

Passage du modèle Entité-Association au modèle Relationnel

| Règle | Modèle E-A | Traduction en modèle relationnel |
|-------|------------|----------------------------------|
| R1 | | |
| R2 | | |
| R3 | | |
| R4 | | |

Normalisation des relations

Forme non normalisée (hypothèse n°1)

ETUDIANT

| <u>N°E</u> | Nom | Adresse | Options |
|------------|-------|------------|------------|
| 0001 | Dulac | 2, allée d | {O2,O3,O4} |
| 0002 | Abbou | 35, rue V | {O1,O3} |
| 0003 | Caron | 3, place A | {O1,O2} |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|-----------|------------|------------|---------|------|----|-------|------------|------|----|-------|------------|------|----|-------|------------|------|----|-------|-----------|------|----|-------|-----------|------|----|-------|------------|--|-----|-----|---------|------|-------|------------|------|-------|---------|------|-------|------------|---|-----|--------|------|----|------|----|------|----|------|----|------|----|------|----|
| ETUDIANT | ETUDIANT | CHOIX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table><tr><td>N°E</td><td>Option</td><td>Nom</td><td>Adresse</td></tr><tr><td>0001</td><td>O2</td><td>Dulac</td><td>2, allée d</td></tr><tr><td>0001</td><td>O3</td><td>Dulac</td><td>2, allée d</td></tr><tr><td>0001</td><td>O4</td><td>Dulac</td><td>2, allée d</td></tr><tr><td>0002</td><td>O1</td><td>Abbou</td><td>35, rue V</td></tr><tr><td>0002</td><td>O3</td><td>Abbou</td><td>35, rue V</td></tr><tr><td>0003</td><td>O2</td><td>Caron</td><td>3, place A</td></tr></table> | N°E | Option | Nom | Adresse | 0001 | O2 | Dulac | 2, allée d | 0001 | O3 | Dulac | 2, allée d | 0001 | O4 | Dulac | 2, allée d | 0002 | O1 | Abbou | 35, rue V | 0002 | O3 | Abbou | 35, rue V | 0003 | O2 | Caron | 3, place A | <table><tr><td>N°E</td><td>Nom</td><td>Adresse</td></tr><tr><td>0001</td><td>Dulac</td><td>2, allée d</td></tr><tr><td>0002</td><td>Abbou</td><td>35, rue</td></tr><tr><td>0003</td><td>Caron</td><td>3, place A</td></tr></table> | N°E | Nom | Adresse | 0001 | Dulac | 2, allée d | 0002 | Abbou | 35, rue | 0003 | Caron | 3, place A | <table><tr><td>N°E</td><td>Option</td></tr><tr><td>0001</td><td>O2</td></tr><tr><td>0001</td><td>O3</td></tr><tr><td>0001</td><td>O4</td></tr><tr><td>0002</td><td>O1</td></tr><tr><td>0002</td><td>O3</td></tr><tr><td>0003</td><td>O2</td></tr></table> | N°E | Option | 0001 | O2 | 0001 | O3 | 0001 | O4 | 0002 | O1 | 0002 | O3 | 0003 | O2 |
| N°E | Option | Nom | Adresse | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0001 | O2 | Dulac | 2, allée d | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0001 | O3 | Dulac | 2, allée d | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0001 | O4 | Dulac | 2, allée d | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0002 | O1 | Abbou | 35, rue V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0002 | O3 | Abbou | 35, rue V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0003 | O2 | Caron | 3, place A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N°E | Nom | Adresse | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0001 | Dulac | 2, allée d | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0002 | Abbou | 35, rue | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0003 | Caron | 3, place A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N°E | Option | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0001 | O2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0001 | O3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0001 | O4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0002 | O1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0002 | O3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0003 | O2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Forme 1NF | Forme 2NF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Forme 2NF (hypothèse n°2)

ETUDIANT

| <u>N°E</u> | Nom | Nrue | Rue | Ville | CP |
|------------|-------|------|----------------|--------|-------|
| 0001 | Dulac | 2 | allée du chêne | Lille | 59000 |
| 0002 | Abbou | 35 | rue V. Hugo | Lille | 59800 |
| 0003 | Caron | 3 | place Allende | Calais | 62000 |
| 0004 | Fabre | 428 | rue V. Hugo | Calais | 62000 |

