>, Succ<11, 111242462>
Node 11: RingState<11, 111242462>: Pred<16, 105081023>, Succ<9, 130236365>
Node 9: RingState<9, 130236365>: Pred<11, 111242462>, Succ<4, 464336328>
Node 4: RingState<4, 464336328>: Pred<9, 130236365>, Succ<18, 554958111>
Node 18: RingState<18, 554958111>: Pred<4, 464336328>, Succ<7, 658957974>
```

```
Node 7: RingState<7, 658957974>: Pred<18, 554958111>, Succ<13, 887973871>
Node 13: RingState<13, 887973871>: Pred<7, 658957974>, Succ<3, 998890467>
Node 3: RingState<3, 998890467>: Pred<13, 887973871>, Succ<1, 1194991458>
Node 1: RingState<1, 1194991458>: Pred<3, 998890467>, Succ<2, 1461312673>
Node 2: RingState<2, 1461312673>: Pred<1, 1194991458>, Succ<17, 1645877774>
Node 17: RingState<17, 1645877774>: Pred<2, 1461312673>, Succ<5, 2242526248>
Node 5: RingState<5, 2242526248>: Pred<17, 1645877774>, Succ<10, 2550696437>
Node 10: RingState<10, 2550696437>: Pred<5, 2242526248>, Succ<12, 2801629341>
Node 12: RingState<12, 2801629341>: Pred<10, 2550696437>, Succ<6, 3070643798>
Node 6: RingState<6, 3070643798>: Pred<12, 2801629341>, Succ<14, 3222236509>
Node 14: RingState<14, 3222236509>: Pred<6, 3070643798>, Succ<8, 3224635303>
Node 8: RingState<8, 3224635303>: Pred<14, 3222236509>, Succ<19, 3287313792>
Node 19: RingState<19, 3287313792>: Pred<8, 3224635303>, Succ<0, 3315427148>
-------------------- Inject Data ------------------------------
Node 9: <Memphis, Grizzlies> hashKey:126663987


Node 16: <Boston, Celtics> hashKey:12238676


Node 12: <Cleveland, Cavaliers> hashKey:2619004665


Node 9: <Toronto, Raptors> hashKey:123823594


Node 12: <Milwaukee, Bucks> hashKey:2639866345


Node 5: <LosAngeles, Lakers> hashKey:1738426247


Node 1: <Portland, TrailBlazers> hashKey:1120908590


Node 5: <LosAngeles, Clippers> hashKey:1738426247


Node 9: <NewYork, Knicks> hashKey:119611988


Node 9: <Orlando, Magic> hashKey:122209019


Node 5: <Washington, Wizards> hashKey:2116082409


Node 10: <NewOrleans, Hornets> hashKey:2528980549
```

Node 16: <Miami, Heat> hashKey:1169827

Node 16: <Denver, Nuggets> hashKey:12540078

Node 9: <Philadelphia, 76ers> hashKey:124843390

Node 10: <SanAntonio, Spurs> hashKey:2464692905

Node 11: <Atlanta, Hawks> hashKey:109809025

Node 16: <Dallas, Mavericks> hashKey:12589838

Node 12: <OklahomaCity, Thunder> hashKey:2558072066

Node 14: <GoldenState, Warriors> hashKey:3083757157

Node 9: <Chicago, Bulls> hashKey:122380607

Node 11: <Indiana, Pacers> hashKey:109086173

Node 4: <Phoenix, Suns> hashKey:131713220

Node 9: <Houston, Rockets> hashKey:122387882

Node 15: <Sacramento, Kings> hashKey:3553910805

Node 12: <Charlotte, Bobcats> hashKey:2798370225

```
Node 16: <Utah, Jazz> hashKey:114945


Node 10: <Minnesota, Timberwolves> hashKey:2393697545


------------------- Lookup Test -----------------------------
```

@ Lookup the keys for Consistency Testing

```
Node 0: Values found after for LosAngeles are:

Node 0: <LosAngeles, Lakers> hashKey:1738426247
Node 0: <LosAngeles, Clippers> hashKey:1738426247



