Part A:

1)
```
SELECT
    T.DBNAME,
    TS.CREATOR,
    T.TSNAME,
    T.NAME,
    T.NPAGESF
FROM
    SYSIBM.SYSTABLES T,
    SYSIBM.TABLESPACE TS
WHERE
    T.CREATOR = "C3P0" AND
    T.TSNAME = TS.NAME
ORDER BY
    T.DBNAME, T.TSNAME, T.NAME
```

2)
```
SELECT
    TBCREATOR,
    TBNAME
FROM
    SYSIBM.SYSCOLUMNS
WHERE
    NAME = "BONUS"
```

3)
```
SELECT
    TS.DBNAME,
    TS.CREATOR,
    TS.NAME,
    T.CREATOR,
    T.NAME,
    T.STATSTIME
FROM
    SYSIBM.SYSTABLES T,
    SYSIBM.TABLESPACE TS
WHERE
    TS.DBNAME = "OILSANDS" AND
    TS.NAME = T.TSNAME
ORDER BY
    T.STATSTIME
```

4)
```
SELECT
    I.CREATOR,
    I.NAME,
    I.TBCREATOR,
    I.TBNAME,
    I.DBNAME
    IT.LEAFFAR,
    IT.PCTFREE
FROM
    SYSIBM.INDEXES I,
    SYSIBM.INDEXPART IT
WHERE
    IT.IXNAME = I.NAME
ORDER BY
    IT.LEAFFAR DESC,
```

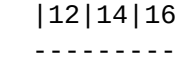
```
        IT.PCTFREE ASC
```

5)
```
SELECT
    I.CREATOR,
    I.NAME,
    I.TBCREATOR,
    I.TBNAME,
    I.DBNAME,
    I.CLUSTERRATIO
FROM
    SYSIBM.SYSINDEXES I
WHERE
    I.UNIQUERULE = 'D' AND
    I.CLUSTERING = 'Y' AND
    I.STATSTIME != '0001-01-01.00.00.00.000000'
ORDER BY
    I.CLUSTERRATIO DESC
```

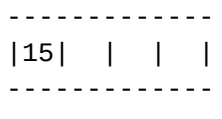
Part B:

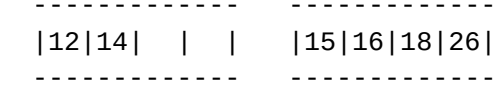
1)

