

Social Networking System

DBMS Assignment 2

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Chapter 1

Mapping Conceptual Model to NoSQL

The problem statement that has been selected for this assignment is a Social Networking System. This essentially refers to a platform where users can connect and interact with each other. Popular Social Networking Systems include Instagram, Twitter, Facebook, and more.

For the implementation of the Social Networking System, a NoSQL, or "Not Only SQL", database management system has been chosen. The specific implementation of a NoSQL database management system that was selected for the project is MongoDB.

The reasons for choosing a NoSQL DBMS include,

- Ability to handle unstructured data
 - NoSQL databases easily handle data in the form of audio, video, social networks, and more
- Maintenance
 - Both creation of maintenance of a NoSQL database are faster and cheaper
- Retrieval time
 - Retrieval of various kinds of data is faster in NoSQL databases

- Scalability
 - NoSQL databases are highly scalable
- Horizontal scaling
 - NoSQL databases tend to scale horizontally, which is more cost efficient

The reasons for choosing MongoDB include,

- Good for scaling
- Quick response time
- Can handle large amounts of unstructured data without needing to change the architecture

Chapter 2

Implementation of Database

The database for this project was implemented via MongoDB Enterprise. The creation of this database, entitled 'SocialNetwork', is shown in Figure 2.1. Via the MongoDB 'use' command, the database is not only created, but also automatically connected to.

```
MongoDB Enterprise > show dbs
admin    0.000GB
config   0.000GB
local    0.000GB
MongoDB Enterprise > show dbs
SocialNetwork 0.000GB
admin          0.000GB
config         0.000GB
local          0.000GB
MongoDB Enterprise > use SocialNetwork
switched to db SocialNetwork
MongoDB Enterprise >
```

Figure 2.1: Creating and connecting to 'SocialNetwork'.

Following this, the collections 'User', 'Posts', 'Friends', 'Fleets', 'User_Home', 'Education', 'Post_Likes', 'Replies', and 'Reply_Likes' were created via the MongoDB 'createCollection' command. This is shown in Figure 2.2.

```
MongoDB Enterprise > show collections
User
MongoDB Enterprise > db.createCollection('Posts')
{ "ok" : 1 }
MongoDB Enterprise > show collections
Posts
User
MongoDB Enterprise > db.createCollection('Friends')
{ "ok" : 1 }
MongoDB Enterprise > db.createCollection('Fleets')
{ "ok" : 1 }
MongoDB Enterprise > db.createCollection('User_Home')
{ "ok" : 1 }
MongoDB Enterprise > db.createCollection('Education')
{ "ok" : 1 }
MongoDB Enterprise > db.createCollection('Post_Likes')
{ "ok" : 1 }
MongoDB Enterprise > db.createCollection('Replies')
{ "ok" : 1 }
MongoDB Enterprise > db.createCollection('Reply_Likes')
{ "ok" : 1 }
MongoDB Enterprise > show collections
Education
Fleets
Friends
Post_Likes
Posts
Replies
Reply_Likes
User
```

Figure 2.2: Creating the collections.

Chapter 3

Population of Database

The database was populated by inserting records in JSON format. Constraints were added via MongoDB commands.

Figure 3.1 shows the insertion of the first record to the 'User' table, while figure 3.2 shows the acknowledgement message displayed on inserting nine more records.

```
MongoDB Enterprise > db.User.insert({ "f_name": "Henrie", "l_name": "Beaze", "username": "Henrie.Beaze", "email":  
: "hbeaze@de.vu", "dob": "01/10/1971", "age": 50 })  
WriteResult({ "nInserted" : 1 })  
MongoDB Enterprise > db.User.find().pretty()  
{  
  "_id" : ObjectId("617398d4ce3cd7dfabac3326"),  
  "f_name" : "Henrie",  
  "l_name" : "Beaze",  
  "username" : "Henrie.Beaze",  
  "email" : "hbeaze@de.vu",  
  "dob" : "01/10/1971",  
  "age" : 50  
}  
MongoDB Enterprise >
```

Figure 3.1: Inserting first 'User' record.

```
{
  "acknowledged" : true,
  "insertedIds" : [
    ObjectId("61739cb1ce3cd7dfabac3327"),
    ObjectId("61739cb1ce3cd7dfabac3328"),
    ObjectId("61739cb1ce3cd7dfabac3329"),
    ObjectId("61739cb1ce3cd7dfabac332a"),
    ObjectId("61739cb1ce3cd7dfabac332b"),
    ObjectId("61739cb1ce3cd7dfabac332c"),
    ObjectId("61739cb1ce3cd7dfabac332d"),
    ObjectId("61739cb1ce3cd7dfabac332e"),
    ObjectId("61739cb1ce3cd7dfabac332f")
  ]
}
```

Figure 3.2: Inserting other 'User' records.

Figure 3.3 shows a unique constraint being added to the username field, while figure 3.4 shows an example that violates this constraints and successfully throws an error for the same.

```
MongoDB Enterprise > db.User.createIndex({"username":1}, {"unique": true})
{
  "numIndexesBefore" : 1,
  "numIndexesAfter" : 2,
  "createdCollectionAutomatically" : false,
  "ok" : 1
}
```

Figure 3.3: Unique username constraint.

```
MongoDB Enterprise > db.User.insert(
... {
...   "f_name": "M",
...   "l_name": "B",
...   "username": "Miguela.Burril",
...   "email": "mb@yowpages.com",
...   "dob": "08/10/2001",
...   "age": 20
... })
WriteResult({
  "nInserted" : 0,
  "writeError" : {
    "code" : 11000,
    "errmsg" : "E11000 duplicate key error collection: SocialNetwork.User index: username_1 dup key: { usern
ame: \"Miguela.Burril\" }"
  }
})
MongoDB Enterprise >
```

Figure 3.4: Sample violation.

Figure 3.5 shows an additional not null constraint being added to the username field.

```
{
  $jsonSchema: {
    required: ['username']
  }
}
```

Figure 3.5: Not null username constraint.