Node 4: Values found after for LosAngeles are:

Node 4: <LosAngeles, Lakers> hashKey:1738426247
Node 4: <LosAngeles, Clippers> hashKey:1738426247



Node 8: Values found after for LosAngeles are:

Node 8: <LosAngeles, Lakers> hashKey:1738426247
Node 8: <LosAngeles, Clippers> hashKey:1738426247



Node 12: Values found after for LosAngeles are:

Node 12: <LosAngeles, Lakers> hashKey:1738426247
Node 12: <LosAngeles, Clippers> hashKey:1738426247



Node 16: Values found after for LosAngeles are:

Node 16: <LosAngeles, Lakers> hashKey:1738426247
Node 16: <LosAngeles, Clippers> hashKey:1738426247
```

@ Lookinup the the different Keys

```
Node 7: Values found after for Philadelphia are:

Node 7: <Philadelphia, 76ers> hashKey:124843390


Node 8: Values found after for Boston are:

Node 8: <Boston, Celtics> hashKey:12238676
```

Node 9: Values found after for Dallas are:

Node 9: <Dallas, Mavericks> hashKey:12589838

Node 10: Values found after for Houston are:

Node 10: <Houston, Rockets> hashKey:122387882

Node 11: Values found after for Portland are:

Node 11: <Portland, TrailBlazers> hashKey:1120908590

------------------- Voluntary Leaving -------------------
Node 2: Receive data from node 1:
Node 2: <Portland, TrailBlazers> hashKey:1120908590

Node 17: Receive data from node 2:
Node 17: <Portland, TrailBlazers> hashKey:1120908590

Node 18: Receive data from node 4:
Node 18: <NewJersey, Nets> hashKey:352595115

Node 18: Receive data from node 4:
Node 18: <Phoenix, Suns> hashKey:131713220

------------------- Ring Size = 16 -------------------------
@ After leaving checking the consitency of the Keys

Node 0: RingState<0, 3315427148>: Pred<19, 3287313792>, Succ<15, 3940518378>
Node 15: RingState<15, 3940518378>: Pred<0, 3315427148>, Succ<16, 105081023>
Node 16: RingState<16, 105081023>: Pred<15, 3940518378>, Succ<11, 111242462>
Node 11: RingState<11, 111242462>: Pred<16, 105081023>, Succ<9, 130236365>
Node 9: RingState<9, 130236365>: Pred<11, 111242462>, Succ<18, 554958111>
Node 18: RingState<18, 554958111>: Pred<9, 130236365>, Succ<7, 658957974>
Node 7: RingState<7, 658957974>: Pred<18, 554958111>, Succ<13, 887973871>
Node 13: RingState<13, 887973871>: Pred<7, 658957974>, Succ<17, 1645877774>
Node 17: RingState<17, 1645877774>: Pred<13, 887973871>, Succ<5, 2242526248>
Node 5: RingState<5, 2242526248>: Pred<17, 1645877774>, Succ<10, 2550696437>
Node 10: RingState<10, 2550696437>: Pred<5, 2242526248>, Succ<12, 2801629341>
Node 12: RingState<12, 2801629341>: Pred<10, 2550696437>, Succ<6, 3070643798>
Node 6: RingState<6, 3070643798>: Pred<12, 2801629341>, Succ<14, 3222236509>
Node 14: RingState<14, 3222236509>: Pred<6, 3070643798>, Succ<8, 3224635303>
Node 8: RingState<8, 3224635303>: Pred<14, 3222236509>, Succ<19, 3287313792>

Node 19: RingState<19, 3287313792>: Pred<8, 3224635303>, Succ<0, 3315427148>

Node 0: LookupRequest<0, 3315427148>: RequestString<Philadelphia, 124843390),
NextHop<15, 3940518378>
Node 15: LookupRequest<15, 3940518378>: RequestString<Philadelphia, 124843390),
NextHop<16, 105081023>
Node 16: LookupRequest<16, 105081023>: RequestString<Philadelphia, 124843390),
NextHop<11, 111242462>
Node 11: LookupRequest<11, 111242462>: RequestString<Philadelphia, 124843390),
NextHop<9, 130236365>
Node 0: Values found after for Philadelphia are:

Node 0: <Philadelphia, 76ers> hashKey:124843390

Node 13: LookupRequest<13, 887973871>: RequestString<Philadelphia, 124843390),
NextHop<17, 1645877774>
Node 17: LookupRequest<17, 1645877774>: RequestString<Philadelphia, 124843390),
NextHop<5, 2242526248>
Node 5: LookupRequest<5, 2242526248>: RequestString<Philadelphia, 124843390),
NextHop<10, 2550696437>
Node 10: LookupRequest<10, 2550696437>: RequestString<Philadelphia, 124843390),
NextHop<12, 2801629341>
Node 12: LookupRequest<12, 2801629341>: RequestString<Philadelphia, 124843390),
NextHop<6, 3070643798>
Node 6: LookupRequest<6, 3070643798>: RequestString<Philadelphia, 124843390),
NextHop<14, 3222236509>
Node 14: LookupRequest<14, 3222236509>: RequestString<Philadelphia, 124843390),
NextHop<8, 3224635303>
Node 8: LookupRequest<8, 3224635303>: RequestString<Philadelphia, 124843390),
NextHop<19, 3287313792>
Node 19: LookupRequest<19, 3287313792>: RequestString<Philadelphia, 124843390),
NextHop<0, 3315427148>
Node 0: LookupRequest<0, 3315427148>: RequestString<Philadelphia, 124843390),
NextHop<15, 3940518378>
Node 15: LookupRequest<15, 3940518378>: RequestString<Philadelphia, 124843390),
NextHop<16, 105081023>
Node 16: LookupRequest<16, 105081023>: RequestString<Philadelphia, 124843390),
NextHop<11, 111242462>
Node 11: LookupRequest<11, 111242462>: RequestString<Philadelphia, 124843390),
NextHop<9, 130236365>
Node 13: Values found after for Philadelphia are:

Node 13: <Philadelphia, 76ers> hashKey:124843390

Node 19: LookupRequest<19, 3287313792>: RequestString<Philadelphia, 124843390),
NextHop<0, 3315427148>
Node 0: LookupRequest<0, 3315427148>: RequestString<Philadelphia, 124843390),
NextHop<15, 3940518378>
Node 15: LookupRequest<15, 3940518378>: RequestString<Philadelphia, 124843390),
NextHop<16, 105081023>
Node 16: LookupRequest<16, 105081023>: RequestString<Philadelphia, 124843390),

