Output For ChordDemo.fish file (Also added Avg Hop Count Command)

```
------------------- 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:3327281659.Joining 0
Node 0: create ring
Node 1: I am:1, my key:4088433241.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:2144790921.Joining 1
Node 3: I am:3, my key:1400918056.Joining 2
Node 4: I am:4, my key:1980395872.Joining 3
Node 5: I am:5, my key:2483463333.Joining 4
Node 6: I am:6, my key:31501486.Joining 5
Node 7: I am:7, my key:3760152129.Joining 0
Node 8: I am:8, my key:3356504560.Joining 1
Node 9: I am:9, my key:4111135071.Joining 2
Node 10: I am:10, my key:3093443581.Joining 3
Node 11: I am:11, my key:1282013677.Joining 8
Node 12: I am:12, my key:2737242721.Joining 9
Node 13: I am:13, my key:1133774792.Joining 10
Node 14: I am:14, my key:875470362.Joining 11
Node 15: I am:15, my key:1685043345.Joining 12
Node 16: I am:16, my key:3934937043.Joining 0
Node 17: I am:17, my key:4111274633.Joining 1
Node 18: I am:18, my key:3844197599.Joining 16
Node 19: I am:19, my key:183366743.Joining 17
```

@ Get Hop count
```
Node 0: Average hop counts per lookup is: NaN
```

@ Printing the current status of the Ring

```
Node 0: RingState<0, 3327281659>: Pred<10, 3093443581>, Succ<8, 3356504560>
Node 8: RingState<8, 3356504560>: Pred<0, 3327281659>, Succ<7, 3760152129>
```

```
Node 7: RingState<7, 3760152129>: Pred<8, 3356504560>, Succ<18, 3844197599>
Node 18: RingState<18, 3844197599>: Pred<7, 3760152129>, Succ<16, 3934937043>
Node 16: RingState<16, 3934937043>: Pred<18, 3844197599>, Succ<1, 4088433241>
Node 1: RingState<1, 4088433241>: Pred<16, 3934937043>, Succ<9, 4111135071>
Node 9: RingState<9, 4111135071>: Pred<1, 4088433241>, Succ<17, 4111274633>
Node 17: RingState<17, 4111274633>: Pred<9, 4111135071>, Succ<6, 31501486>
Node 6: RingState<6, 31501486>: Pred<17, 4111274633>, Succ<19, 183366743>
Node 19: RingState<19, 183366743>: Pred<6, 31501486>, Succ<14, 875470362>
Node 14: RingState<14, 875470362>: Pred<19, 183366743>, Succ<13, 1133774792>
Node 13: RingState<13, 1133774792>: Pred<14, 875470362>, Succ<11, 1282013677>
Node 11: RingState<11, 1282013677>: Pred<13, 1133774792>, Succ<3, 1400918056>
Node 3: RingState<3, 1400918056>: Pred<11, 1282013677>, Succ<15, 1685043345>
Node 15: RingState<15, 1685043345>: Pred<3, 1400918056>, Succ<4, 1980395872>
Node 4: RingState<4, 1980395872>: Pred<15, 1685043345>, Succ<2, 2144790921>
Node 2: RingState<2, 2144790921>: Pred<4, 1980395872>, Succ<5, 2483463333>
Node 5: RingState<5, 2483463333>: Pred<2, 2144790921>, Succ<12, 2737242721>
Node 12: RingState<12, 2737242721>: Pred<5, 2483463333>, Succ<10, 3093443581>
Node 10: RingState<10, 3093443581>: Pred<12, 2737242721>, Succ<0, 3327281659>
-------------------- Inject Data ------------------------------
Node 12: <Cleveland, Cavaliers> hashKey:2619004665



Node 6: <Utah, Jazz> hashKey:114945



Node 19: <Detroit, Pistons> hashKey:127736678



Node 19: <Chicago, Bulls> hashKey:122380607



Node 12: <NewOrleans, Hornets> hashKey:2528980549



Node 19: <Toronto, Raptors> hashKey:123823594



Node 7: <Sacramento, Kings> hashKey:3553910805



Node 6: <Boston, Celtics> hashKey:12238676



Node 6: <Miami, Heat> hashKey:1169827



Node 19: <Houston, Rockets> hashKey:122387882
```