Insert 12,14,16,18

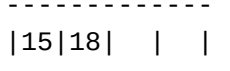


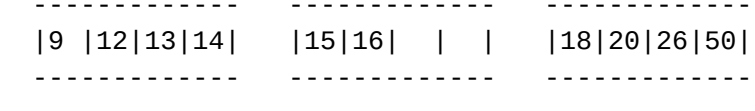
Insert 15,26



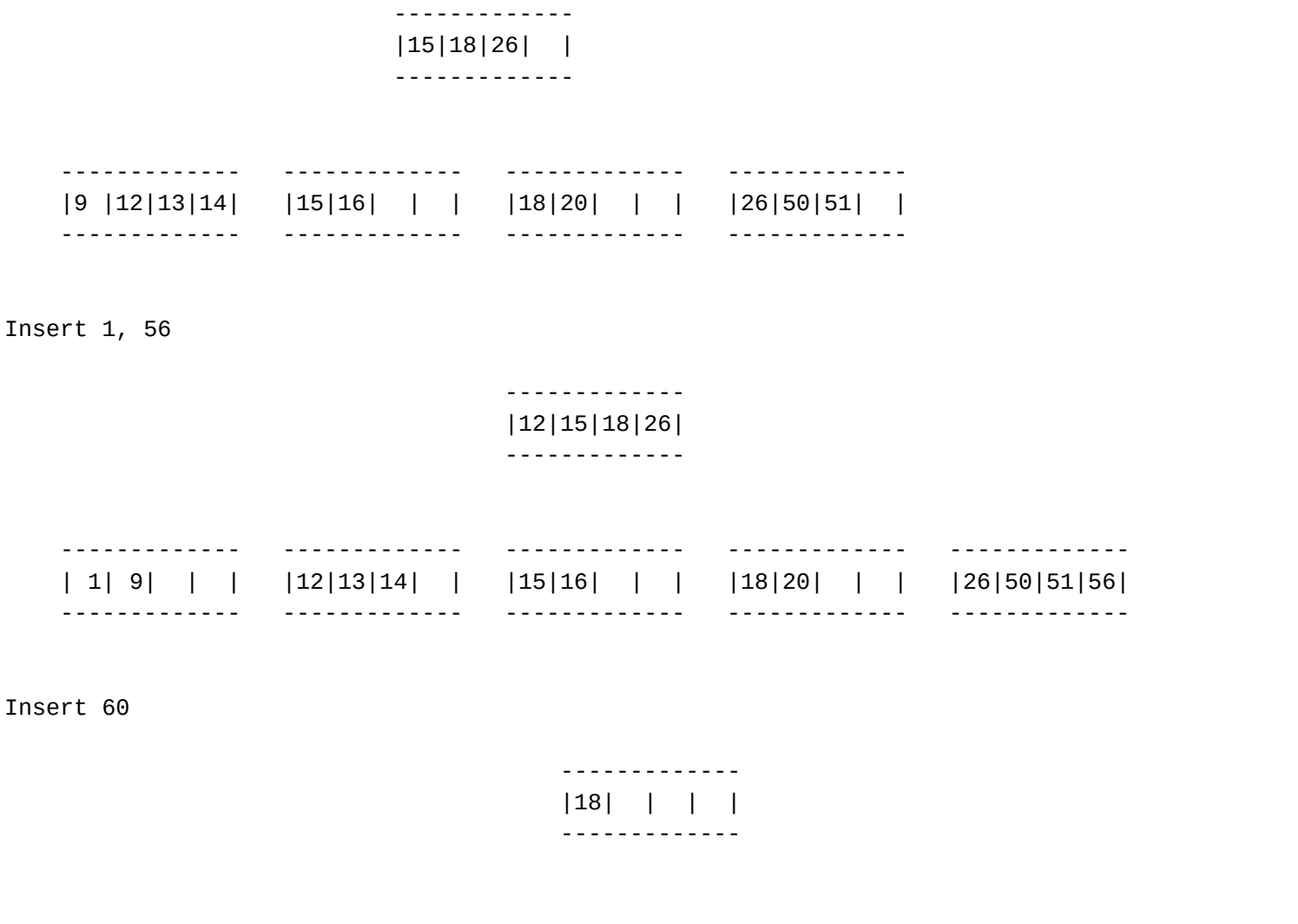


Insert 20, 50, 9, 13





Insert 51



2) 13 Keys
One possbile sequence:
12,14,16,18,15,26,20,50,9,51,1,56,60
This is the same sequence as in part a except without the 13.
All nodes on the 2nd level need to be half filled, so thats 5*2=10
We then need to add 3 to one of the nodes to force it to split and push up to the already full node and cause it to split as well.

3) Alt.2 Index = key+rid
key=24bytes
rid=10bytes
Total = 34 bytes

4096 Bytes/Page
--- = 120.47 Index/Page = 120 Index/Page

34 Bytes/Index

THEREFORE: each node has a fanout of 121

2,000,000 Records
---------- = 16,666.666 Pages = 16,667 Pages
120 Records/page

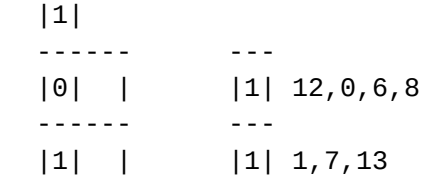
Level 0 = 1 Page
Level 1 = 121 Pages
Level 2 = 14,641 Pages
Level 3 = 1,771,561 Pages

4) 4096 bytes/page
--------- = 31.507 Records/Page = 31 Records/Page
130 bytes/record

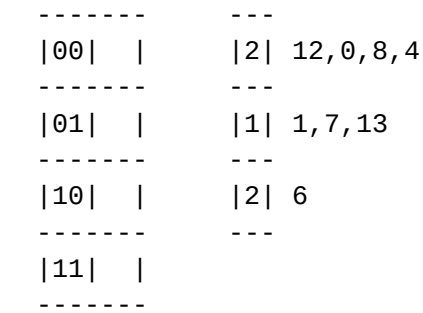
2,000,000 Records
---------- = 64516.129 Pages = 64517 Pages
31 Records/Page

Part C:

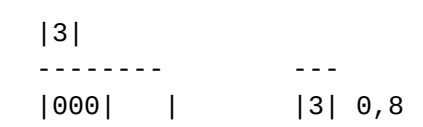
Insert 1,7,12,0,6,13,8



Extend then Insert 4



Insert 9



```
|001|   |       |1| 1,7,13,9
--------        ---
|010|   |       |2| 6
--------        ---
|011|   |       |3| 12,4
--------        ---
|100|   |
--------
|101|   |
--------
|110|   |
--------
|111|   |
--------
```

Extend

```
---
|3|
--------        ---
|000|   |       |3| 0,8
--------        ---
|001|   |       |2| 1,13,9
--------        ---
|010|   |       |2| 6
--------        ---
|011|   |       |3| 12,4
--------        ---
|100|   |       |2| 7
--------        ---
|101|   |
--------
|110|   |
--------
|111|   |
--------
```

Part D:

1)

Insert 0,4,15

```
|h(1)|h(0)|
|---------|     -----------------
|000 | 00 |     |32 | 8 |24 | 0 |
|001 | 01 |     |9  |25 |41 |17 |
|010 | 10 |     |14 |18 |10 |30 |
|011 | 11 |     |31 |35 | 7 |11 | -> 15
|100 | 00 |     |44 |36 | 4 |   |
-----------     -----------------
```

Extend and Insert 12

```
|h(1)|h(0)|
|---------|     -----------------
|000 | 00 |     |32 | 8 |24 | 0 |
|001 | 01 |     |9  |25 |41 |17 |
|010 | 10 |     |14 |18 |10 |30 |
|011 | 11 |     |31 |35 | 7 |11 | -> 15
|100 | 00 |     |44 |36 | 4 |12 |
|101 | 01 |     |   |   |   |   |
-----------     -----------------
```

2) Possible Sequence: 1,33,65,97,129,161,193,225,289
As each overflow page the same size of a bucket, we need a minimum of 9 insertions to fill up two overflow buckets and create the third.
In order to do this, we a series of 9 numbers which will be inserted into the same bucket even as the level increases.
All of the numbers chosen for this sequence have binary structure as: *00001
Where * can be any series of bits
This means that these numbers will only not be inserted into the same bucket until h(4) which will not happen for a faily high amount of insertions after the 9.