| <div>ETUDIANT</div> <table><tr><th>N°E</th><th>Nom</th><th>Nrue</th><th>Rue</th><th>Ville</th></tr><tr><td>0001</td><td>Dulac</td><td>2</td><td>allée du chêne</td><td>Lille</td></tr><tr><td>0002</td><td>Abbou</td><td>35</td><td>rue V. Hugo</td><td>Lille</td></tr><tr><td>0003</td><td>Caron</td><td>3</td><td>place Allende</td><td>Calais</td></tr><tr><td>0004</td><td>Fabre</td><td>428</td><td>rue V. Hugo</td><td>Calais</td></tr></table> <div>CODE_POSTAL</div> <table><tr><th>Rue</th><th>Ville</th><th>CP</th></tr><tr><td>allée du chêne</td><td>Lille</td><td>59000</td></tr><tr><td>rue V. Hugo</td><td>Lille</td><td>59800</td></tr><tr><td>place Allende</td><td>Calais</td><td>62000</td></tr><tr><td>rue V. Hugo</td><td>Calais</td><td>62000</td></tr></table> | N°E | Nom | Nrue | Rue | Ville | 0001 | Dulac | 2 | allée du chêne | Lille | 0002 | Abbou | 35 | rue V. Hugo | Lille | 0003 | Caron | 3 | place Allende | Calais | 0004 | Fabre | 428 | rue V. Hugo | Calais | Rue | Ville | CP | allée du chêne | Lille | 59000 | rue V. Hugo | Lille | 59800 | place Allende | Calais | 62000 | rue V. Hugo | Calais | 62000 | <div>RUE_CODE</div> <table><tr><th>Rue</th><th>CP</th></tr><tr><td>allée du chêne</td><td>59000</td></tr><tr><td>rue V. Hugo</td><td>59800</td></tr><tr><td>place Allende</td><td>62000</td></tr><tr><td>rue V. Hugo</td><td>62000</td></tr></table> <div>CODE_VILLE</div> <table><tr><th>CP</th><th>Ville</th></tr><tr><td>59000</td><td>Lille</td></tr><tr><td>59800</td><td>Lille</td></tr><tr><td>62000</td><td>Calais</td></tr></table> | Rue | CP | allée du chêne | 59000 | rue V. Hugo | 59800 | place Allende | 62000 | rue V. Hugo | 62000 | CP | Ville | 59000 | Lille | 59800 | Lille | 62000 | Calais |
|---|------------|-------|----------------|--------|-------|------|-------|---|----------------|-------|------|-------|----|-------------|-------|------|-------|---|---------------|--------|------|-------|-----|-------------|--------|-----|-------|----|--|-------|-------|-------------|-------|-------|---------------|--------|-------|-------------|--------|-------|--|-----|----|----------------|-------|-------------|-------|---------------|-------|-------------|-------|----|-------|-------|-------|-------|-------|-------|--------|
| N°E | Nom | Nrue | Rue | Ville | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0001 | Dulac | 2 | allée du chêne | Lille | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0002 | Abbou | 35 | rue V. Hugo | Lille | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0003 | Caron | 3 | place Allende | Calais | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0004 | Fabre | 428 | rue V. Hugo | Calais | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rue | Ville | CP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| allée du chêne | Lille | 59000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| rue V. Hugo | Lille | 59800 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| place Allende | Calais | 62000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| rue V. Hugo | Calais | 62000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rue | CP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| allée du chêne | 59000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| rue V. Hugo | 59800 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| place Allende | 62000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| rue V. Hugo | 62000 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CP | Ville | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59000 | Lille | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 59800 | Lille | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 62000 | Calais | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <div><div>E</div><div><table><tr><th>N°E</th><th>N</th><th>N°R</th><th>R</th><th>V</th><th>CP</th></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></div><div><div>C_P</div><div>E</div></div><div><table><tr><th>R</th><th>V</th><th>CP</th></tr><tr><td></td><td></td><td></td></tr></table><table><tr><th>N°E</th><th>N</th><th>N°R</th><th>R</th><th>V</th></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table></div></div> | N°E | N | N°R | R | V | CP | | | | | | | R | V | CP | | | | N°E | N | N°R | R | V | | | | | | <div><div>C_P</div><div><table><tr><th>R</th><th>V</th><th>C</th></tr><tr><td></td><td></td><td></td></tr></table></div><div><div>R_C</div><div>C_V</div></div><div><table><tr><th>R</th><th>C</th></tr><tr><td></td><td></td></tr></table><table><tr><th>C</th><th>V</th></tr><tr><td></td><td></td></tr></table></div></div> | R | V | C | | | | R | C | | | C | V | | | | | | | | | | | | | | | | | | |
| N°E | N | N°R | R | V | CP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R | V | CP | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| N°E | N | N°R | R | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R | V | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| R | C | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Forme 3NF | Forme BCNF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Opérateurs de l'algèbre relationnelle