Node 5: <SanAntonio, Spurs> hashKey:2464692905

Node 19: <NewYork, Knicks> hashKey:119611988

Node 13: <Portland, TrailBlazers> hashKey:1120908590

Node 6: <Denver, Nuggets> hashKey:12540078

Node 5: <Minnesota, Timberwolves> hashKey:2393697545

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

Node 19: <Atlanta, Hawks> hashKey:109809025

Node 10: <Charlotte, Bobcats> hashKey:2798370225

Node 4: <LosAngeles, Clippers> hashKey:1738426247

Node 12: <Milwaukee, Bucks> hashKey:2639866345

Node 6: <Dallas, Mavericks> hashKey:12589838

Node 2: <Washington, Wizards> hashKey:2116082409

Node 14: <NewJersey, Nets> hashKey:352595115

Node 19: <Phoenix, Suns> hashKey:131713220

Node 19: <Memphis, Grizzlies> hashKey:126663987

Node 19: <Indiana, Pacers> hashKey:109086173

Node 12: <OklahomaCity, Thunder> hashKey:2558072066

Node 4: <LosAngeles, Lakers> hashKey:1738426247

Node 10: <GoldenState, Warriors> hashKey:3083757157

Node 19: <Orlando, Magic> hashKey:122209019

-------------------- Lookup Test ----------------------------
@ Lookup the keys for Consistency Testing

Node 0: Values found after for LosAngeles are:

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

@ Get Hop count after 1st Lookup

Node 0: Average hop counts per lookup is: 15.0
Node 4: <LosAngeles, Clippers> hashKey:1738426247
Node 4: <LosAngeles, Lakers> hashKey:1738426247

Node 8: Values found after for LosAngeles are:

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

Node 12: Values found after for LosAngeles are:

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

Node 16: Values found after for LosAngeles are:

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

@ Get Hop count After 5 Lookups
Node 0: Average hop counts per lookup is: 11.4

@ 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

@ Get Hop count After 10 Lookups
Node 0: Average hop counts per lookup is: 10.2
-------------------- Voluntary Leaving -------------------
Node 5: Receive data from node 2:
Node 5: <Washington, Wizards> hashKey:2116082409

Node 5: Receive data from node 4:
Node 5: <LosAngeles, Clippers> hashKey:1738426247
Node 5: <LosAngeles, Lakers> hashKey:1738426247

-------------------- Ring Size = 16 -------------------------

@ After leaving checking the consitency of the Keys

Node 0: RingState<0, 3327281659>: Pred<10, 3093443581>, Succ<8, 3356504560>
Node 8: RingState<8, 3356504560>: Pred<0, 3327281659>, Succ<7, 3760152129>
Node 7: RingState<7, 3760152129>: Pred<8, 3356504560>, Succ<18, 3844197599>

```
Node 18: RingState<18, 3844197599>: Pred<7, 3760152129>, Succ<16, 3934937043>
Node 16: RingState<16, 3934937043>: Pred<18, 3844197599>, Succ<9, 4111135071>
Node 9: RingState<9, 4111135071>: Pred<16, 3934937043>, Succ<17, 4111274633>
Node 17: RingState<17, 4111274633>: Pred<9, 4111135071>, Succ<6, 31501486>
Node 6: RingState<6, 31501486>: Pred<17, 4111274633>, Succ<19, 183366743>
Node 19: RingState<19, 183366743>: Pred<6, 31501486>, Succ<14, 875470362>
Node 14: RingState<14, 875470362>: Pred<19, 183366743>, Succ<13, 1133774792>
Node 13: RingState<13, 1133774792>: Pred<14, 875470362>, Succ<11, 1282013677>
Node 11: RingState<11, 1282013677>: Pred<13, 1133774792>, Succ<15, 1685043345>
Node 15: RingState<15, 1685043345>: Pred<11, 1282013677>, Succ<5, 2483463333>
Node 5: RingState<5, 2483463333>: Pred<15, 1685043345>, Succ<12, 2737242721>
Node 12: RingState<12, 2737242721>: Pred<5, 2483463333>, Succ<10, 3093443581>
Node 10: RingState<10, 3093443581>: Pred<12, 2737242721>, Succ<0, 3327281659>
```

