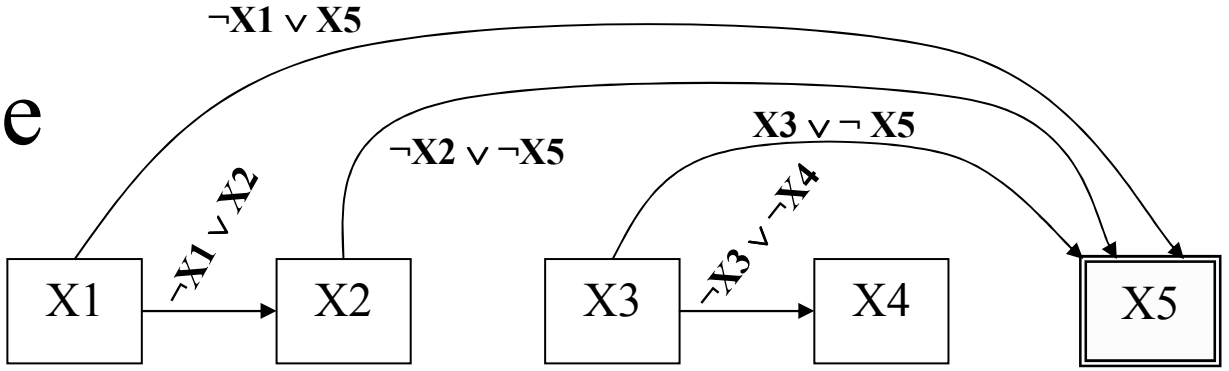
Exercise – Intelligent Backtracking

- **The following is a SAT problem:**
  1. **$\neg X1 \vee X5$**
  2. **$\neg X2 \vee \neg X5$**
  3. **$X3 \vee \neg X5$**
  4. **$\neg X3 \vee \neg X4$**
  5. **$\neg X1 \vee X2$**
- **Draw the constraint graph of the above problem.**
- **Under the ordering (X1, X2, X3, X4, X5), suppose we have assigned:**

  X1 = X2 = X3 = True; X4 = False
- **No value for X5 is compatible with all the assignments made so far. What will the following algorithms do next and why:**
  - **Simple chronological backtracking**
  - **Graph-based BackJumping**
  - **Conflict-based BackJumping**

DDBT Exercise – Answer



- **Simple chronological backtracking will backtrack to the preceding decision, X4.**
- **Conflict-based BackJumping will backtrack to X2. This is because X1=True plus constraint (1) together disallow X5 to take the value False; X2=True plus constraint (2) together disallow X5 to take the value True. Therefore, <X1,True> and <X2, False> together wipe out the value of X5. Conflict-based BJ will jump back to X2, the nearest culprit.**
- **Graph-based BackJumping will simply jump back based on the topoloty of the constraint graph. Since X3 is the closest node connected to X5, Graph-based BackJumping will jump back to X3.**