**Running simulation for a 50 nodes graph of density 20**

Shortest path cost from Node 0 to Node 1 is 10

0->24->35->30->18->1

Shortest path cost from Node 0 to Node 2 is 8

0->49->5->35->18->2

Shortest path cost from Node 0 to Node 3 is 7

0->14->8->3

Shortest path cost from Node 0 to Node 4 is 8

0->29->38->42->27->4

Shortest path cost from Node 0 to Node 5 is 3

0->39->5

Shortest path cost from Node 0 to Node 6 is 7

0->43->6

Shortest path cost from Node 0 to Node 7 is 5

0->4->17->7

Shortest path cost from Node 0 to Node 8 is 3

0->8

Shortest path cost from Node 0 to Node 9 is 4

0->29->45->9

Shortest path cost from Node 0 to Node 10 is 7

0->10

Shortest path cost from Node 0 to Node 11 is 7

0->15->31->7->44->11

Shortest path cost from Node 0 to Node 12 is 6

0->39->11->12

Shortest path cost from Node 0 to Node 13 is 1

0->13

Shortest path cost from Node 0 to Node 14 is 4

0->14

Shortest path cost from Node 0 to Node 15 is 12

0->45->49->18->24->15

Shortest path cost from Node 0 to Node 16 is 7

0->24->30->36->16

Shortest path cost from Node 0 to Node 17 is 10

0->8->7->17

Shortest path cost from Node 0 to Node 18 is 7

0->42->12->18

Shortest path cost from Node 0 to Node 19 is 9

0->49->19

Shortest path cost from Node 0 to Node 20 is 6

0->7->20

Shortest path cost from Node 0 to Node 21 is 8

0->2->49->21

Shortest path cost from Node 0 to Node 22 is 3

0->12->22

Shortest path cost from Node 0 to Node 23 is 3

0->23

Shortest path cost from Node 0 to Node 24 is 4

0->10->9->24

Shortest path cost from Node 0 to Node 25 is 10

0->21->18->27->23->25

Shortest path cost from Node 0 to Node 26 is 5

0->48->31->3->26

Shortest path cost from Node 0 to Node 27 is 7

0->32->15->8->27

Shortest path cost from Node 0 to Node 28 is 7

0->7->39->28

Shortest path cost from Node 0 to Node 29 is 6

0->31->29

Shortest path cost from Node 0 to Node 30 is 5

0->8->25->30

Shortest path cost from Node 0 to Node 31 is 4

0->35->16->31

Shortest path cost from Node 0 to Node 32 is 7

0->14->29->35->32

Shortest path cost from Node 0 to Node 33 is 2

0->33

Shortest path cost from Node 0 to Node 34 is 6

0->18->45->34

Shortest path cost from Node 0 to Node 35 is 6

0->20->35

Shortest path cost from Node 0 to Node 36 is 6

0->41->42->36

Shortest path cost from Node 0 to Node 37 is 6

0->46->17->37

Shortest path cost from Node 0 to Node 38 is 6

0->1->38

Shortest path cost from Node 0 to Node 39 is 7

0->2->23->26->39

Shortest path cost from Node 0 to Node 40 is 3

0->40

Shortest path cost from Node 0 to Node 41 is 9

0->41

Shortest path cost from Node 0 to Node 42 is 8

0->13->16->42

Shortest path cost from Node 0 to Node 43 is 10

0->24->45->43

Shortest path cost from Node 0 to Node 44 is 6

0->44

Shortest path cost from Node 0 to Node 45 is 4

0->1->45

Shortest path cost from Node 0 to Node 46 is 10

0->10->49->46

Shortest path cost from Node 0 to Node 47 is 8

0->9->8->11->47

Shortest path cost from Node 0 to Node 48 is 6

0->38->9->4->8->48

Shortest path cost from Node 0 to Node 49 is 8

0->46->47->8->2->49

**Average path cost for all shortest paths with a graph of density 20 is 6.34694**

**Running simulation for a 50 nodes graph of density 40**

Shortest path cost from Node 0 to Node 1 is 4

0->1

Shortest path cost from Node 0 to Node 2 is 6

0->9->2

Shortest path cost from Node 0 to Node 3 is 3

0->25->3

Shortest path cost from Node 0 to Node 4 is 3

0->28->4

Shortest path cost from Node 0 to Node 5 is 4

0->39->5

Shortest path cost from Node 0 to Node 6 is 2

0->16->6

Shortest path cost from Node 0 to Node 7 is 4

0->24->7

Shortest path cost from Node 0 to Node 8 is 4

0->34->5->8

Shortest path cost from Node 0 to Node 9 is 4

0->27->37->9

Shortest path cost from Node 0 to Node 10 is 4

0->7->41->10

Shortest path cost from Node 0 to Node 11 is 4

0->11

Shortest path cost from Node 0 to Node 12 is 5

0->11->12

Shortest path cost from Node 0 to Node 13 is 1

0->13

Shortest path cost from Node 0 to Node 14 is 4

0->45->40->14

Shortest path cost from Node 0 to Node 15 is 3

0->21->15

Shortest path cost from Node 0 to Node 16 is 5

0->13->17->16

Shortest path cost from Node 0 to Node 17 is 4

0->35->17

Shortest path cost from Node 0 to Node 18 is 5

0->49->24->25->18

Shortest path cost from Node 0 to Node 19 is 3

0->19

Shortest path cost from Node 0 to Node 20 is 4

0->12->20

Shortest path cost from Node 0 to Node 21 is 4

0->26->21

Shortest path cost from Node 0 to Node 22 is 3

0->31->22

Shortest path cost from Node 0 to Node 23 is 6

0->23

Shortest path cost from Node 0 to Node 24 is 5

0->46->24

Shortest path cost from Node 0 to Node 25 is 3

0->15->7->25

Shortest path cost from Node 0 to Node 26 is 3

0->33->26

Shortest path cost from Node 0 to Node 27 is 2

0->27

Shortest path cost from Node 0 to Node 28 is 4

0->28

Shortest path cost from Node 0 to Node 29 is 4

0->49->9->29

Shortest path cost from Node 0 to Node 30 is 2

0->16->30

Shortest path cost from Node 0 to Node 31 is 4

0->28->44->31

Shortest path cost from Node 0 to Node 32 is 4

0->18->12->32

Shortest path cost from Node 0 to Node 33 is 3

0->49->35->33

Shortest path cost from Node 0 to Node 34 is 2

0->34

Shortest path cost from Node 0 to Node 35 is 4

0->15->35

Shortest path cost from Node 0 to Node 36 is 3

0->22->42->36

Shortest path cost from Node 0 to Node 37 is 4

0->4->37

Shortest path cost from Node 0 to Node 38 is 2

0->38

Shortest path cost from Node 0 to Node 39 is 1

0->39

Shortest path cost from Node 0 to Node 40 is 6

0->16->37->40

Shortest path cost from Node 0 to Node 41 is 2

0->13->41

Shortest path cost from Node 0 to Node 42 is 5

0->42

Shortest path cost from Node 0 to Node 43 is 4

0->15->42->48->43

Shortest path cost from Node 0 to Node 44 is 1

0->44

Shortest path cost from Node 0 to Node 45 is 6

0->14->45

Shortest path cost from Node 0 to Node 46 is 5

0->26->17->7->46

Shortest path cost from Node 0 to Node 47 is 3

0->1->28->47

Shortest path cost from Node 0 to Node 48 is 4

0->17->48

Shortest path cost from Node 0 to Node 49 is 4

0->14->25->49

**Average path cost for all shortest paths with a graph of density 40 is 3.65306**