@ Checking the hop by hop lookup bye lookupDebug Command

```
Node 0: LookupRequest<0, 3327281659>: RequestString<Philadelphia, 124843390),
NextHop<8, 3356504560>
Node 8: LookupRequest<8, 3356504560>: RequestString<Philadelphia, 124843390),
NextHop<7, 3760152129>
Node 7: LookupRequest<7, 3760152129>: RequestString<Philadelphia, 124843390),
NextHop<18, 3844197599>
Node 18: LookupRequest<18, 3844197599>: RequestString<Philadelphia, 124843390),
NextHop<16, 3934937043>
Node 16: LookupRequest<16, 3934937043>: RequestString<Philadelphia, 124843390),
NextHop<9, 4111135071>
Node 9: LookupRequest<9, 4111135071>: RequestString<Philadelphia, 124843390),
NextHop<17, 4111274633>
Node 17: LookupRequest<17, 4111274633>: RequestString<Philadelphia, 124843390),
NextHop<6, 31501486>
Node 6: LookupRequest<6, 31501486>: RequestString<Philadelphia, 124843390),
NextHop<19, 183366743>
Node 0: Values found after for Philadelphia are:

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




Node 13: LookupRequest<13, 1133774792>: RequestString<Philadelphia, 124843390),
NextHop<11, 1282013677>
Node 11: LookupRequest<11, 1282013677>: RequestString<Philadelphia, 124843390),
NextHop<15, 1685043345>
Node 15: LookupRequest<15, 1685043345>: RequestString<Philadelphia, 124843390),
NextHop<5, 2483463333>
Node 5: LookupRequest<5, 2483463333>: RequestString<Philadelphia, 124843390),
NextHop<12, 2737242721>
Node 12: LookupRequest<12, 2737242721>: RequestString<Philadelphia, 124843390),
NextHop<10, 3093443581>
Node 10: LookupRequest<10, 3093443581>: RequestString<Philadelphia, 124843390),
NextHop<0, 3327281659>
Node 0: LookupRequest<0, 3327281659>: RequestString<Philadelphia, 124843390),
NextHop<8, 3356504560>
Node 8: LookupRequest<8, 3356504560>: RequestString<Philadelphia, 124843390),
NextHop<7, 3760152129>
Node 7: LookupRequest<7, 3760152129>: RequestString<Philadelphia, 124843390),
NextHop<18, 3844197599>
Node 18: LookupRequest<18, 3844197599>: RequestString<Philadelphia, 124843390),
NextHop<16, 3934937043>
Node 16: LookupRequest<16, 3934937043>: RequestString<Philadelphia, 124843390),
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NextHop<9, 4111135071>
Node 9: LookupRequest<9, 4111135071>: RequestString<Philadelphia, 124843390),
NextHop<17, 4111274633>
Node 17: LookupRequest<17, 4111274633>: RequestString<Philadelphia, 124843390),
NextHop<6, 31501486>
Node 6: LookupRequest<6, 31501486>: RequestString<Philadelphia, 124843390),
NextHop<19, 183366743>
Node 13: Values found after for Philadelphia are:

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

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

Node 5: LookupRequest<5, 2483463333>: RequestString<Philadelphia, 124843390),
NextHop<12, 2737242721>
Node 12: LookupRequest<12, 2737242721>: RequestString<Philadelphia, 124843390),
NextHop<10, 3093443581>
Node 10: LookupRequest<10, 3093443581>: RequestString<Philadelphia, 124843390),
NextHop<0, 3327281659>
Node 0: LookupRequest<0, 3327281659>: RequestString<Philadelphia, 124843390),
NextHop<8, 3356504560>
Node 8: LookupRequest<8, 3356504560>: RequestString<Philadelphia, 124843390),
NextHop<7, 3760152129>
Node 7: LookupRequest<7, 3760152129>: RequestString<Philadelphia, 124843390),
NextHop<18, 3844197599>
Node 18: LookupRequest<18, 3844197599>: RequestString<Philadelphia, 124843390),
NextHop<16, 3934937043>
Node 16: LookupRequest<16, 3934937043>: RequestString<Philadelphia, 124843390),
NextHop<9, 4111135071>
Node 9: LookupRequest<9, 4111135071>: RequestString<Philadelphia, 124843390),
NextHop<17, 4111274633>
Node 17: LookupRequest<17, 4111274633>: RequestString<Philadelphia, 124843390),
NextHop<6, 31501486>
Node 6: LookupRequest<6, 31501486>: RequestString<Philadelphia, 124843390),
NextHop<19, 183366743>
Node 5: Values found after for Philadelphia are:

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

@ **Reducing the ring size by quitting more Nodes**

Node 11: Receive data from node 13:
Node 11: <Portland, TrailBlazers> hashKey:1120908590

Node 11: Receive data from node 14:
Node 11: <NewJersey, Nets> hashKey:352595115

-------------------- Ring Size = 12 -------------------------
Node 12: RingState<12, 2737242721>: Pred<5, 2483463333>, Succ<10, 3093443581>