Figure 3.6 shows a unique constraint being added to the email field.

```
MongoDB Enterprise > db.User.createIndex({"email":1}, {"unique": true})
{
  "numIndexesBefore" : 2,
  "numIndexesAfter" : 3,
  "createdCollectionAutomatically" : false,
  "ok" : 1
}
```

Figure 3.6: Unique email constraint.

Figure 3.7 shows the addition of a foreign key constraint to the 'Posts' table, referencing the 'User' table.

```
MongoDB Enterprise > db.Posts.insert(
... {
...   "post_id": "63-416-3080",
...   "post_date": "9/24/2021",
...   "username": {
...     "$ref": "User",
...     "$id": ObjectId("61739cb1ce3cd7dfabac332f")},
...   "post_content": "Maecenas tristique, est et tempus semper, est quam pharetra magna, ac consequat metus sapien ut n
unc. Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Mauris viverra diam vitae q
uam. Suspendisse potenti."
... })
WriteResult({ "nInserted" : 1 })
MongoDB Enterprise >
```

Figure 3.7: Username as a foreign key.

In a similar fashion, the remaining entities were also created, and the constraints for the data were added.

The following is the code for the 'User' entity.

```
[{
  "_id": {
    "$oid": "617398d4ce3cd7dfabac3326"
  },
  "f_name": "Henrie",
  "l_name": "Beaze",
  "username": "Henrie.Beaze",
  "email": "hbeaze0@de.vu",
  "dob": "01/10/1971",
  "age": 50
},{
  "_id": {
    "$oid": "61739cb1ce3cd7dfabac3327"
  },
  "f_name": "Lesly",
  "l_name": "Clubbe",
  "username": "Lesly.Clubbe",
  "email": "lclubbe0@ycombinator.com",
  "dob": "13/12/1979",
  "age": 41
},{
  "_id": {
    "$oid": "61739cb1ce3cd7dfabac3328"
  },
  "f_name": "Inger",
  "l_name": "Landreth",
  "username": "Inger.Landreth",
  "email": "ilandreth1@wunderground.com",
  "dob": "23/05/1985",
  "age": 36
},{
  "_id": {
    "$oid": "61739cb1ce3cd7dfabac3329"
  },
  "f_name": "Tilda",
  "l_name": "Andrusyak",
```

```

    "username": "Tilda.Andrusyak",
    "email": "tandrusyak2@jiathis.com",
    "dob": "27/08/1970",
    "age": 51
  },{
    "_id": {
      "$oid": "61739cb1ce3cd7dfabac332a"
    },
    "f_name": "Calhoun",
    "l_name": "Colly",
    "username": "Calhoun.Colly",
    "email": "ccolly3@statcounter.com",
    "dob": "11/12/1982",
    "age": 38
  },{
    "_id": {
      "$oid": "61739cb1ce3cd7dfabac332b"
    },
    "f_name": "Bertrando",
    "l_name": "Szach",
    "username": "Bertrando.Szach",
    "email": "bszach4@webs.com",
    "dob": "24/05/1985",
    "age": 36
  },{
    "_id": {
      "$oid": "61739cb1ce3cd7dfabac332c"
    },
    "f_name": "Ashien",
    "l_name": "Jeremiah",
    "username": "Ashien.Jeremiah",
    "email": "ajeremiah5@patch.com",
    "dob": "01/01/1993",
    "age": 28
  },{
    "_id": {
      "$oid": "61739cb1ce3cd7dfabac332d"
    },

```

```

    "f_name": "Robbin",
    "l_name": "Aiers",
    "username": "Robbin.Aiers",
    "email": "raiers6@clickbank.net",
    "dob": "30/08/2002",
    "age": 19
  },{
    "_id": {
      "$oid": "61739cb1ce3cd7dfabac332e"
    },
    "f_name": "Eugen",
    "l_name": "Mouan",
    "username": "Eugen.Mouan",
    "email": "emouan7@skype.com",
    "dob": "28/08/1982",
    "age": 39
  },{
    "_id": {
      "$oid": "61739cb1ce3cd7dfabac332f"
    },
    "f_name": "Miguela",
    "l_name": "Burril",
    "username": "Miguela.Burril",
    "email": "mburril8@yellowpages.com",
    "dob": "08/10/1968",
    "age": 53
  }]

```

The following is the code for the 'Posts' entity, while Figure 3.8 shows the acknowledgement message received on inserting the values.

```

[ {
  "_id": {
    "$oid": "6173ba05ce3cd7dfabac3333"
  },
  "post_id": "63-416-3080",
  "post_date": "9/24/2021",
  "username": {
    "$ref": "User",

```

```

    "$id": {
      "$oid": "61739cb1ce3cd7dfabac332f"
    }
  },
  "post_content": "Maecenas tristique, est et tempus semper,
est quam pharetra magna, ac consequat metus sapien ut nunc.
Vestibulum ante ipsum primis in faucibus orci luctus et ultrices
posuere cubilia Curae; Mauris viverra diam vitae quam.
Suspendisse potenti."
},{
  "_id": {
    "$oid": "6173bbf3ce3cd7dfabac3334"
  },
  "post_id": "47-842-5592",
  "post_date": "1/16/2021",
  "username": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac3326"
    }
  },
  "post_content": "Nam nulla. Integer pede justo, lacinia eget,
tincidunt eget, tempus vel, pede. Morbi porttitor lorem id ligula."
},{
  "_id": {
    "$oid": "6173bbf3ce3cd7dfabac3335"
  },
  "post_id": "45-191-5147",
  "post_date": "7/9/2021",
  "username": {
    "$ref": "User",
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac3327"
    }
  },
  "post_content": "Fusce posuere felis sed lacus. Morbi sem
mauris, laoreet ut, rhoncus aliquet, pulvinar sed, nisl. Nunc
rhoncus dui vel sem."