```
NextHop<11, 111242462>
Node 11: LookupRequest<11, 111242462>: RequestString<Philadelphia, 124843390),
NextHop<9, 130236365>
Node 19: Values found after for Philadelphia are:

Node 19: <Philadelphia, 76ers> hashKey:124843390



Node 5: LookupRequest<5, 2242526248>: RequestString<Philadelphia, 124843390),
NextHop<10, 2550696437>
Node 10: LookupRequest<10, 2550696437>: RequestString<Philadelphia, 124843390),
NextHop<12, 2801629341>
Node 12: LookupRequest<12, 2801629341>: RequestString<Philadelphia, 124843390),
NextHop<6, 3070643798>
Node 6: LookupRequest<6, 3070643798>: RequestString<Philadelphia, 124843390),
NextHop<14, 3222236509>
Node 14: LookupRequest<14, 3222236509>: RequestString<Philadelphia, 124843390),
NextHop<8, 3224635303>
Node 8: LookupRequest<8, 3224635303>: RequestString<Philadelphia, 124843390),
NextHop<19, 3287313792>
Node 19: LookupRequest<19, 3287313792>: RequestString<Philadelphia, 124843390),
NextHop<0, 3315427148>
Node 0: LookupRequest<0, 3315427148>: RequestString<Philadelphia, 124843390),
NextHop<15, 3940518378>
Node 15: LookupRequest<15, 3940518378>: RequestString<Philadelphia, 124843390),
NextHop<16, 105081023>
Node 16: LookupRequest<16, 105081023>: RequestString<Philadelphia, 124843390),
NextHop<11, 111242462>
Node 11: LookupRequest<11, 111242462>: RequestString<Philadelphia, 124843390),
NextHop<9, 130236365>
Node 5: Values found after for Philadelphia are:

Node 5: <Philadelphia, 76ers> hashKey:124843390
```

@ Reducing the ring size by quitting more Nodes

```
Node 8: Receive data from node 14:
Node 8: <GoldenState, Warriors> hashKey:3083757157



Node 16: Receive data from node 15:
Node 16: <Sacramento, Kings> hashKey:3553910805



Node 19: Receive data from node 8:
Node 19: <GoldenState, Warriors> hashKey:3083757157



------------------- Ring Size = 12 ------------------------
Node 12: RingState<12, 2801629341>: Pred<10, 2550696437>, Succ<6, 3070643798>
Node 6: RingState<6, 3070643798>: Pred<12, 2801629341>, Succ<19, 3287313792>
Node 19: RingState<19, 3287313792>: Pred<6, 3070643798>, Succ<0, 3315427148>
Node 0: RingState<0, 3315427148>: Pred<19, 3287313792>, Succ<16, 105081023>
```

```
Node 16: RingState<16, 105081023>: Pred<0, 3315427148>, Succ<11, 111242462>
Node 11: RingState<11, 111242462>: Pred<16, 105081023>, Succ<9, 130236365>
Node 9: RingState<9, 130236365>: Pred<11, 111242462>, Succ<18, 554958111>
Node 18: RingState<18, 554958111>: Pred<9, 130236365>, Succ<7, 658957974>
Node 7: RingState<7, 658957974>: Pred<18, 554958111>, Succ<17, 1645877774>
Node 17: RingState<17, 1645877774>: Pred<7, 658957974>, Succ<5, 2242526248>
Node 5: RingState<5, 2242526248>: Pred<17, 1645877774>, Succ<10, 2550696437>
Node 10: RingState<10, 2550696437>: Pred<5, 2242526248>, Succ<12, 2801629341>
```

@ Checking the hop by hop lookup bye lookupDebug Command

```
Node 12: LookupRequest<12, 2801629341>: RequestString<Philadelphia, 124843390),
NextHop<6, 3070643798>
Node 6: LookupRequest<6, 3070643798>: RequestString<Philadelphia, 124843390),
NextHop<19, 3287313792>
Node 19: LookupRequest<19, 3287313792>: RequestString<Philadelphia, 124843390),
NextHop<0, 3315427148>
Node 0: LookupRequest<0, 3315427148>: RequestString<Philadelphia, 124843390),
NextHop<16, 105081023>
Node 16: LookupRequest<16, 105081023>: RequestString<Philadelphia, 124843390),
NextHop<11, 111242462>
Node 11: LookupRequest<11, 111242462>: RequestString<Philadelphia, 124843390),
NextHop<9, 130236365>
Node 12: Values found after for Philadelphia are:

Node 12: <Philadelphia, 76ers> hashKey:124843390



Node 7: LookupRequest<7, 658957974>: RequestString<LosAngeles, 1738426247),
NextHop<17, 1645877774>
Node 17: LookupRequest<17, 1645877774>: RequestString<LosAngeles, 1738426247),
NextHop<5, 2242526248>
Node 7: Values found after for LosAngeles are:

Node 7: <LosAngeles, Lakers> hashKey:1738426247
Node 7: <LosAngeles, Clippers> hashKey:1738426247



Node 9: <Houston, Rockets> hashKey:122387882



Node 13: I am:13, my key:887973871.Joining 19
Node 14: I am:14, my key:3222236509.Joining 19
Node 14: Receive data from node 19:
Node 14: <GoldenState, Warriors> hashKey:3083757157



Node 15: I am:15, my key:3940518378.Joining 19
Node 15: Receive data from node 16:
Node 15: <Dallas, Mavericks> hashKey:12589838



Node 15: Receive data from node 16:
Node 15: <Boston, Celtics> hashKey:12238676
```