Node 10: RingState<10, 3093443581>: Pred<12, 2737242721>, Succ<0, 3327281659>
Node 0: RingState<0, 3327281659>: Pred<10, 3093443581>, Succ<7, 3760152129>
Node 7: RingState<7, 3760152129>: Pred<0, 3327281659>, Succ<18, 3844197599>
Node 18: RingState<18, 3844197599>: Pred<7, 3760152129>, Succ<16, 3934937043>
Node 16: RingState<16, 3934937043>: Pred<18, 3844197599>, Succ<9, 4111135071>
Node 9: RingState<9, 4111135071>: Pred<16, 3934937043>, Succ<17, 4111274633>
Node 17: RingState<17, 4111274633>: Pred<9, 4111135071>, Succ<6, 31501486>
Node 6: RingState<6, 31501486>: Pred<17, 4111274633>, Succ<19, 183366743>
Node 19: RingState<19, 183366743>: Pred<6, 31501486>, Succ<11, 1282013677>
Node 11: RingState<11, 1282013677>: Pred<19, 183366743>, Succ<5, 2483463333>
Node 5: RingState<5, 2483463333>: Pred<11, 1282013677>, Succ<12, 2737242721>
Node 12: LookupRequest<12, 2737242721>: RequestString<Philadelphia, 124843390),
NextHop<10, 3093443581>
Node 10: LookupRequest<10, 3093443581>: RequestString<Philadelphia, 124843390),
NextHop<0, 3327281659>
Node 0: LookupRequest<0, 3327281659>: RequestString<Philadelphia, 124843390),
NextHop<7, 3760152129>
Node 7: LookupRequest<7, 3760152129>: RequestString<Philadelphia, 124843390),
NextHop<18, 3844197599>
Node 18: LookupRequest<18, 3844197599>: RequestString<Philadelphia, 124843390),
NextHop<16, 3934937043>
Node 16: LookupRequest<16, 3934937043>: RequestString<Philadelphia, 124843390),
NextHop<9, 4111135071>
Node 9: LookupRequest<9, 4111135071>: RequestString<Philadelphia, 124843390),
NextHop<17, 4111274633>
Node 17: LookupRequest<17, 4111274633>: RequestString<Philadelphia, 124843390),
NextHop<6, 31501486>
Node 6: LookupRequest<6, 31501486>: RequestString<Philadelphia, 124843390),
NextHop<19, 183366743>
Node 12: Values found after for Philadelphia are:

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

Node 7: LookupRequest<7, 3760152129>: RequestString<LosAngeles, 1738426247),
NextHop<18, 3844197599>
Node 18: LookupRequest<18, 3844197599>: RequestString<LosAngeles, 1738426247),
NextHop<16, 3934937043>
Node 16: LookupRequest<16, 3934937043>: RequestString<LosAngeles, 1738426247),
NextHop<9, 4111135071>
Node 9: LookupRequest<9, 4111135071>: RequestString<LosAngeles, 1738426247),
NextHop<17, 4111274633>
Node 17: LookupRequest<17, 4111274633>: RequestString<LosAngeles, 1738426247),
NextHop<6, 31501486>
Node 6: LookupRequest<6, 31501486>: RequestString<LosAngeles, 1738426247),
NextHop<19, 183366743>
Node 19: LookupRequest<19, 183366743>: RequestString<LosAngeles, 1738426247),
NextHop<11, 1282013677>
Node 11: LookupRequest<11, 1282013677>: RequestString<LosAngeles, 1738426247),
NextHop<5, 2483463333>
Node 7: Values found after for LosAngeles are:

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

Node 9: LookupRequest<9, 4111135071>: RequestString<Houston, 122387882),

NextHop<17, 4111274633>
Node 17: LookupRequest<17, 4111274633>: RequestString<Houston, 122387882),
NextHop<6, 31501486>
Node 6: LookupRequest<6, 31501486>: RequestString<Houston, 122387882), NextHop<19,
183366743>
Node 9: Values found after for Houston are:

Node 9: <Houston, Rockets> hashKey:122387882

@ Get Hop count After 17 Lookups

Node 0: Average hop counts per lookup is: 8.692307692307692
Node 13: I am:13, my key:1133774792.Joining 19
Node 13: Receive data from node 11:
Node 13: <Portland, TrailBlazers> hashKey:1120908590

Node 13: Receive data from node 11:
Node 13: <NewJersey, Nets> hashKey:352595115

Node 14: I am:14, my key:875470362.Joining 19
Node 14: Receive data from node 13:
Node 14: <NewJersey, Nets> hashKey:352595115

Node 15: I am:15, my key:1685043345.Joining 19
------------------- Ring Size = 15 ------------------------

@ checking the current status of the Ring bye ringstate command

Node 13: RingState<13, 1133774792>: Pred<14, 875470362>, Succ<11, 1282013677>
Node 11: RingState<11, 1282013677>: Pred<13, 1133774792>, Succ<15, 1685043345>
Node 15: RingState<15, 1685043345>: Pred<11, 1282013677>, Succ<5, 2483463333>
Node 5: RingState<5, 2483463333>: Pred<15, 1685043345>, Succ<12, 2737242721>
Node 12: RingState<12, 2737242721>: Pred<5, 2483463333>, Succ<10, 3093443581>
Node 10: RingState<10, 3093443581>: Pred<12, 2737242721>, Succ<0, 3327281659>