```

```

},{
  "_id": {
    "$oid": "6173bbf3ce3cd7dfabac3336"
  },
  "post_id": "16-515-2242",
  "post_date": "4/5/2021",
  "username": {
    "$ref": "User",
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac3328"
    }
  },
  "post_content": "Donec semper sapien a libero."
},{
  "_id": {
    "$oid": "6173bbf3ce3cd7dfabac3337"
  },
  "post_id": "60-097-7675",
  "post_date": "1/7/2021",
  "username": {
    "$ref": "User",
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac3329"
    }
  },
  "post_content": "Pellentesque eget nunc. Donec quis orci  
eget orci vehicula condimentum. Curabitur in libero ut  
massa volutpat convallis."
},{
  "_id": {
    "$oid": "6173bbf3ce3cd7dfabac3338"
  },
  "post_id": "88-928-9344",
  "post_date": "9/27/2021",
  "username": {
    "$ref": "User",
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac332a"
    }
  }
}

```

```

    }
  },
  "post_content": "Maecenas pulvinar lobortis est. Phasellus
sit amet erat. Nulla tempus. Vivamus in felis eu sapien cursus
vestibulum."
}, {
  "_id": {
    "$oid": "6173bbf3ce3cd7dfabac3339"
  },
  "post_id": "28-348-4935",
  "post_date": "7/25/2021",
  "username": {
    "$ref": "User",
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac332b"
    }
  },
  "post_content": "Integer tincidunt ante vel ipsum. Praesent
blandit lacinia erat."
}, {
  "_id": {
    "$oid": "6173bbf3ce3cd7dfabac333a"
  },
  "post_id": "58-796-5200",
  "post_date": "8/31/2021",
  "username": {
    "$ref": "User",
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac332c"
    }
  },
  "post_content": "Aenean lectus. Pellentesque eget nunc. Donec quis
orci eget orci vehicula condimentum. Curabitur in libero ut massa
volutpat convallis. Morbi odio odio, elementum eu, interdum eu,
tincidunt in, leo."
}, {
  "_id": {
    "$oid": "6173bbf3ce3cd7dfabac333b"
  }
}

```

```

},
"post_id": "06-907-6212",
"post_date": "7/22/2021",
"username": {
  "$ref": "User",
  "$id": {
    "$oid": "61739cb1ce3cd7dfabac332d"
  }
},
"post_content": "Vestibulum ante ipsum primis in faucibus orci luctus et ultrices posuere cubilia Curae; Duis faucibus accumsan odio. Curabitur convallis. Duis consequat dui nec nisi volutpat eleifend. Donec ut dolor. Morbi vel lectus in quam fringilla rhoncus."
},{
  "_id": {
    "$oid": "6173bbf3ce3cd7dfabac333c"
  },
  "post_id": "37-959-7117",
  "post_date": "5/21/2021",
  "username": {
    "$ref": "User",
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac332e"
    }
  },
  "post_content": "Pellentesque ultrices mattis odio. Donec vitae nisi. Nam ultrices, libero non mattis pulvinar, nulla pede ullamcorper augue, a suscipit nulla elit ac nulla. Sed vel enim sit amet nunc viverra dapibus. Nulla suscipit ligula in lacus."
}]

```



```
{
  "acknowledged" : true,
  "insertedIds" : [
    ObjectId("6173bbf3ce3cd7dfabac3334"),
    ObjectId("6173bbf3ce3cd7dfabac3335"),
    ObjectId("6173bbf3ce3cd7dfabac3336"),
    ObjectId("6173bbf3ce3cd7dfabac3337"),
    ObjectId("6173bbf3ce3cd7dfabac3338"),
    ObjectId("6173bbf3ce3cd7dfabac3339"),
    ObjectId("6173bbf3ce3cd7dfabac333a"),
    ObjectId("6173bbf3ce3cd7dfabac333b"),
    ObjectId("6173bbf3ce3cd7dfabac333c")
  ]
}
```

Figure 3.8: Acknowledgement for insertion into 'Posts'.

The following is the code for the 'Fleets' entity, while Figure 3.9 shows the acknowledgement message received on inserting the values.

```
[{
  "_id": {
    "$oid": "6173bed7ce3cd7dfabac333d"
  },
  "fleet_id": "76-759-4870",
  "fleet_time": "1/7/2021",
  "fleet_content": "http://dummyimage.com/218x100.png/cc0000/ffffff",
  "username": {
    "$ref": "User",
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac3326"
    }
  },
  "duration": 1275
},{
  "_id": {
```

```

    "$oid": "6173bed7ce3cd7dfabac333e"
  },
  "fleet_id": "01-445-6404",
  "fleet_time": "8/29/2021",
  "fleet_content": "http://dummyimage.com/227x100.png/ff4444/ffffff",
  "username": {
    "$ref": "User",
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac3327"
    }
  },
  "duration": 998
}, {
  "_id": {
    "$oid": "6173bed7ce3cd7dfabac333f"
  },
  "fleet_id": "50-716-8995",
  "fleet_time": "3/19/2021",
  "fleet_content": "http://dummyimage.com/222x100.png/dddddd/000000",
  "username": {
    "$ref": "User",
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac3328"
    }
  },
  "duration": 677
}, {
  "_id": {
    "$oid": "6173bed7ce3cd7dfabac3340"
  },
  "fleet_id": "80-003-7419",
  "fleet_time": "9/28/2021",
  "fleet_content": "http://dummyimage.com/115x100.png/ff4444/ffffff",
  "username": {
    "$ref": "User",
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac3329"
    }
  }
}