```
Node 15: Receive data from node 16:
Node 15: <Miami, Heat> hashKey:1169827



Node 15: Receive data from node 16:
Node 15: <Utah, Jazz> hashKey:114945



Node 15: Receive data from node 16:
Node 15: <Denver, Nuggets> hashKey:12540078



------------------- Ring Size = 15 ------------------------
```

@ checking the current status of the Ring bye ringstate command

```
Node 13: RingState<13, 887973871>: Pred<7, 658957974>, Succ<17, 1645877774>
Node 17: RingState<17, 1645877774>: Pred<13, 887973871>, Succ<5, 2242526248>
Node 5: RingState<5, 2242526248>: Pred<17, 1645877774>, Succ<10, 2550696437>
Node 10: RingState<10, 2550696437>: Pred<5, 2242526248>, Succ<12, 2801629341>
Node 12: RingState<12, 2801629341>: Pred<10, 2550696437>, Succ<6, 3070643798>
Node 6: RingState<6, 3070643798>: Pred<12, 2801629341>, Succ<14, 3222236509>
Node 14: RingState<14, 3222236509>: Pred<6, 3070643798>, Succ<19, 3287313792>
Node 19: RingState<19, 3287313792>: Pred<14, 3222236509>, Succ<0, 3315427148>
Node 0: RingState<0, 3315427148>: Pred<19, 3287313792>, Succ<15, 3940518378>
Node 15: RingState<15, 3940518378>: Pred<0, 3315427148>, Succ<16, 105081023>
Node 16: RingState<16, 105081023>: Pred<15, 3940518378>, Succ<11, 111242462>
Node 11: RingState<11, 111242462>: Pred<16, 105081023>, Succ<9, 130236365>
Node 9: RingState<9, 130236365>: Pred<11, 111242462>, Succ<18, 554958111>
Node 18: RingState<18, 554958111>: Pred<9, 130236365>, Succ<7, 658957974>
Node 7: RingState<7, 658957974>: Pred<18, 554958111>, Succ<13, 887973871>
```

@ Checking the hop by hop lookup bye lookupDebug Command