Node 0: RingState<0, 3327281659>: Pred<10, 3093443581>, Succ<7, 3760152129>
Node 7: RingState<7, 3760152129>: Pred<0, 3327281659>, Succ<18, 3844197599>
Node 18: RingState<18, 3844197599>: Pred<7, 3760152129>, Succ<16, 3934937043>
Node 16: RingState<16, 3934937043>: Pred<18, 3844197599>, Succ<9, 4111135071>
Node 9: RingState<9, 4111135071>: Pred<16, 3934937043>, Succ<17, 4111274633>
Node 17: RingState<17, 4111274633>: Pred<9, 4111135071>, Succ<6, 31501486>
Node 6: RingState<6, 31501486>: Pred<17, 4111274633>, Succ<19, 183366743>
Node 19: RingState<19, 183366743>: Pred<6, 31501486>, Succ<14, 875470362>
Node 14: RingState<14, 875470362>: Pred<19, 183366743>, Succ<13, 1133774792>

@ Checking the hop by hop lookup bye lookupDebug Command

Node 13: LookupRequest<13, 1133774792>: RequestString<Philadelphia, 124843390),
NextHop<11, 1282013677>
Node 11: LookupRequest<11, 1282013677>: RequestString<Philadelphia, 124843390),
NextHop<15, 1685043345>
Node 15: LookupRequest<15, 1685043345>: RequestString<Philadelphia, 124843390),

NextHop<5, 2483463333>
Node 5: LookupRequest<5, 2483463333>: RequestString<Philadelphia, 124843390),
NextHop<12, 2737242721>
Node 12: LookupRequest<12, 2737242721>: RequestString<Philadelphia, 124843390),
NextHop<10, 3093443581>
Node 10: LookupRequest<10, 3093443581>: RequestString<Philadelphia, 124843390),
NextHop<0, 3327281659>
Node 0: LookupRequest<0, 3327281659>: RequestString<Philadelphia, 124843390),
NextHop<7, 3760152129>
Node 7: LookupRequest<7, 3760152129>: RequestString<Philadelphia, 124843390),
NextHop<18, 3844197599>
Node 18: LookupRequest<18, 3844197599>: RequestString<Philadelphia, 124843390),
NextHop<16, 3934937043>
Node 16: LookupRequest<16, 3934937043>: RequestString<Philadelphia, 124843390),
NextHop<9, 4111135071>
Node 9: LookupRequest<9, 4111135071>: RequestString<Philadelphia, 124843390),
NextHop<17, 4111274633>
Node 17: LookupRequest<17, 4111274633>: RequestString<Philadelphia, 124843390),
NextHop<6, 31501486>
Node 6: LookupRequest<6, 31501486>: RequestString<Philadelphia, 124843390),
NextHop<19, 183366743>
Node 13: Values found after for Philadelphia are:

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

Node 14: LookupRequest<14, 875470362>: RequestString<LosAngeles, 1738426247),
NextHop<13, 1133774792>
Node 13: LookupRequest<13, 1133774792>: RequestString<LosAngeles, 1738426247),
NextHop<11, 1282013677>
Node 11: LookupRequest<11, 1282013677>: RequestString<LosAngeles, 1738426247),
NextHop<15, 1685043345>
Node 15: LookupRequest<15, 1685043345>: RequestString<LosAngeles, 1738426247),
NextHop<5, 2483463333>
Node 14: Values found after for LosAngeles are:

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

Node 15: LookupRequest<15, 1685043345>: RequestString<Houston, 122387882),
NextHop<5, 2483463333>
Node 5: LookupRequest<5, 2483463333>: RequestString<Houston, 122387882),
NextHop<12, 2737242721>
Node 12: LookupRequest<12, 2737242721>: RequestString<Houston, 122387882),
NextHop<10, 3093443581>
Node 10: LookupRequest<10, 3093443581>: RequestString<Houston, 122387882),
NextHop<0, 3327281659>
Node 0: LookupRequest<0, 3327281659>: RequestString<Houston, 122387882), NextHop<7,
3760152129>
Node 7: LookupRequest<7, 3760152129>: RequestString<Houston, 122387882),
NextHop<18, 3844197599>
Node 18: LookupRequest<18, 3844197599>: RequestString<Houston, 122387882),
NextHop<16, 3934937043>
Node 16: LookupRequest<16, 3934937043>: RequestString<Houston, 122387882),
NextHop<9, 4111135071>
Node 9: LookupRequest<9, 4111135071>: RequestString<Houston, 122387882),

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NextHop<17, 4111274633>
Node 17: LookupRequest<17, 4111274633>: RequestString<Houston, 122387882),
NextHop<6, 31501486>
Node 6: LookupRequest<6, 31501486>: RequestString<Houston, 122387882), NextHop<19,
183366743>
Node 15: Values found after for Houston are:

Node 15: <Houston, Rockets> hashKey:122387882



Node 1: I am:1, my key:4088433241.Joining 13
Node 2: I am:2, my key:2144790921.Joining 15
Node 2: Receive data from node 5:
Node 2: <Washington, Wizards> hashKey:2116082409



Node 2: Receive data from node 5:
Node 2: <LosAngeles, Clippers> hashKey:1738426247
Node 2: <LosAngeles, Lakers> hashKey:1738426247



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