Opérateurs ensemblistes

| VOL1 | N_Vol | Vil_Dep | Vil_Arr | H_Dep | H_Arr | N_Av |
|------|-------|---------|---------|-------|-------|------|
| | IT100 | Lille | Paris | 7:00 | 7:20 | 100 |
| | IT101 | Paris | Lille | 11:00 | 11:20 | 100 |
| | IT102 | Lyon | Paris | 14:00 | 14:35 | 101 |

| VOL2 | CodeVol | Vil_Dep | Vil_Arr | H_Dep | H_Arr | N_Av |
|------|---------|---------|----------|-------|-------|------|
| | IT105 | Lille | Toulouse | 9:00 | 9:50 | 101 |
| | IT101 | Paris | Lille | 11:00 | 11:20 | 100 |

| VOL3=VOL1 \cup VOL2 | N_Vol | Vil_Dep | Vil_Arr | H_Dep | H_Arr | N_Av |
|-----------------------|-------|---------|----------|-------|-------|------|
| | IT100 | Lille | Paris | 7:00 | 7:20 | 100 |
| | IT101 | Paris | Lille | 11:00 | 11:20 | 100 |
| | IT102 | Lyon | Paris | 14:00 | 14:35 | 101 |
| | IT105 | Lille | Toulouse | 9:00 | 9:50 | 101 |

| VOL3i=VOL1 \cap VOL2 | N_Vol | Vil_Dep | Vil_Arr | H_Dep | H_Arr | N_Av |
|------------------------|-------|---------|---------|-------|-------|------|
| | IT101 | Paris | Lille | 11:00 | 11:20 | 100 |

| VOL4=VOL1-VOL2 | N_Vol | Vil_Dep | Vil_Arr | H_Dep | H_Arr | N_A |
|----------------|-------|---------|---------|-------|-------|-----|
| | IT100 | Lille | Paris | 7:00 | 7:20 | 100 |
| | IT102 | Lyon | Paris | 14:00 | 14:35 | 101 |

| AVION | N_A | Typ_Av |
|-------|-----|--------|
| | 100 | A300 |
| | 101 | B747 |

| VOL5=VOL2 \times AVION | CodeVol | Vil_Dep | Vil_Arr | H_Dep | H_Arr | N_Av | N_A | Typ_Av |
|--------------------------|---------|---------|----------|-------|-------|------|-----|--------|
| | IT105 | Lille | Toulouse | 9:00 | 9:50 | 101 | 100 | A300 |
| | IT105 | Lille | Toulouse | 9:00 | 9:50 | 101 | 101 | B747 |
| | IT101 | Paris | Lille | 11:00 | 11:20 | 100 | 100 | A300 |
| | IT101 | Paris | Lille | 11:00 | 11:20 | 100 | 101 | B747 |

Opérateurs relationnels

| VOL6= $\pi_{\text{Vil_Arr}}$ (VOL3) | Vil_Arr |
|--------------------------------------|----------|
| | Paris |
| | Lille |
| | Toulouse |

| VOL7= $\pi_{\text{Vil_Arr, Vil_Dep}}$ (VOL5) | Vil_Arr | Vil_Dep |
|--|----------|---------|
| | Toulouse | Lille |
| | Lille | Paris |

| VOL8= $\sigma_{\text{Vil_Arr}=\text{"Paris"}}$ (VOL1) | N_Vol | Vil_Dep | Vil_Arr | H_Dep | H_Arr | N_Av |
|--|-------|---------|---------|-------|-------|------|
| | IT100 | Lille | Paris | 7:00 | 7:20 | 100 |
| | IT102 | Lyon | Paris | 14:00 | 14:35 | 101 |

| VOL9= $\sigma_{\text{H_Dep} \geq 11:00 \text{ AND } \text{H_Arr} < 15:00}$ (VOL3) | N_Vol | Vil_Dep | Vil_Arr | H_Dep | H_Arr | N_Av |
|---|-------|---------|---------|-------|-------|------|
| | IT101 | Paris | Lille | 11:00 | 11:20 | 100 |
| | IT102 | Lyon | Paris | 14:00 | 14:35 | 101 |

| VOL0=VOL2 $\bowtie_{\text{N_Av}=\text{N_A}}$ AVION | CodeVol | Vil_Dep | Vil_Arr | H_Dep | H_Arr | N_Av | N_A | Typ_Av |
|--|---------|---------|----------|-------|-------|------|-----|--------|
| | IT105 | Lille | Toulouse | 9:00 | 9:50 | 101 | 100 | A300 |
| | IT105 | Lille | Toulouse | 9:00 | 9:50 | 101 | 101 | B747 |
| | IT101 | Paris | Lille | 11:00 | 11:20 | 100 | 100 | A300 |
| | IT101 | Paris | Lille | 11:00 | 11:20 | 100 | 101 | B747 |

