**9. 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. //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;
13. printf("\nenter the number of locks and to exit the loop enter -1 for locks\n");

|  |  |  |
| --- | --- | --- |
|  | scanf("%d", &locks); | |
| **14** | while(locks!=-1) { | |
| **15** | printf("enter the number of stocks and barrels\n"); | |
|  | scanf("%d%d",&stocks,&barrels); | |
| **16** | tlocks=tlocks+locks; | |
| **17** | tstocks=tstocks+stocks; | |
| **18** | tbarrels=btarrels+barrels; | |
| **19** | printf("\nenter the number of locks and to exit the loop enter | |
|  | -1 for locks\n"); | scanf("%d",&locks); |

20 }

21 printf("\ntotal 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("\nthe 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 printf("the commission is=%f\n",comm);

41 return 0;

42 }

**Precondition : Enter -1 for locks to exit from input loop**

**Brief Description : Enter the locks, stocks and barrels > 0**

**Test Case Name : Data Flow Testing for Commission**

**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 | 32,33,37,40 |

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

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Test case id** | **Description** | **Variables Path (Beginning, End nodes)** | **Du Paths** | **Definition clear?** |
| **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> | Yes |
| (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) | <16-17-18-19-20-14-21> | 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) | <17-18-19-20-14-21-22> | No |
| (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 |
| ( 13 , 16) | <13-14-15-16> | Yes |
| (19 , 14) | <19-20-14> | Yes |
| (19 , 16) | <19-20-14-15-16> | Yes |
| 7 | Check for stocks variable  (DEF(stocks,15) and USE(stocks,17) | (15 , 17) | <15-16-17> | Yes |
| 8 | Check for sales 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,34,35) and DEF(comm,39) and USE(comm,40) | ( (31,32,33), 40) | <31-32-33-40> | No |
| ((34 , 35) , 40) | <34-35-40> | No |
| (39 , 40 ) | <39 - 40> | Yes |