# Lab 3

Q1)

a)

**Variables**: Start time of {

**Domain:** D = {1pm, 2pm, 3pm}

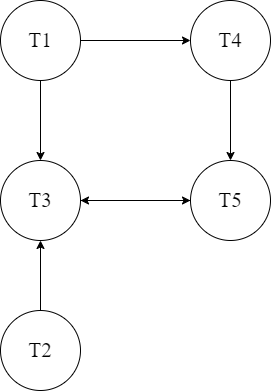
**Constraints:**

Implicit:

Explicit:

b)

Constrain graph



Q2)

**AC-3 Execution**

Iteration 1:

* Queue: {(a,b),(b,a),(b,c),(c,b),(c,d),(d,c)}
* (u,v) removed: (a,b)
* Revise (,a,b):

  + For each , check if there is a such that
  + After revision, (since 1,4,9 are the squares, and only these values can be within 1 of these squares).
* New pairs added: {(a,b)} (no new pairs added because all variables connected to are already in the queue)

Iteration 2:

* Queue: {(b,a),(b,c),(c,b),(c,d),(d,c)}
* (u,v) removed: (b,a)
* Revise (,b,a):
  + For each check if there is an such that
  + After revision, (only are such that within 1 of the revised )
* New pairs added: {(a,b),(b,c)} (no new pairs added because all variables connect to are already in the queue)

Iteration 3:

* Queue: {(b,c),(c, b),(c,d),(d,c)}
* (u,v) removed: (b,c)
* Revise (,b,c):
  + For each , checking if there is a such that
  + After revision, (no changes needed because all values have corresponding values in the domain)
* New pair added: {(a,b)} (no pair added because all variables connected to are already in the queue)

Iteration 4:

* Queue: {(c,b),(c,d),(d,c)}
* (u,v) removed: (c,d)
* Revise (:
  + For each , checking if there is a such that
  + After revision, (since in {1,2,3} means )
* New pairs added: {(b,c)} (no new pairs added because all variables connected to c are already in the queue)

Iteration 5:

* Queue: {(c,d),(d,c)}
* (u,v) removed: (c,d)
* Revise ():
  + For each , checking if there is a such that
  + After revision, (since means )
* New pairs added: {(c,d)} (no pairs added because all variables connected to *d* are already in the queue)

Iteration 6:

* Queue: {(d,c)}
* (u,v) removed: (d,c)
* Revise (:
  + For each , checking if there is a such that
  + After revision, (no change needed because all *d* values have corresponding *c* in the queue)
* New pairs added: {(d,c)} (no pairs added because all variables connected to *d* are already in the queue)

Final Domains

Q3)

View Codes in the codes folder submitted along with this document.

4)

1. **Concept**

* Books
* Author
* Library Member

2. **Properties**

Book

* Title (string): the title of the book.
* ISBN (string): the International Standard Book Number of the book.
* Publication Date (date): the date the book was published.
* Authors (list of authors): The authors who wrote the book.

Author

* Name (string): the name of the author.
* Birthdate(date): the birthdate of the author.
* Books Written (list of Book): The books that the author has written.

Library Member

* Name (string): the name of the library member.
* Library Card Number (string): the unique number associated with the library member’s card.
* Borrowed Books (list of Book): the books that the library member has borrowed.

3. **Relationships**

* Wrote (**Author -> Book**): Relationship between **Author** and **Book**. An author can write multiple books, and a book can have multiple authors.
* Borrowed By (**Library Member -> Book**): Relationship between **Library Member** and **Book**. A library member can borrow multiple books, and a book can be borrowed by multiple library members over time.

Q5)

**Neo4J Example Guide**

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**Cypher Tutorial**

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