```

```

    },
    "duration": 1029
  },{
    "_id": {
      "$oid": "6173bed7ce3cd7dfabac3341"
    },
    "fleet_id": "97-510-8818",
    "fleet_time": "9/5/2021",
    "fleet_content": "http://dummyimage.com/168x100.png/cc0000/ffffff",
    "username": {
      "$ref": "User",
      "$id": {
        "$oid": "61739cb1ce3cd7dfabac332a"
      }
    }
  },{
    "_id": {
      "$oid": "6173bed7ce3cd7dfabac3342"
    },
    "fleet_id": "86-747-2269",
    "fleet_time": "7/23/2021",
    "fleet_content": "http://dummyimage.com/199x100.png/5fa2dd/ffffff",
    "username": {
      "$ref": "User",
      "$id": {
        "$oid": "61739cb1ce3cd7dfabac332b"
      }
    }
  },
  "duration": 45
},{
  "_id": {
    "$oid": "6173bed7ce3cd7dfabac3343"
  },
  "fleet_id": "80-054-7172",
  "fleet_time": "4/15/2021",
  "fleet_content": "http://dummyimage.com/142x100.png/cc0000/ffffff",
  "username": {
    "$ref": "User",

```

```

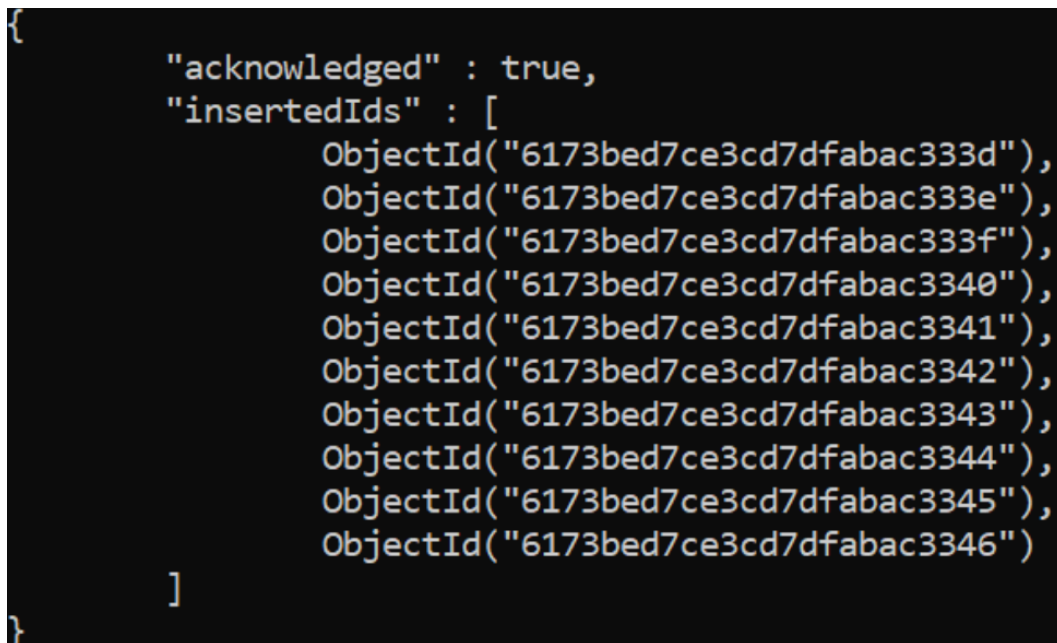
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac332c"
    }
  },
  "duration": 488
}, {
  "_id": {
    "$oid": "6173bed7ce3cd7dfabac3344"
  },
  "fleet_id": "64-647-4212",
  "fleet_time": "9/1/2021",
  "fleet_content": "http://dummyimage.com/128x100.png/5fa2dd/ffffff",
  "username": {
    "$ref": "User",
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac332d"
    }
  },
  "duration": 318
}, {
  "_id": {
    "$oid": "6173bed7ce3cd7dfabac3345"
  },
  "fleet_id": "16-673-2620",
  "fleet_time": "10/20/2021",
  "fleet_content": "http://dummyimage.com/145x100.png/cc0000/ffffff",
  "username": {
    "$ref": "User",
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac332e"
    }
  },
  "duration": 802
}, {
  "_id": {
    "$oid": "6173bed7ce3cd7dfabac3346"
  },
  "fleet_id": "25-929-6476",

```

```

    "fleet_time": "4/15/2021",
    "fleet_content": "http://dummyimage.com/184x100.png/5fa2dd/ffffff",
    "username": {
      "$ref": "User",
      "$id": {
        "$oid": "61739cb1ce3cd7dfabac332f"
      }
    },
    "duration": 1291
  }
}]

```



```

{
  "acknowledged" : true,
  "insertedIds" : [
    ObjectId("6173bed7ce3cd7dfabac333d"),
    ObjectId("6173bed7ce3cd7dfabac333e"),
    ObjectId("6173bed7ce3cd7dfabac333f"),
    ObjectId("6173bed7ce3cd7dfabac3340"),
    ObjectId("6173bed7ce3cd7dfabac3341"),
    ObjectId("6173bed7ce3cd7dfabac3342"),
    ObjectId("6173bed7ce3cd7dfabac3343"),
    ObjectId("6173bed7ce3cd7dfabac3344"),
    ObjectId("6173bed7ce3cd7dfabac3345"),
    ObjectId("6173bed7ce3cd7dfabac3346")
  ]
}

```

Figure 3.9: Acknowledgement for insertion into 'Fleets'.

The following is the code for the 'Replies' entity, while Figure 3.10 shows the acknowledgement message received on inserting the values.

```

[{
  "_id": {
    "$oid": "61756d3df1ab2720ac217101"
  },

```

```

"reply_id": "26-124-0493",
"reply_content": "Mauris lacinia sapien quis libero. Nullam sit amet
turpis elementum ligula vehicula consequat. Morbi a ipsum.",
"replier_id": {
  "$ref": "User",
  "$id": {
    "$oid": "617398d4ce3cd7dfabac3327"
  }
},
"post_id": {
  "$ref": "Posts",
  "$id": {
    "$oid": "6173ba05ce3cd7dfabac3333"
  }
}
}, {
  "_id": {
    "$oid": "61756d3df1ab2720ac217102"
  },
  "reply_id": "51-082-0446",
  "reply_content": "Nullam orci pede, venenatis non, sodales sed,
tincidunt eu, felis. Fusce posuere felis sed lacus. Morbi sem mauris,
laoreet ut, rhoncus aliquet, pulvinar sed, nisl.",
  "replier_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac3328"
    }
  },
  "post_id": {
    "$ref": "Posts",
    "$id": {
      "$oid": "6173ba05ce3cd7dfabac3334"
    }
  }
}
}, {
  "_id": {
    "$oid": "61756d3df1ab2720ac217103"
  },

