E0 272

Formal Methods in Software Engineering

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Assignment 1

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| Problem 5: |
|--|
| 1. Rentals: no |
| Car : Co, C1, C2 |
| available: aoo, aor, aoz |
| rented: roo, roy, roz |
| all c: Carl (c in Rentals. available && c not in Rentals. rent ed) |
| on (c in Rentals, rented && c not in Rentals, awarlable) |
| Co / Co / Co / Co in Rentals. evanlable Also co not in furtals. Tented Co mot in furtals. Co mot in furtals. |
| Co in Rentals. (true => (non roo) ~ false = 7 (non roo) ~ false = 7 (non roo)) Rentals. Rentals. available: (true => 7 (non aoo) ~ false => 7 (non aoo) ~ false => 7 (non aoo)) + |
| Co in Rentals.: (true = >(nonaoo) ~ false => (nonaoo) ~ false => (nonaoo) |
| Runtals. [nonrow monrow monrow] |
| Restals. available: [monaoo monaoo] |
| Co: [true feuse false] Rentals: [mo] rented: [roo ron roz |
| Denote the expression to as eq ; as eq |
| x on ez |

```
Ful Enpression:
```

((tru=7 (no 1 aoo) 1 fulse = 7 (no 1 aoi) 1 false => (no 1 aoo) 1 true => 7 (no 1 1 rob) 1 false => 7 (no 1 1 rob) 1 false => 7 (no 1 1 rob) V (tru => (no r roo) r false => (no r roo) r false => (mo r roo)

Λ fru => (no r αοο) r false =>) (mo r αοι) r false => ? (mo r αοι)) 1 (fouse=7 (no ^aoo) ^ fru=7 (no ^aoo) ^ false=7 (no ^aoo) 1 felse=>](no 1 poo) 1 true=>](no 1 rol) 1 felse=>](mo 1 ro2)) V (false=> (no roo) , hu=> (no roo) , false=> (no roo) 1 false=77(non aoo) 1 frue=27(non aon) 1 false=27(non ao2)) 1 (faire =) (mon and) 1 faire (mon and) 1 faire => (mon and) r false =>7(morrow) r false=7(morrow) r frue=17(morrow)) V (false => (nonroo) n false => (nonroi) n true => (nonroz) r false=>7(mor aoo) r false=7(mor avi) r true=>7(mor ao2)))

In part (1) and part (2) we have used the proposition al fact that: "false implies anything is true".

Problem 5: 2. Rentals: Care: (0, C1, C2 cuailable: and, and, and rent ed: 100, 101, 102 some c: Carl c in Rentals, available Tree: same und of true for 4, 12 also available: (true => (no ^ aso) ^ faire => (no ^ asi) ^ faire => (no ^ asi) Rentale: [(nor avo) (nor avo) (nor avoz)] Co: Etrue false false] available: [ass an as2] Rentals: [Mo] Full Expression: (true = 7 (no navo) 1 felse = 7 (no navo) 1 felse = 7 (mo navo) faise => (no 1 ano) 1 true => (no 1 and) 1 folke = > (no 1 ano)

faise =7 (no naoi). N faise =7 (mo naoi) n true =7 (mo naoz)