```
Node 1: RingState<1, 4088433241>: Pred<16, 3934937043>, Succ<9, 4111135071>
Node 9: RingState<9, 4111135071>: Pred<1, 4088433241>, Succ<17, 4111274633>
Node 17: RingState<17, 4111274633>: Pred<9, 4111135071>, Succ<6, 31501486>
Node 6: RingState<6, 31501486>: Pred<17, 4111274633>, Succ<19, 183366743>
Node 19: RingState<19, 183366743>: Pred<6, 31501486>, Succ<14, 875470362>
Node 14: RingState<14, 875470362>: Pred<19, 183366743>, Succ<13, 1133774792>
Node 13: RingState<13, 1133774792>: Pred<14, 875470362>, Succ<11, 1282013677>
Node 11: RingState<11, 1282013677>: Pred<13, 1133774792>, Succ<15, 1685043345>
Node 15: RingState<15, 1685043345>: Pred<11, 1282013677>, Succ<2, 2144790921>
Node 2: RingState<2, 2144790921>: Pred<15, 1685043345>, Succ<5, 2483463333>
Node 5: RingState<5, 2483463333>: Pred<2, 2144790921>, Succ<12, 2737242721>
Node 12: RingState<12, 2737242721>: Pred<5, 2483463333>, Succ<10, 3093443581>
Node 10: RingState<10, 3093443581>: Pred<12, 2737242721>, Succ<0, 3327281659>
Node 0: RingState<0, 3327281659>: Pred<10, 3093443581>, Succ<7, 3760152129>
Node 7: RingState<7, 3760152129>: Pred<0, 3327281659>, Succ<18, 3844197599>
Node 18: RingState<18, 3844197599>: Pred<7, 3760152129>, Succ<16, 3934937043>
Node 16: RingState<16, 3934937043>: Pred<18, 3844197599>, Succ<1, 4088433241>
```