```

```

    },
    "reply_id": "58-357-7201",
    "reply_content": "Maecenas pulvinar lobortis est.",
    "replier_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3329"
      }
    },
    },
    "post_id": {
      "$ref": "Posts",
      "$id": {
        "$oid": "6173ba05ce3cd7dfabac3335"
      }
    }
  }
}, {
  "_id": {
    "$oid": "61756d3df1ab2720ac217104"
  },
  "reply_id": "93-314-5990",
  "reply_content": "Vivamus tortor.",
  "replier_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac332a"
    }
  },
  },
  "post_id": {
    "$ref": "Posts",
    "$id": {
      "$oid": "6173ba05ce3cd7dfabac3336"
    }
  }
}
}, {
  "_id": {
    "$oid": "61756d3df1ab2720ac217105"
  },
  },
  "reply_id": "14-101-2190",

```

```

"reply_content": "Fusce posuere felis sed lacus. Morbi sem mauris,
laoreet ut, rhoncus aliquet, pulvinar sed, nisl.",
"replier_id": {
  "$ref": "User",
  "$id": {
    "$oid": "617398d4ce3cd7dfabac332b"
  }
},
"post_id": {
  "$ref": "Posts",
  "$id": {
    "$oid": "6173ba05ce3cd7dfabac3337"
  }
}
},{
  "_id": {
    "$oid": "61756d3df1ab2720ac217106"
  },
  "reply_id": "83-951-2230",
  "reply_content": "Aliquam augue quam, sollicitudin vitae,
consectetuer eget, rutrum at, lorem. Integer tincidunt ante
vel ipsum.",
  "replier_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac332c"
    }
  },
  "post_id": {
    "$ref": "Posts",
    "$id": {
      "$oid": "6173ba05ce3cd7dfabac3338"
    }
  }
}
},{
  "_id": {
    "$oid": "61756d3df1ab2720ac217107"
  },

```



```

"reply_id": "30-247-1544",
"reply_content": "Duis bibendum. Morbi non quam nec dui luctus rutrum.",
"replier_id": {
  "$ref": "User",
  "$id": {
    "$oid": "617398d4ce3cd7dfabac332d"
  }
},
"post_id": {
  "$ref": "Posts",
  "$id": {
    "$oid": "6173ba05ce3cd7dfabac3339"
  }
}
},{
  "_id": {
    "$oid": "61756d3df1ab2720ac217108"
  },
  "reply_id": "21-810-5313",
  "reply_content": "Duis at velit eu est congue elementum.",
  "replier_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac332e"
    }
  },
  "post_id": {
    "$ref": "Posts",
    "$id": {
      "$oid": "6173ba05ce3cd7dfabac333a"
    }
  }
}
},{
  "_id": {
    "$oid": "61756d3df1ab2720ac217109"
  },
  "reply_id": "84-228-2014",
  "reply_content": "Nulla justo.",

```

```

    "replier_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332f"
      }
    },
    "post_id": {
      "$ref": "Posts",
      "$id": {
        "$oid": "6173ba05ce3cd7dfabac333b"
      }
    }
  },{
    "_id": {
      "$oid": "61756d3df1ab2720ac21710a"
    },
    "reply_id": "08-809-4754",
    "reply_content": "Nulla neque libero, convallis eget, eleifend luctus, ultricies",
    "replier_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3326"
      }
    },
    "post_id": {
      "$ref": "Posts",
      "$id": {
        "$oid": "6173ba05ce3cd7dfabac333c"
      }
    }
  }
}]

```

```

{
  "acknowledged" : true,
  "insertedIds" : [
    ObjectId("61756d3df1ab2720ac217101"),
    ObjectId("61756d3df1ab2720ac217102"),
    ObjectId("61756d3df1ab2720ac217103"),
    ObjectId("61756d3df1ab2720ac217104"),
    ObjectId("61756d3df1ab2720ac217105"),
    ObjectId("61756d3df1ab2720ac217106"),
    ObjectId("61756d3df1ab2720ac217107"),
    ObjectId("61756d3df1ab2720ac217108"),
    ObjectId("61756d3df1ab2720ac217109"),
    ObjectId("61756d3df1ab2720ac21710a")
  ]
}

```

Figure 3.10: Acknowledgement for insertion into 'Replies'.

The following is the code for the 'Post_Likes' entity, while Figure 3.11 shows the acknowledgement message received on inserting the values.

```

[ {
  "_id": {
    "$oid": "6175723af1ab2720ac21710b"
  },
  "post_id": {
    "$ref": "Posts",
    "$id": {
      "$oid": "6173ba05ce3cd7dfabac3333"
    }
  },
  "liker_id": {
    "$ref": "User",
    "$id": {
      "$oid": "61739cb1ce3cd7dfabac3327"
    }
  }
} ]

```

```

    }
  },{
    "_id": {
      "$oid": "6175723af1ab2720ac21710c"
    },
    "post_id": {
      "$ref": "Posts",
      "$id": {
        "$oid": "6173ba05ce3cd7dfabac3334"
      }
    },
    "liker_id": {
      "$ref": "User",
      "$id": {
        "$oid": "61739cb1ce3cd7dfabac3328"
      }
    }
  },{
    "_id": {
      "$oid": "6175723af1ab2720ac21710d"
    },
    "post_id": {
      "$ref": "Posts",
      "$id": {
        "$oid": "6173ba05ce3cd7dfabac3335"
      }
    },
    "liker_id": {
      "$ref": "User",
      "$id": {
        "$oid": "61739cb1ce3cd7dfabac3329"
      }
    }
  },{
    "_id": {
      "$oid": "6175723af1ab2720ac21710e"
    },
    "post_id": {

