Q1

**(1 mark for each correct placing in table)**

Hash Function = Key % TableSize

F(i) = (-1)i-1 ((i+1)/2)2

|  |  |
| --- | --- |
| 0 |  |
| 1 | **105** |
| 2 | **93** |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 | **22** |
| 10 |  |
| 11 |  |
| 12 |  |

Insert 14

14%13=1 (colision)

1 + F(1) = 1 + ((-1)1-1 ((1+1)/2)2) = 1+1 =2 (collision)

1 + F(2) = 1 + ((-1)2-1 ((2+1)/2)2) = -1 + 1 =0

|  |  |
| --- | --- |
| 0 | **14** |
| 1 | **105** |
| 2 | **93** |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 | **22** |
| 10 |  |
| 11 |  |
| 12 |  |

Insert 28

28%13=2 (colision)

2 + F(1) = 2 + ((-1)1-1 ((1+1)/2)2) = 2+1 =3

|  |  |
| --- | --- |
| 0 | **14** |
| 1 | **105** |
| 2 | **93** |
| 3 | **28** |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 | **22** |
| 10 |  |
| 11 |  |
| 12 |  |

Insert 41

41%13=2 (colision)

2 + F(3) = 2 + ((-1)3-1 ((3+1)/2)2) = 2+4 =6

|  |  |
| --- | --- |
| 0 | **14** |
| 1 | **105** |
| 2 | **93** |
| 3 | **28** |
| 4 |  |
| 5 |  |
| 6 | **41** |
| 7 |  |
| 8 |  |
| 9 | **22** |
| 10 |  |
| 11 |  |
| 12 |  |

Insert 27

27%13=1 (colision)

1 + F(3) = 1 + ((-1)3-1 ((3+1)/2)2) = 1+4 =5

|  |  |
| --- | --- |
| 0 | **14** |
| 1 | **105** |
| 2 | **93** |
| 3 | **28** |
| 4 |  |
| 5 | **27** |
| 6 | **41** |
| 7 |  |
| 8 |  |
| 9 | **22** |
| 10 |  |
| 11 |  |
| 12 |  |

Insert 40

40%13=1 (colision)

1 + F(5) = 1 + ((-1)5-1 ((5+1)/2)2) = 1+9 =10

|  |  |
| --- | --- |
| 0 | **14** |
| 1 | **105** |
| 2 | **93** |
| 3 | **28** |
| 4 |  |
| 5 | **27** |
| 6 | **41** |
| 7 |  |
| 8 |  |
| 9 | **22** |
| 10 | **40** |
| 11 |  |
| 12 |  |

Insert 66

66%13=1 (colision)

1 + F(7) = 1 + ((-1)7-1 ((7+1)/2)2) = 1+16 =17 % 13 = 4

|  |  |
| --- | --- |
| 0 | **14** |
| 1 | **105** |
| 2 | **93** |
| 3 | **28** |
| 4 | **66** |
| 5 | **27** |
| 6 | **41** |
| 7 |  |
| 8 |  |
| 9 | **22** |
| 10 | **40** |
| 11 |  |
| 12 |  |

Insert 15

15%13=2 (colision)

2 + F(5) = 2 + ((-1)5-1 ((5+1)/2)2) = 2+9 = 11

|  |  |
| --- | --- |
| 0 | **14** |
| 1 | **105** |
| 2 | **93** |
| 3 | **28** |
| 4 | **66** |
| 5 | **27** |
| 6 | **41** |
| 7 |  |
| 8 |  |
| 9 | **22** |
| 10 | **40** |
| 11 | **15** |
| 12 |  |

Q2

Advantages:

1. Primary clusters avoided
2. Lower probability of collision (no repitition of pattern)
3. Reduced storage requirements