```
Node 1: LookupRequest<1, 4088433241>: RequestString<Philadelphia, 124843390),
NextHop<9, 4111135071>
Node 9: LookupRequest<9, 4111135071>: RequestString<Philadelphia, 124843390),
NextHop<17, 4111274633>
Node 17: LookupRequest<17, 4111274633>: RequestString<Philadelphia, 124843390),
NextHop<6, 31501486>
Node 6: LookupRequest<6, 31501486>: RequestString<Philadelphia, 124843390),
NextHop<19, 183366743>
Node 1: Values found after for Philadelphia are:

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

Node 2: LookupRequest<2, 2144790921>: RequestString<Houston, 122387882), NextHop<5, 2483463333>
Node 5: LookupRequest<5, 2483463333>: RequestString<Houston, 122387882), NextHop<12, 2737242721>
Node 12: LookupRequest<12, 2737242721>: RequestString<Houston, 122387882), NextHop<10, 3093443581>
Node 10: LookupRequest<10, 3093443581>: RequestString<Houston, 122387882), NextHop<0, 3327281659>
Node 0: LookupRequest<0, 3327281659>: RequestString<Houston, 122387882), NextHop<7, 3760152129>
Node 7: LookupRequest<7, 3760152129>: RequestString<Houston, 122387882), NextHop<18, 3844197599>
Node 18: LookupRequest<18, 3844197599>: RequestString<Houston, 122387882), NextHop<16, 3934937043>
Node 16: LookupRequest<16, 3934937043>: RequestString<Houston, 122387882), NextHop<1, 4088433241>
Node 1: LookupRequest<1, 4088433241>: RequestString<Houston, 122387882), NextHop<9, 4111135071>
Node 9: LookupRequest<9, 4111135071>: RequestString<Houston, 122387882), NextHop<17, 4111274633>
Node 17: LookupRequest<17, 4111274633>: RequestString<Houston, 122387882), NextHop<6, 31501486>
Node 6: LookupRequest<6, 31501486>: RequestString<Houston, 122387882), NextHop<19, 183366743>
Node 2: Values found after for Houston are:

Node 2: <Houston, Rockets> hashKey:122387882

Node 3: I am:3, my key:1400918056.Joining 1
Node 4: I am:4, my key:1980395872.Joining 6
Node 4: Receive data from node 2:
Node 4: <LosAngeles, Clippers> hashKey:1738426247
Node 4: <LosAngeles, Lakers> hashKey:1738426247