```

```

        "$ref": "Posts",
        "$id": {
            "$oid": "6173ba05ce3cd7dfabac3336"
        }
    },
    "liker_id": {
        "$ref": "User",
        "$id": {
            "$oid": "61739cb1ce3cd7dfabac332a"
        }
    }
}, {
    "_id": {
        "$oid": "6175723af1ab2720ac21710f"
    },
    "post_id": {
        "$ref": "Posts",
        "$id": {
            "$oid": "6173ba05ce3cd7dfabac3337"
        }
    },
    "liker_id": {
        "$ref": "User",
        "$id": {
            "$oid": "61739cb1ce3cd7dfabac332b"
        }
    }
}, {
    "_id": {
        "$oid": "6175723af1ab2720ac217110"
    },
    "post_id": {
        "$ref": "Posts",
        "$id": {
            "$oid": "6173ba05ce3cd7dfabac3338"
        }
    },
    "liker_id": {

```

```

        "$ref": "User",
        "$id": {
            "$oid": "61739cb1ce3cd7dfabac332c"
        }
    }, {
        "_id": {
            "$oid": "6175723af1ab2720ac217111"
        },
        "post_id": {
            "$ref": "Posts",
            "$id": {
                "$oid": "6173ba05ce3cd7dfabac3339"
            }
        },
        "liker_id": {
            "$ref": "User",
            "$id": {
                "$oid": "61739cb1ce3cd7dfabac332d"
            }
        }
    }, {
        "_id": {
            "$oid": "6175723af1ab2720ac217112"
        },
        "post_id": {
            "$ref": "Posts",
            "$id": {
                "$oid": "6173ba05ce3cd7dfabac333a"
            }
        },
        "liker_id": {
            "$ref": "User",
            "$id": {
                "$oid": "61739cb1ce3cd7dfabac332e"
            }
        }
    }, {

```

```

    "_id": {
      "$oid": "6175723af1ab2720ac217113"
    },
    "post_id": {
      "$ref": "Posts",
      "$id": {
        "$oid": "6173ba05ce3cd7dfabac333b"
      }
    },
    "liker_id": {
      "$ref": "User",
      "$id": {
        "$oid": "61739cb1ce3cd7dfabac332f"
      }
    }
  }, {
    "_id": {
      "$oid": "6175723af1ab2720ac217114"
    },
    "post_id": {
      "$ref": "Posts",
      "$id": {
        "$oid": "6173ba05ce3cd7dfabac333c"
      }
    },
    "liker_id": {
      "$ref": "User",
      "$id": {
        "$oid": "61739cb1ce3cd7dfabac3326"
      }
    }
  }
}]

```

```

{
    "acknowledged" : true,
    "insertedIds" : [
        ObjectId("6175723af1ab2720ac21710b"),
        ObjectId("6175723af1ab2720ac21710c"),
        ObjectId("6175723af1ab2720ac21710d"),
        ObjectId("6175723af1ab2720ac21710e"),
        ObjectId("6175723af1ab2720ac21710f"),
        ObjectId("6175723af1ab2720ac217110"),
        ObjectId("6175723af1ab2720ac217111"),
        ObjectId("6175723af1ab2720ac217112"),
        ObjectId("6175723af1ab2720ac217113"),
        ObjectId("6175723af1ab2720ac217114")
    ]
}

```

Figure 3.11: Acknowledgement for insertion into 'Post_Likes'.

The following is the code for the 'Reply_Likes' entity, while Figure 3.12 shows the acknowledgement message received on inserting the values.

```

[
  {
    "_id": {
      "$oid": "61757b26f1ab2720ac217115"
    },
    "reply_id": {
      "$ref": "Replies",
      "$id": {
        "$oid": "61756d3df1ab2720ac217101"
      }
    },
    "post_id": {
      "$ref": "Posts",
      "$id": {
        "$oid": "6173ba05ce3cd7dfabac3333"
      }
    }
  }
]

```



```

    },
    "liker_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3326"
      }
    }
  },{
    "_id": {
      "$oid": "61757b26f1ab2720ac217116"
    },
    "reply_id": {
      "$ref": "Replies",
      "$id": {
        "$oid": "61756d3df1ab2720ac217102"
      }
    },
    "post_id": {
      "$ref": "Posts",
      "$id": {
        "$oid": "6173ba05ce3cd7dfabac3334"
      }
    },
    "liker_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3327"
      }
    }
  },{
    "_id": {
      "$oid": "61757b26f1ab2720ac217117"
    },
    "reply_id": {
      "$ref": "Replies",
      "$id": {
        "$oid": "61756d3df1ab2720ac217103"
      }
    }
  }

```

```

    },
    "post_id": {
      "$ref": "Posts",
      "$id": {
        "$oid": "6173ba05ce3cd7dfabac3335"
      }
    },
    "liker_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3328"
      }
    }
  }, {
    "_id": {
      "$oid": "61757b26f1ab2720ac217118"
    },
    "reply_id": {
      "$ref": "Replies",
      "$id": {
        "$oid": "61756d3df1ab2720ac217104"
      }
    },
    "post_id": {
      "$ref": "Posts",
      "$id": {
        "$oid": "6173ba05ce3cd7dfabac3336"
      }
    },
    "liker_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3329"
      }
    }
  }, {
    "_id": {
      "$oid": "61757b26f1ab2720ac217119"
    }
  }

```

```

    },
    "reply_id": {
      "$ref": "Replies",
      "$id": {
        "$oid": "61756d3df1ab2720ac217105"
      }
    },
    "post_id": {
      "$ref": "Posts",
      "$id": {
        "$oid": "6173ba05ce3cd7dfabac3337"
      }
    },
    "liker_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332a"
      }
    }
  }, {
    "_id": {
      "$oid": "61757b26f1ab2720ac21711a"
    },
    "reply_id": {
      "$ref": "Replies",
      "$id": {
        "$oid": "61756d3df1ab2720ac217106"
      }
    },
    "post_id": {
      "$ref": "Posts",
      "$id": {
        "$oid": "6173ba05ce3cd7dfabac3338"
      }
    },
    "liker_id": {
      "$ref": "User",
      "$id": {