```
Node 13: LookupRequest<13, 887973871>: RequestString<Philadelphia, 124843390),
NextHop<17, 1645877774>
Node 17: LookupRequest<17, 1645877774>: RequestString<Philadelphia, 124843390),
NextHop<5, 2242526248>
Node 5: LookupRequest<5, 2242526248>: RequestString<Philadelphia, 124843390),
NextHop<10, 2550696437>
Node 10: LookupRequest<10, 2550696437>: RequestString<Philadelphia, 124843390),
NextHop<12, 2801629341>
Node 12: LookupRequest<12, 2801629341>: RequestString<Philadelphia, 124843390),
NextHop<6, 3070643798>
Node 6: LookupRequest<6, 3070643798>: RequestString<Philadelphia, 124843390),
NextHop<14, 3222236509>
Node 14: LookupRequest<14, 3222236509>: RequestString<Philadelphia, 124843390),
NextHop<19, 3287313792>
Node 19: LookupRequest<19, 3287313792>: RequestString<Philadelphia, 124843390),
NextHop<0, 3315427148>
Node 0: LookupRequest<0, 3315427148>: RequestString<Philadelphia, 124843390),
NextHop<15, 3940518378>
Node 15: LookupRequest<15, 3940518378>: RequestString<Philadelphia, 124843390),
NextHop<16, 105081023>
```

Node 16: LookupRequest<16, 105081023>: RequestString<Philadelphia, 124843390),
NextHop<11, 111242462>
Node 11: LookupRequest<11, 111242462>: RequestString<Philadelphia, 124843390),
NextHop<9, 130236365>
Node 13: Values found after for Philadelphia are:

Node 13: <Philadelphia, 76ers> hashKey:124843390

Node 14: LookupRequest<14, 3222236509>: RequestString<LosAngeles, 1738426247),
NextHop<19, 3287313792>
Node 19: LookupRequest<19, 3287313792>: RequestString<LosAngeles, 1738426247),
NextHop<0, 3315427148>
Node 0: LookupRequest<0, 3315427148>: RequestString<LosAngeles, 1738426247),
NextHop<15, 3940518378>
Node 15: LookupRequest<15, 3940518378>: RequestString<LosAngeles, 1738426247),
NextHop<16, 105081023>
Node 16: LookupRequest<16, 105081023>: RequestString<LosAngeles, 1738426247),
NextHop<11, 111242462>
Node 11: LookupRequest<11, 111242462>: RequestString<LosAngeles, 1738426247),
NextHop<9, 130236365>
Node 9: LookupRequest<9, 130236365>: RequestString<LosAngeles, 1738426247),
NextHop<18, 554958111>
Node 18: LookupRequest<18, 554958111>: RequestString<LosAngeles, 1738426247),
NextHop<7, 658957974>
Node 7: LookupRequest<7, 658957974>: RequestString<LosAngeles, 1738426247),
NextHop<13, 887973871>
Node 13: LookupRequest<13, 887973871>: RequestString<LosAngeles, 1738426247),
NextHop<17, 1645877774>
Node 17: LookupRequest<17, 1645877774>: RequestString<LosAngeles, 1738426247),
NextHop<5, 2242526248>
Node 14: Values found after for LosAngeles are:

Node 14: <LosAngeles, Lakers> hashKey:1738426247
Node 14: <LosAngeles, Clippers> hashKey:1738426247

Node 15: LookupRequest<15, 3940518378>: RequestString<Houston, 122387882),
NextHop<16, 105081023>
Node 16: LookupRequest<16, 105081023>: RequestString<Houston, 122387882),
NextHop<11, 111242462>
Node 11: LookupRequest<11, 111242462>: RequestString<Houston, 122387882),
NextHop<9, 130236365>
Node 15: Values found after for Houston are:

Node 15: <Houston, Rockets> hashKey:122387882

Node 1: I am:1, my key:1194991458.Joining 13
Node 1: Receive data from node 17:
Node 1: <Portland, TrailBlazers> hashKey:1120908590

Node 2: I am:2, my key:1461312673.Joining 15
Node 2: Receive data from node 17:

Node 2: <Portland, TrailBlazers> hashKey:1120908590

-------------------- Ring Size = 17 ------------------------

Node 1: RingState<1, 1194991458>: Pred<13, 887973871>, Succ<2, 1461312673>
Node 2: RingState<2, 1461312673>: Pred<1, 1194991458>, Succ<17, 1645877774>
Node 17: RingState<17, 1645877774>: Pred<2, 1461312673>, Succ<5, 2242526248>
Node 5: RingState<5, 2242526248>: Pred<17, 1645877774>, Succ<10, 2550696437>
Node 10: RingState<10, 2550696437>: Pred<5, 2242526248>, Succ<12, 2801629341>
Node 12: RingState<12, 2801629341>: Pred<10, 2550696437>, Succ<6, 3070643798>
Node 6: RingState<6, 3070643798>: Pred<12, 2801629341>, Succ<14, 3222236509>
Node 14: RingState<14, 3222236509>: Pred<6, 3070643798>, Succ<19, 3287313792>
Node 19: RingState<19, 3287313792>: Pred<14, 3222236509>, Succ<0, 3315427148>
Node 0: RingState<0, 3315427148>: Pred<19, 3287313792>, Succ<15, 3940518378>
Node 15: RingState<15, 3940518378>: Pred<0, 3315427148>, Succ<16, 105081023>
Node 16: RingState<16, 105081023>: Pred<15, 3940518378>, Succ<11, 111242462>
Node 11: RingState<11, 111242462>: Pred<16, 105081023>, Succ<9, 130236365>
