

**Name and Info:**

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**Brief description on the model:**

There are three types: People, Time and Courses, for the three objects involved in the problem:

```
// Courses
type Courses = { Phy, Mat1, Mat2, Che1, Che2, AI, Logic, Prog, Fin, Spa,
Ara, Jap };
// People
type People = { Andrew, Emily, Phoebe };
// Time
type Time = { 8, 9, 10, 11 };
```

Then comes the background assumption about the uniqueness: 1. Each course has only one teacher, 2. Each course will happen only at one time, 3. Each person can only have one course at one time.

```
// Each course will have only one teacher
forall c : Courses
    exactlyone p : People
        Teach(p,c)
    end
end;
// Each course will happen at only one time
forall c : Courses
    exactlyone t : Time
        AtTime(c,t)
    end
end;
// Each person can have only one course at a time
forall p : People
    forall t : Time
        exactlyone c : Courses
            (AtTime(c,t) & Teach(p,c))
        end
    end
end;
```

Then comes the problem restrictions :

```
// 1.Only Emily can teach Spanish
Teach(Emily,Spa);
// 2.Only Andrew can teach Match2
Teach(Andrew,Mat2);
// 3.Only Phoebe can teach AI
Teach(Phoebe,AI);
// 4. Only Andrew and Emily can teach Logic
(Teach(Andrew,Logic) | Teach(Emily,Logic));
// 5. Only Andrew and Phoebe can teach the Chemistry courses, Japanese
and Finnish.
( Teach(Andrew,Che1) | Teach(Phoebe,Che1) ) &
( Teach(Andrew,Che2) | Teach(Phoebe,Che2) ) &
( Teach(Andrew,Jap) | Teach(Phoebe,Jap) ) &
( Teach(Andrew,Fin) | Teach(Phoebe,Fin) );
// 6. Math1 and Math2 cannot be simultaneous.
forall t : Time
    (not (AtTime(Mat1,t) & AtTime(Mat2,t) ) )
end;
// 7. Only Phoebe and Emily can teach Arabic.
(Teach(Phoebe,Ara) | Teach(Emily,Ara));
// 8. Programming and Logic cannot be simultaneous.
```

```
forall t : Time
    (not (AtTime(Prog,t) & AtTime(Logic,t) ) )
end;
// 9. The language courses must be later than 8am.
(not ( AtTime(Fin,8) | AtTime(Spa,8) | AtTime(Ara,8) | AtTime(Jap,8)));
```

## Output:

```
sat
( (AtTime_AI_11 true)
  (AtTime_Ara_9 true)
  (AtTime_Che1_8 true)
  (AtTime_Che2_10 true)
  (AtTime_Fin_9 true)
  (AtTime_Jap_10 true)
  (AtTime_Logic_10 true)
  (AtTime_Mat1_8 true)
  (AtTime_Mat2_11 true)
  (AtTime_Phy_8 true)
  (AtTime_Prog_9 true)
  (AtTime_Spa_11 true)
  (Teach_Andrew_Che1 true)
  (Teach_Andrew_Che2 true)
  (Teach_Andrew_Mat2 true)
  (Teach_Andrew_Prog true)
  (Teach_Emily_Ara true)
  (Teach_Emily_Logic true)
  (Teach_Emily_Phy true)
  (Teach_Emily_Spa true)
  (Teach_Phoebe_AI true)
  (Teach_Phoebe_Fin true)
  (Teach_Phoebe_Jap true)
  (Teach_Phoebe_Mat1 true))
```

## Description for the solutions:

	Andrew	Emily	Phoebe
8am	Chemistry1	Physics	Math1
9am	Programming	Arabic	Finnish
10am	Chemistry2	Logic	Japanese
11am	Math2	Spanish	AI

Finished it within 1.5 hours.