```

```

        "$oid": "617398d4ce3cd7dfabac332b"
    }
}
},{
  "_id": {
    "$oid": "61757b26f1ab2720ac21711b"
  },
  "reply_id": {
    "$ref": "Replies",
    "$id": {
      "$oid": "61756d3df1ab2720ac217107"
    }
  },
  "post_id": {
    "$ref": "Posts",
    "$id": {
      "$oid": "6173ba05ce3cd7dfabac3339"
    }
  },
  "liker_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac332c"
    }
  }
}, {
  "_id": {
    "$oid": "61757b26f1ab2720ac21711c"
  },
  "reply_id": {
    "$ref": "Replies",
    "$id": {
      "$oid": "61756d3df1ab2720ac217108"
    }
  },
  "post_id": {
    "$ref": "Posts",
    "$id": {

```

```

        "$oid": "6173ba05ce3cd7dfabac333a"
    }
},
"liker_id": {
    "$ref": "User",
    "$id": {
        "$oid": "617398d4ce3cd7dfabac332d"
    }
}
}, {
    "_id": {
        "$oid": "61757b26f1ab2720ac21711d"
    },
    "reply_id": {
        "$ref": "Replies",
        "$id": {
            "$oid": "61756d3df1ab2720ac217109"
        }
    },
    "post_id": {
        "$ref": "Posts",
        "$id": {
            "$oid": "6173ba05ce3cd7dfabac333b"
        }
    },
    "liker_id": {
        "$ref": "User",
        "$id": {
            "$oid": "617398d4ce3cd7dfabac332e"
        }
    }
}, {
    "_id": {
        "$oid": "61757b26f1ab2720ac21711e"
    },
    "reply_id": {
        "$ref": "Replies",
        "$id": {

```

```

        "$oid": "61756d3df1ab2720ac21710a"
    },
    "post_id": {
        "$ref": "Posts",
        "$id": {
            "$oid": "6173ba05ce3cd7dfabac333c"
        }
    },
    "liker_id": {
        "$ref": "User",
        "$id": {
            "$oid": "617398d4ce3cd7dfabac332f"
        }
    }
}
}]

```

```

{
    "acknowledged" : true,
    "insertedIds" : [
        ObjectId("61757b26f1ab2720ac217115"),
        ObjectId("61757b26f1ab2720ac217116"),
        ObjectId("61757b26f1ab2720ac217117"),
        ObjectId("61757b26f1ab2720ac217118"),
        ObjectId("61757b26f1ab2720ac217119"),
        ObjectId("61757b26f1ab2720ac21711a"),
        ObjectId("61757b26f1ab2720ac21711b"),
        ObjectId("61757b26f1ab2720ac21711c"),
        ObjectId("61757b26f1ab2720ac21711d"),
        ObjectId("61757b26f1ab2720ac21711e")
    ]
}

```

Figure 3.12: Acknowledgement for insertion into 'Reply_Likes'.

The following is the code for the 'User_Home' entity, while Figure 3.13 shows

the acknowledgement message received on inserting the values.

```
[{
  "_id": {
    "$oid": "61758d2bf1ab2720ac21711f"
  },
  "user_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac3326"
    }
  },
  "bio": "In hac habitasse platea dictumst.",
  "city": "Molteno",
  "country": "South Africa",
  "work": "Occupational Therapist",
  "link": "https://ox.ac.uk/praesent/lectus/vestibulum/quam.jsp?
turpis=integer&sed=a&ante=nibh&vivamus=in&tortor=quis&duis=justo
&mattis=maecenas&egestas=rhuncus&metus=aliquam&aenean=lacus&
fermentum=morbi&donec=quis&ut=tortor&mauris=id&eget=nulla&massa=
ultrices&tempor=aliquet&convallis=maecenas&nulla=leo&neque=odio&
libero=condimentum&convallis=id&eget=luctus&eleifend=nec&luctus=
molestie&ultrices=sed"
}, {
  "_id": {
    "$oid": "61758d2bf1ab2720ac217120"
  },
  "user_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac3327"
    }
  },
  "bio": "Curabitur in libero ut massa volutpat convallis. Morbi odio
odio, elementum eu, interdum eu, tincidunt in, leo.",
  "city": "Hongwansi",
  "country": "China",
  "work": "Media Manager II",
```

```

"link": "http://unesco.org/eget/rutrum/at/lorem.aspx?sapien=quis
&non=augue&mi=luctus&integer=tincidunt&ac=nulla&neque=mollis&duis
=molestie&bibendum=lorem&morbi=quisque&non=ut&quam=erat&nec=curabitur
&dui=gravida&luctus=nisi&rutrum=at&nulla=nibh&tellus=in&in=hac&
sagittis=habitasse&dui=platea&vel=dictumst&nisl=aliquam&duis=augue&ac
=quam&nibh=sollicitudin&fusce=vitae&lacus=consectetuer&purus=eget&
aliquet=rutrum&at=at&feugiat=lorem&non=integer&pretium=tincidunt&
quis=ante&lectus=vel&suspendisse=ipsum&potenti=praesent&in=blandit
&eleifend=lacinia&quam=erat&a=vestibulum&odio=sed&in=magna&hac=at&
habitasse=nunc&platea=commodo&dictumst=placemat&maecenas=praesent&ut
=blandit&massa=nam&quis=nulla&augue=integer"
},{
  "_id": {
    "$oid": "61758d2bf1ab2720ac217121"
  },
  "user_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac3328"
    }
  },
  "bio": "Nam nulla. Integer pede justo, lacinia eget, tincidunt eget,
tempus vel, pede.",
  "city": "Ndungu",
  "country": "Tanzania",
  "work": "VP Accounting",
  "link": "http://intel.com/faucibus.jsp?odio=adipiscing&cras=lorem&mi
=vitae&pede=mattis&malesuada=nibh&in=ligula&imperdiet=nec&et=sem&
commodo=duis&vulputate=aliquam&justo=convallis&in=nunc&blandit=proin
&ultrices=at&enim=turpis&lorem=a&ipsum=pede&dolor=posuere&sit=nonummy
&amet=integer&consectetuer=non&adipiscing=velit&elit=donec&proin=
diam&interdum=neque&mauris=vestibulum&non=eget&ligula=vulputate&
pellentesque=ut&ultrices=ultrices&phasellus=vel&id=augue&sapien=
vestibulum&in=ante&sapien=ipsum&iaculis=primis&congue=in&vivamus=
faucibus&metus=orci&arcu=luctus&adipiscing=et&molestie=ultrices"
},{
  "_id": {
    "$oid": "61758d2bf1ab2720ac217122"
  }
}