Node 9: RingState<9, 130236365>: Pred<11, 111242462>, Succ<18, 554958111>
Node 18: RingState<18, 554958111>: Pred<9, 130236365>, Succ<7, 658957974>
Node 7: RingState<7, 658957974>: Pred<18, 554958111>, Succ<13, 887973871>
Node 13: RingState<13, 887973871>: Pred<7, 658957974>, Succ<1, 1194991458>
@ Checking the hop by hop lookup bye lookupDebug Command
Node 1: LookupRequest<1, 1194991458>: RequestString<Philadelphia, 124843390),
NextHop<2, 1461312673>
Node 2: LookupRequest<2, 1461312673>: RequestString<Philadelphia, 124843390),
NextHop<17, 1645877774>
Node 17: LookupRequest<17, 1645877774>: RequestString<Philadelphia, 124843390),
NextHop<5, 2242526248>
Node 5: LookupRequest<5, 2242526248>: RequestString<Philadelphia, 124843390),
NextHop<10, 2550696437>
Node 10: LookupRequest<10, 2550696437>: RequestString<Philadelphia, 124843390),
NextHop<12, 2801629341>
Node 12: LookupRequest<12, 2801629341>: RequestString<Philadelphia, 124843390),
NextHop<6, 3070643798>
Node 6: LookupRequest<6, 3070643798>: RequestString<Philadelphia, 124843390),
NextHop<14, 3222236509>
Node 14: LookupRequest<14, 3222236509>: RequestString<Philadelphia, 124843390),
NextHop<19, 3287313792>
Node 19: LookupRequest<19, 3287313792>: RequestString<Philadelphia, 124843390),
NextHop<0, 3315427148>
Node 0: LookupRequest<0, 3315427148>: RequestString<Philadelphia, 124843390),
NextHop<15, 3940518378>
Node 15: LookupRequest<15, 3940518378>: RequestString<Philadelphia, 124843390),
NextHop<16, 105081023>
Node 16: LookupRequest<16, 105081023>: RequestString<Philadelphia, 124843390),
NextHop<11, 111242462>
Node 11: LookupRequest<11, 111242462>: RequestString<Philadelphia, 124843390),
NextHop<9, 130236365>
Node 1: Values found after for Philadelphia are:

Node 1: <Philadelphia, 76ers> hashKey:124843390

Node 2: LookupRequest<2, 1461312673>: RequestString<Houston, 122387882),

NextHop<17, 1645877774>
Node 17: LookupRequest<17, 1645877774>: RequestString<Houston, 122387882),
NextHop<5, 2242526248>
Node 5: LookupRequest<5, 2242526248>: RequestString<Houston, 122387882),
NextHop<10, 2550696437>
Node 10: LookupRequest<10, 2550696437>: RequestString<Houston, 122387882),
NextHop<12, 2801629341>
Node 12: LookupRequest<12, 2801629341>: RequestString<Houston, 122387882),
NextHop<6, 3070643798>
Node 6: LookupRequest<6, 3070643798>: RequestString<Houston, 122387882),
NextHop<14, 3222236509>
Node 14: LookupRequest<14, 3222236509>: RequestString<Houston, 122387882),
NextHop<19, 3287313792>
Node 19: LookupRequest<19, 3287313792>: RequestString<Houston, 122387882),
NextHop<0, 3315427148>
Node 0: LookupRequest<0, 3315427148>: RequestString<Houston, 122387882),
NextHop<15, 3940518378>
Node 15: LookupRequest<15, 3940518378>: RequestString<Houston, 122387882),
NextHop<16, 105081023>
Node 16: LookupRequest<16, 105081023>: RequestString<Houston, 122387882),
NextHop<11, 111242462>
Node 11: LookupRequest<11, 111242462>: RequestString<Houston, 122387882),
NextHop<9, 130236365>
Node 2: Values found after for Houston are:

Node 2: <Houston, Rockets> hashKey:122387882

Node 3: I am:3, my key:998890467.Joining 1
Node 4: I am:4, my key:464336328.Joining 6
Node 4: Receive data from node 18:
Node 4: <NewJersey, Nets> hashKey:352595115

Node 4: Receive data from node 18:
Node 4: <Phoenix, Suns> hashKey:131713220

Node 8: I am:8, my key:3224635303.Joining 0
Node 8: Receive data from node 19:
Node 8: <GoldenState, Warriors> hashKey:3083757157

-------------------- Ring Size = 20 -------------------------
Node 8: RingState<8, 3224635303>: Pred<14, 3222236509>, Succ<19, 3287313792>
Node 19: RingState<19, 3287313792>: Pred<8, 3224635303>, Succ<0, 3315427148>
Node 0: RingState<0, 3315427148>: Pred<19, 3287313792>, Succ<15, 3940518378>
Node 15: RingState<15, 3940518378>: Pred<0, 3315427148>, Succ<16, 105081023>
Node 16: RingState<16, 105081023>: Pred<15, 3940518378>, Succ<11, 111242462>
Node 11: RingState<11, 111242462>: Pred<16, 105081023>, Succ<9, 130236365>
Node 9: RingState<9, 130236365>: Pred<11, 111242462>, Succ<4, 464336328>
Node 4: RingState<4, 464336328>: Pred<9, 130236365>, Succ<18, 554958111>
Node 18: RingState<18, 554958111>: Pred<4, 464336328>, Succ<7, 658957974>
Node 7: RingState<7, 658957974>: Pred<18, 554958111>, Succ<13, 887973871>
Node 13: RingState<13, 887973871>: Pred<7, 658957974>, Succ<3, 998890467>