Node 8: I am:8, my key:3356504560.Joining 0
-------------------- Ring Size = 20 -------------------------
Node 8: RingState<8, 3356504560>: Pred<0, 3327281659>, Succ<7, 3760152129>
Node 7: RingState<7, 3760152129>: Pred<8, 3356504560>, Succ<18, 3844197599>
Node 18: RingState<18, 3844197599>: Pred<7, 3760152129>, Succ<16, 3934937043>
Node 16: RingState<16, 3934937043>: Pred<18, 3844197599>, Succ<1, 4088433241>
Node 1: RingState<1, 4088433241>: Pred<16, 3934937043>, Succ<9, 4111135071>
Node 9: RingState<9, 4111135071>: Pred<1, 4088433241>, Succ<17, 4111274633>
Node 17: RingState<17, 4111274633>: Pred<9, 4111135071>, Succ<6, 31501486>
Node 6: RingState<6, 31501486>: Pred<17, 4111274633>, Succ<19, 183366743>
Node 19: RingState<19, 183366743>: Pred<6, 31501486>, Succ<14, 875470362>
Node 14: RingState<14, 875470362>: Pred<19, 183366743>, Succ<13, 1133774792>
Node 13: RingState<13, 1133774792>: Pred<14, 875470362>, Succ<11, 1282013677>
Node 11: RingState<11, 1282013677>: Pred<13, 1133774792>, Succ<3, 1400918056>
Node 3: RingState<3, 1400918056>: Pred<11, 1282013677>, Succ<15, 1685043345>
Node 15: RingState<15, 1685043345>: Pred<3, 1400918056>, Succ<4, 1980395872>
Node 4: RingState<4, 1980395872>: Pred<15, 1685043345>, Succ<2, 2144790921>
Node 2: RingState<2, 2144790921>: Pred<4, 1980395872>, Succ<5, 2483463333>
Node 5: RingState<5, 2483463333>: Pred<2, 2144790921>, Succ<12, 2737242721>

```
Node 12: RingState<12, 2737242721>: Pred<5, 2483463333>, Succ<10, 3093443581>
Node 10: RingState<10, 3093443581>: Pred<12, 2737242721>, Succ<0, 3327281659>
Node 0: RingState<0, 3327281659>: Pred<10, 3093443581>, Succ<8, 3356504560>
Node 8: LookupRequest<8, 3356504560>: RequestString<Philadelphia, 124843390),
NextHop<7, 3760152129>
Node 7: LookupRequest<7, 3760152129>: RequestString<Philadelphia, 124843390),
NextHop<18, 3844197599>
Node 18: LookupRequest<18, 3844197599>: RequestString<Philadelphia, 124843390),
NextHop<16, 3934937043>
Node 16: LookupRequest<16, 3934937043>: RequestString<Philadelphia, 124843390),
NextHop<1, 4088433241>
Node 1: LookupRequest<1, 4088433241>: RequestString<Philadelphia, 124843390),
NextHop<9, 4111135071>
Node 9: LookupRequest<9, 4111135071>: RequestString<Philadelphia, 124843390),
NextHop<17, 4111274633>
Node 17: LookupRequest<17, 4111274633>: RequestString<Philadelphia, 124843390),
NextHop<6, 31501486>
Node 6: LookupRequest<6, 31501486>: RequestString<Philadelphia, 124843390),
NextHop<19, 183366743>
Node 8: Values found after for Philadelphia are:

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



Node 8: LookupRequest<8, 3356504560>: RequestString<Houston, 122387882), NextHop<7,
3760152129>
Node 7: LookupRequest<7, 3760152129>: RequestString<Houston, 122387882),
NextHop<18, 3844197599>
Node 18: LookupRequest<18, 3844197599>: RequestString<Houston, 122387882),
NextHop<16, 3934937043>
Node 16: LookupRequest<16, 3934937043>: RequestString<Houston, 122387882),
NextHop<1, 4088433241>
Node 1: LookupRequest<1, 4088433241>: RequestString<Houston, 122387882), NextHop<9,
4111135071>
Node 9: LookupRequest<9, 4111135071>: RequestString<Houston, 122387882),
NextHop<17, 4111274633>
Node 17: LookupRequest<17, 4111274633>: RequestString<Houston, 122387882),
NextHop<6, 31501486>
Node 6: LookupRequest<6, 31501486>: RequestString<Houston, 122387882), NextHop<19,
183366743>
Node 8: Values found after for Houston are:

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

@ Get Hop count at the end after 25 lookups
```
Node 0: Average hop counts per lookup is: 8.65
```

Fishnet exiting after time: 870000 msec.
Number of packets sent: 135431