BLACK BOX TESTING

Software Testing

EMPLOYEE'S PAYROLL

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CASE STUDY

A company generates a weekly payroll for every employee and issue them. However, it gets very confusing for the company to calculate all the wages of the employees. As it is very time consuming and inefficient to do it manually. The company needs a program to figure its weekly payroll automatically. The program will ask you to input the number of employees in your company. Then you need to input data consisting of each employee's identification number, name, pay rate, hours worked and holidays in a week. The program should input the data for each employee to calculate the weekly wages, tax deduction and insurance, respectively.

For weekly wages there would be two type of wages one for regular hours and the other for overtime. For regular employees payrate should not exceed more than 70 and should not be less than 30. If there are no overtime, wages are the pay rate times the hours worked.

```
wage = payrate * hours
```

If the working hours are greater than 40 hours, then the wages are 40 times the pay rate, plus the number of overtime hours times 1 ½ times the pay rate. The over time hours are computed by subtracting 40 from the total number of hours worked. However, there are 167 hours in a week so hours worked should not exceed 167 hours. For overtime employees payrate should not exceed more than 50 and should not be less than 20. Here is the formula:

```
wage = wage + (hours - 40) * 1.5 * payrate
```

If the employee gets absent for more than 2 days in a week then 100 into number of holidays rupees would be deducted from employee's pay. Here is the formula:

```
wage = wage – 100 * holidays
```

After calculating the weekly wage, the next step is to calculate the tax deduction of each employee on weekly bases. To calculate the tax deduction first enter the marital status of the employee then check if the weekly wage of the employee is greater than 10000 only then the employee needs to pay the tax else, they don't need to. If the employee is married, then 15% federal income tax and 18.00 Rs medical insurance deduction. If the employee is single, then 20% federal income tax and 10.00 Rs medical insurance deduction. Here is the formula for married employee:

```
wage = wage - 18
tax = 0.15 * wage
```

For unmarried employee:

```
wage = wage - 10
tax = 0.20 * wage
```

If an employee has applied for insurance, then he must have pay greater than 10000. The company will deduct 1000 rupees from his pay and save his insured money in his account. Insurance will be calculated with the formula:

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$$\text{insurance} = \text{wage} - 1000$$

This is how company wants to calculate its payroll under such limitations and criteria. This would reduce the time and increase the efficiency of the work.

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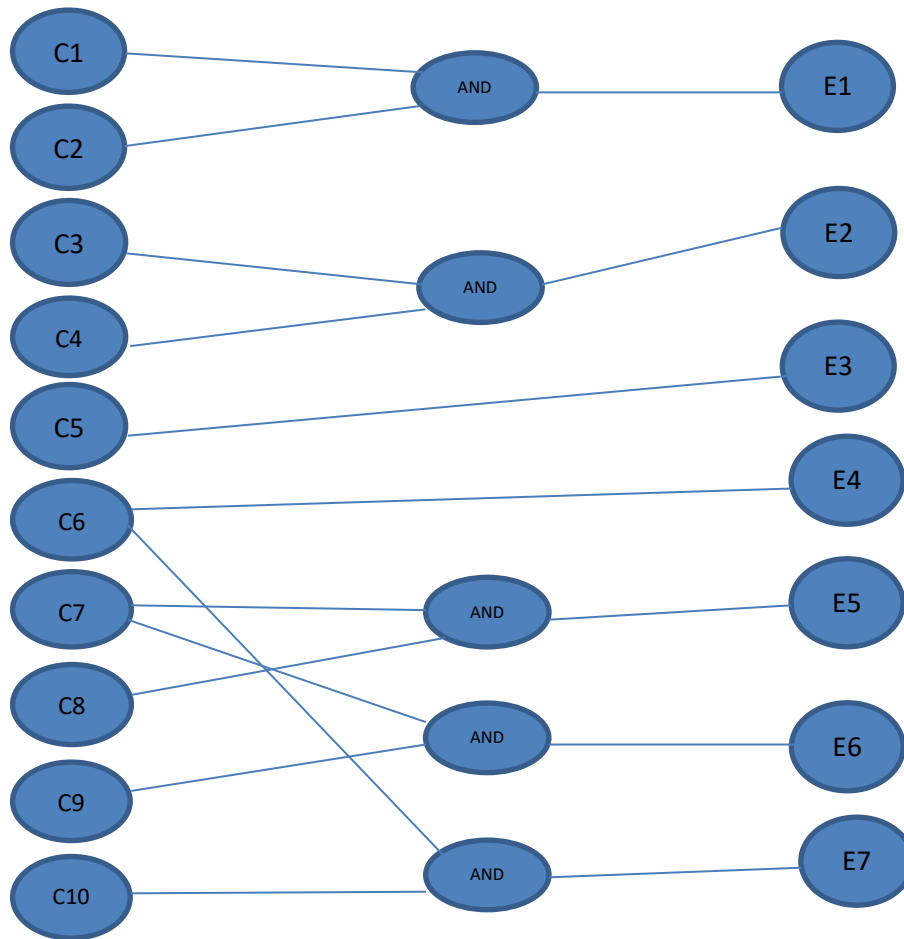
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CAUSES AND EFFECTS:

CAUSES	EFFECTS
C1: pay rate <70 and pay rate >30 C2: regular employee C3: overtime employee C4: working hours > 40 C5: 2 holidays in a week C6: wage > 10,000 C7: weekly base C8: married employee C9: unmarried employee C10: insurance	E1: pay rate * hours worked E2: wage + (hours - 40) * 1.5 * pay rate E3: wage – 100 * holidays E4: pay tax E5: 15 % tax and 18 Rs. Medical insurance E6: 20 % tax and 10 Rs. Medical insurance E7: detection of 1000 Rupee

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CAUSE EFFECT GRAPH:

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DECISION TABLE:

Actions	1	2	3	4	5	6	7
C1	1	0	0	0	0	0	0
C2	1	0	0	0	0	0	0
C3	0	1	0	0	0	0	0
C4	0	1	0	0	0	0	0
C5	0	0	1	0	0	0	0
C6	0	0	0	1	0	0	1
C7	0	0	0	0	1	1	0
C8	0	0	0	0	1	0	0
C9	0	0	0	0	0	1	0
C10	0	0	0	0	0	0	1
E1	1	0	0	0	0	0	0
E2	0	1	0	0	0	0	0
E3	0	0	1	0	0	0	0
E4	0	0	0	1	0	0	0
E5	0	0	0	0	1	0	0
E6	0	0	0	0	0	1	0
E7	0	0	0	0	0	0	1

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TEST CASES:

Test Cases	Input		Expected Output
	payrate	hours	
T1	50	20	1000
T2	20	10	Invalid input
T3	75	20	Invalid input
T4	40	30	1200

Test Cases	Input		Expected Output
	wage	holidays	
T1	2000	1	Invalid input
T2	5000	2	9800
T3	75	0	Invalid input
T4	1000	2	1800
Test Cases	Input		Expected Output(tax)
	wage	marital status	
T1	11000	Married	1650
T2	14000	Married	2100
T3	1200	Married	Invalid input
T4	5000	Married	Invalid input

Test Cases	Input		Expected Output(tax)
	wage	marital status	
T1	1000	Unmarried	Invalid input
T2	4000	Unmarried	Invalid input
T3	20000	Unmarried	4000
T4	15500	Unmarried	3100

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