**5. Design, develop, code and run the program in any suitable language to solve the commission problem. Analyze it from the perspective of dataflow testing, derive different test cases, execute these test cases and discuss the test results.**

```
1   //Program 9:(Dataflow Testing  for commission calculation)
2   #include<stdio.h>
3   int main()
4   {
5                           int locks, stocks, barrels, tlocks, tstocks, tbarrels;
6               float lprice, sprice, bprice, lsales, ssales, bsales, sales, comm;
7                     lprice =45.0;
8               sprice=30.0;
9                     bprice=25.0;
10                    tlocks=0;
11                    tstocks=0;
12                    tbarrels=0;
          printf("\nenter the number of locks and to exit the loop enter -1 for locks\n");
13        scanf("%d",&locks);
14        while(locks!= -1){
          printf("enter the number of stocks and barrels\n");
15        scanf("%d%d",&stocks, &barrels);
16                  tlocks = tlocks + locks;
17                          tstocks = tstocks + stocks;
18                  tbarrels = btarrels + barrels;
          printf("\n enter the number of locks and to exit the loop enter -1 for locks\n");
19        scanf("%d", &locks);
20    }
21        printf("\n total locks = %d\", tlocks);
22        printf("total stocks =%d\n", tstocks);
```

```
23      printf("total barrels =%d\n", tbarrels);

24      lsales = lprice*tlocks;
25      ssales = sprice*tstocks;
26      bsales = bprice*tbarrels;
27      sales = lsales + ssales + bsales;
28      printf("\n the total sales=%f\n", sales);
29      if(sales > 1800.0)
30      {
31                      comm=0.10*1000.0;
32                      comm=comm+0.15*800;
33                      comm=comm+0.20*(sales-1800.0);
        }
34      else if(sales > 1000)
35      {
36                      comm =0.10*1000;
37                      comm=comm+0.15*(sales-1000);
         }
38      else
39              { comm=0.10*sales;
40                      }
41      printf" \n value of commission is\n");
42              printf("the commission is=%f\n", comm);
43      return 0;  }
```

**Define /Use nodes for variables in the commission problem**

| Variable name | Defined at node | Used at Node |
|---|---|---|
| lprice | 7 | 24 |
| sprice | 8 | 25 |
| bprice | 9 | 26 |
| tlocks | 10,16 | 16, 21, 24 |
| tstocks | 11,17 | 17, 22, 25 |
| tbarrels | 12,18 | 18, 23, 26 |
| locks | 13,19 | 14,16 |
| stocks | 15 | 17 |
| barrels | 15 | 18 |
| lsales | 24 | 27 |
| ssales | 25 | 27 |
| bsales | 26 | 27 |
| sales | 27 | 28, 29, 33, 34, 37, 39 |
| comm | 31, 32, 33, 36, 37, 39 | 32, 33, 37, 42 |

**Selected Define/Use Paths for Commission problem**

| Test case id | Description | Variables Path(Beginning, End nodes) | Du Paths | Definition clear? | Comments |
|---|---|---|---|---|---|
| 1 | Check for lock price variable **DEF(lprice,7)** and **USE(lprice,24)** | (7 , 24) | <7-8-9-10-11-12-13-14-15-16-17-18-19-20-14-21-22-23-24> | Yes | |
| 2 | Check for Stock price variable **DEF(sprice,8)** and **USE(sprice,25)** | (8 , 25) | <8-9-10-11-12-13-14-15-16-17-18-19-20-14-21-22-23-24-25> | Yes | |
| 3 | Check for barrel price variable **DEF(bprice,9)** and **USE(bprice,26)** | (9 , 26) | <9-10-11-12-13-14-15-16-17-18-19-20-14-21-22-23-24-25-26> | Yes | |
| 4 | Check for total locks variable **DEF(tlocks,10) and DEF(tlocks,16)** and **3 usage nodes USE(tlocks,16), USE(tlocks,21), USE(tlocks,24)** | (10 , 16) | <10-11-12-13-14-15-16> | Yes | |
| | | (10 , 21) | <10-11-12-13-14-15-16-17-18-19-20-14-21> | No | |
| | | (10 , 24) | <10-11-12-13-14-15-16-17-18-19-20-14-21-22-23-24> | No | |
| | | (16 , 16) | <16-16> | Yes | |
| | | (16 , 21) | <16-17-18-19-14-21> | No | |
| | | (16 , 24) | <16-17-18-19-20-14-21-22-23-24> | No | |
| 5 | Check for total stocks **variable DEF(tstocks,11) and DEF(tstocks,17)** and **3 usage nodes (USE(tstocks,17), USE(tstocks,22), USE(tstocks,25)** | (11 , 17) | <11-12-13-14-15-16-17> | Yes | |
| | | (11 , 22) | <11-12-13-14-15-16-17-18-19-20-14-21-22> | No | |
| | | (11, 25) | <11-12-13-14-15-16-17-18-19-20-14-21-22-23-24-25> | No | |
| | | (17 , 17) | <17-17> | Yes | |
| | | (17 , 22) | <17-18-19-20- | No | |

| | | | | | |
|---|---|---|---|---|---|
| | | | 14-21-22> | | |
| | | (17 , 25) | <17-18-19-20-14-21-22-23-24-25> | No | |
| 6 | check for locks variable **DEF(locks,13), DEF(locks,19) and USE(locks,14), USE(locks,16)** | (13 , 14) | <13-14> | Yes | Begin the loop |
| | | ( 13 , 16) | <13-14-15-16> | Yes | |
| | | (19 , 14) | <19-20-14> | Yes | |
| | | (19 , 16) | <19-20-14-15-16> | Yes | Repeat the loop |
| 7 | Check for stocks variable **(DEF(stocks,15)** and **USE(stocks,17)** | (15 , 17) | <15-16-17> | Yes | |
| 8 | Check for sales variable **DEF(sales, 27)** and **USE(Sales, 28), USE(Sales , 29), USE(Sales,33) , USE(Sales , 34) , USE(Sales,37) , USE(Sales , 39)** | (27 ,28) | <27-28> | Yes | |
| | | (27 , 29) | <27-28-29> | Yes | |
| | | (27 , 33) | <27-28-29-30-31-32-33> | Yes | |
| | | (27 , 34) | <27-28-29-34> | Yes | |
| | | (27 , 37) | <27-28-29-34-35-36-37> | Yes | |
| | | (27 , 39) | <27-28-29-34-38-39> | Yes | |
| 9 | Check for Commission variable **DEF(comm, 31,32,33) , DEF(comm,36,37) and DEF(comm,39)** and **USE(comm,42)** | ((31,32,33),42) | <31-32-33-42> | Yes | |
| | | ((36 , 37) , 42) | <36-37-42> | Yes | |
| | | (39 , 42 ) | <39 - 42> | Yes | |