```
Node 3: RingState<3, 998890467>: Pred<13, 887973871>, Succ<1, 1194991458>
Node 1: RingState<1, 1194991458>: Pred<3, 998890467>, Succ<2, 1461312673>
Node 2: RingState<2, 1461312673>: Pred<1, 1194991458>, Succ<17, 1645877774>
Node 17: RingState<17, 1645877774>: Pred<2, 1461312673>, Succ<5, 2242526248>
Node 5: RingState<5, 2242526248>: Pred<17, 1645877774>, Succ<10, 2550696437>
Node 10: RingState<10, 2550696437>: Pred<5, 2242526248>, Succ<12, 2801629341>
Node 12: RingState<12, 2801629341>: Pred<10, 2550696437>, Succ<6, 3070643798>
Node 6: RingState<6, 3070643798>: Pred<12, 2801629341>, Succ<14, 3222236509>
Node 14: RingState<14, 3222236509>: Pred<6, 3070643798>, Succ<8, 3224635303>
Node 8: LookupRequest<8, 3224635303>: RequestString<Philadelphia, 124843390),
NextHop<19, 3287313792>
Node 19: LookupRequest<19, 3287313792>: RequestString<Philadelphia, 124843390),
NextHop<0, 3315427148>
Node 0: LookupRequest<0, 3315427148>: RequestString<Philadelphia, 124843390),
NextHop<15, 3940518378>
Node 15: LookupRequest<15, 3940518378>: RequestString<Philadelphia, 124843390),
NextHop<16, 105081023>
Node 16: LookupRequest<16, 105081023>: RequestString<Philadelphia, 124843390),
NextHop<11, 111242462>
Node 11: LookupRequest<11, 111242462>: RequestString<Philadelphia, 124843390),
NextHop<9, 130236365>
Node 8: Values found after for Philadelphia are:

Node 8: <Philadelphia, 76ers> hashKey:124843390



Node 8: LookupRequest<8, 3224635303>: RequestString<Houston, 122387882),
NextHop<19, 3287313792>
Node 19: LookupRequest<19, 3287313792>: RequestString<Houston, 122387882),
NextHop<0, 3315427148>
Node 0: LookupRequest<0, 3315427148>: RequestString<Houston, 122387882),
NextHop<15, 3940518378>
Node 15: LookupRequest<15, 3940518378>: RequestString<Houston, 122387882),
NextHop<16, 105081023>
Node 16: LookupRequest<16, 105081023>: RequestString<Houston, 122387882),
NextHop<11, 111242462>
Node 11: LookupRequest<11, 111242462>: RequestString<Houston, 122387882),
NextHop<9, 130236365>
Node 8: Values found after for Houston are:

Node 8: <Houston, Rockets> hashKey:122387882
```

@ Printing the average Hop Count for all the lookup requests

```
Node 0: Average hop counts per lookup is: 8.25
Fishnet exiting after time: 820000 msec.
Number of packets sent: 128396
```