Le langage SQL

Base EMPLOYES

employees (num_emp, nom, fonction, _superieur, date_embauche, salaire, comm, _num_dep)

| employees | <u>num_emp</u> | nom | fonction | _superieur | date_embauche | salaire | comm | _num_dep |
|-----------|----------------|-----------|------------|------------|---------------|---------|------|----------|
| | 7369 | Coquillet | Technicien | 7902 | 1980-12-17 | 800 | | 20 |
| | 7499 | Parent | Commercial | 7698 | 1981-02-20 | 1600 | 300 | 30 |
| | 7521 | Henry | Commercial | 7698 | 1981-02-22 | 1250 | 500 | 30 |
| | 7566 | Dumoulin | Directeur | 7839 | 1981-04-02 | 2975 | | 20 |
| | 7654 | Ferron | Commercial | 7698 | 1981-09-28 | 1250 | 1400 | 30 |
| | 7698 | Capon | Directeur | 7839 | 1981-05-01 | 2850 | | 30 |
| | 7782 | Martin | Directeur | 7839 | 1981-06-09 | 2450 | | 10 |
| | 7788 | Colin | Analyste | 7566 | 1987-04-19 | 3000 | | 20 |
| | 7839 | Patton | Président | | 1981-11-17 | 5000 | | 10 |
| | 7844 | Benami | Commercial | 7698 | 1981-09-08 | 1500 | 0 | 30 |
| | 7876 | Calamon | Technicien | 7788 | 1987-05-23 | 1100 | | 20 |
| | 7900 | James | Technicien | 7698 | 1981-12-03 | 950 | | 30 |
| | 7902 | Henry | Analyste | 7566 | 1981-12-03 | 3000 | | 20 |
| | 7934 | Tozzi | Technicien | 7782 | 1982-01-23 | 1300 | | 10 |

departements (num_dep, nom, ville)

| departements | <u>num_dep</u> | nom | ville |
|--------------|----------------|--------------|-----------|
| | 10 | Comptabilité | Paris |
| | 20 | Recherche | Lille |
| | 30 | Ventes | Marseille |
| | 40 | Opérations | Lyon |

Base ETUDIANTS

etudiants (num_etu, nom_etu, date_naiss, sexe) **enseignants** (num_ens, nom_ens, grade, anciennete)

| etudiants | <u>num_etu</u> | nom_etu | date_naiss | sexe |
|-----------|----------------|------------------|------------|------|
| | 1 | Dupont, Charles | 1991-03-18 | M |
| | 2 | Dubois, Jules | 1992-02-11 | M |
| | 3 | Favier, Isabelle | 1989-02-02 | F |
| | 4 | Gros, Sophie | 1990-06-21 | F |
| | 5 | Henri, Pierre | | M |
| | 6 | Humbert, Odile | 1990-03-19 | F |
| | 7 | Bouziane, Mehdi | 1992-08-10 | M |
| | 8 | Martin, Julie | 1990-04-25 | F |
| | 9 | Paris, Jeanne | 1991-01-03 | F |
| | 10 | Yang, Bing | 1988-09-25 | M |
| | 11 | Romain, Georges | 1987-06-21 | M |

| enseignants | <u>num_ens</u> | nom_ens | grade | anciennete |
|-------------|----------------|------------------|-------|------------|
| | 10 | Bertrand, Pierre | ASS | 2 |
| | 11 | Dupond, Auguste | MCF | 3 |
| | 12 | Aubois, Jean | MCF | 5 |
| | 13 | Boyer, Julie | ASS | 2 |
| | 14 | Vincent, Paul | PR | 4 |
| | 15 | Simon, Etienne | ASS | 5 |

notes (_num_etu, _num_mat, note)

| notes | <u>_num_etu</u> | <u>_num_mat</u> | note |
|-------|-----------------|-----------------|------|
| | 1 | 1 | 10.5 |
| | 1 | 2 | 9 |
| | 1 | 3 | 12.5 |
| | 1 | 4 | 13 |
| | 1 | 5 | 7 |
| | 2 | 1 | 11 |
| | 2 | 2 | 14.5 |
| | ... | ... | ... |

matieres (num_mat, nom_mat, coef, _num_ens)

| matieres | <u>num_mat</u> | nom_mat | coef | _num_ens |
|----------|----------------|------------------|------|----------|
| | 1 | Programmation | 3 | 11 |
| | 2 | Bases de données | 2 | 13 |
| | 3 | G.P.A.O. | 2 | 10 |
| | 4 | Logique | 1 | 15 |
| | 5 | Statistiques | 1 | 15 |