```



```

},
"user_id": {
  "$ref": "User",
  "$id": {
    "$oid": "617398d4ce3cd7dfabac3329"
  }
},
"bio": "Aliquam erat volutpat. In congue.",
"city": "Hanyuan",
"country": "China",
"work": "Financial Analyst",
"link": "http://google.com.hk/sociis/natoque/penatibus/et/magnis.json
?risus=blandit&semper=mi&porta=in&volutpat=porttitor&quam=pede&pede=
justo&lobortis=eu&ligula=massa&sit=donec&amet=dapibus&eleifend=duis&
pede=at&libero=velit&quis=eu&orci=est&nullam=congue&molestie=elementum
&nibh=in&in=hac&lectus=habitasse&pellentesque=platea&at=dictumst&nulla
=morbi&suspendisse=vestibulum&potenti=velit&cras=id&in=pretium&purus
=iaculis&eu=diam&magna=erat&vulputate=fermentum&luctus=justo&cum=nec
&sociis=condimentum&natoque=neque&penatibus=sapien&et=placerat&magnis
=ante&dis=nulla&parturient=justo&montes=aliquam&nascetur=quis&ridiculus
=turpis&mus=eget&vivamus=elit"
},{
  "_id": {
    "$oid": "61758d2bf1ab2720ac217123"
  },
  "user_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac332a"
    }
  },
  "bio": "Nam congue, risus semper porta volutpat, quam pede lobortis
ligula, sit amet eleifend pede libero quis orci.",
  "city": "Sant Cugat Del Valles",
  "country": "Spain",
  "work": "Senior Editor",
  "link": "http://salon.com/congue/eget/semper/rutrum/nulla.jsp?volutpat
=ultrices&in=posuere&congue=cubilia&etiam=curae&justo=nulla&etiam=

```

```

dapibus&pretium=dolor&iaculis=vel&justo=est&in=donec&hac=odio&habitasse
=justo&platea=sollicitudin&dictumst=ut&etiam=suscipit&faucibus=a&
cursus=feugiat&urna=et&ut=eros&tellus=vestibulum&nulla=ac&ut=est&erat
=lacinia&id=nisi&mauris=venenatis&vulputate=tristique&elementum=fusce
&nullam=congue&varius=diam&nulla=id&facilisi=ornare&cras=imperdiet&non
=sapient&velit=urna&nec=pretium&nisi=nisl&vulputate=ut&nonummy=volutpat
&maecenas=sapient&tincidunt=arcu&lacus=sed&at=augue&velit=aliquam&
vivamus=erat&vel=volutpat&nulla=in&eget=congue&eros=etiam&elementum=
justo&pellentesque=etiam&quisque=pretium&porta=iaculis&volutpat=justo
&erat=in&quisque=hac&erat=habitasse&eros=platea&viverra=dictumst&eget
=etiam&congue=faucibus&eget=cursus&semper=urna&rutrum=ut&nulla=tellus
&nunc=nulla&purus=ut&phasellus=erat&in=id&felis=mauris&donec=vulputate
&semper=elementum&sapient=nullam&a=varius&libero=nulla&nam=facilisi&
dui=cras&proin=non&leo=velit&odio=nec&porttitor=nisi&id=vulputate&
consequat=nonummy&in=maecenas&consequat=tincidunt&ut=lacus&nulla=at&
sed=velit&accumsan=vivamus&felis=vel"
}, {
  "_id": {
    "$oid": "61758d2bf1ab2720ac217124"
  },
  "user_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac332b"
    }
  },
  "bio": "Aenean sit amet justo.",
  "city": "Cosquín",
  "country": "Argentina",
  "work": "Information Systems Manager",
  "link": "http://mapquest.com/suscipit/nulla/elit/ac/nulla/sed/vel.
json?porttitor=in&id=quam&consequat=fringilla&in=rhuncus&consequat
=mauris&ut=enim&nulla=leo&sed=rhuncus&accumsan=sed&felis=vestibulum
&ut=sit&at=amet&dolor=cursus&quis=id&odio=turpis&consequat=integer&
varius=aliquet&integer=massa&ac=id&leo=lobortis&pellentesque=convallis
&ultrices=tortor&mattis=risus&odio=dapibus&donec=augue&vitae=vel&
nisi=accumsan&nam=tellus&ultrices=nisi&libero=eu&non=orci&mattis=
mauris&pulvinar=lacinia&nulla=sapient&pede=quis&nullamcorper=libero&

```

```

augue=nullam&a=sit&suscipit=amet&nulla=turpis&elit=elementum&ac=ligula
&nulla=vehicula&sed=consequat&vel=morbi&enim=a&sit=ipsum&amet=integer
&nunc=a&viverra=nibh&dapibus=in&nulla=quis&suscipit=justo&ligula=
maecenas&in=rhuncus&lacus=aliquam&curabitur=lacus&at=morbi&ipsum=quis
&ac=tortor&tellus=id&semper=nulla&interdum=ultrices&mauris=aliquet&
ullamcorper=maecenas&purus=leo&sit=odio&amet=condimentum&nulla=id"
},{
  "_id": {
    "$oid": "61758d2bf1ab2720ac217125"
  },
  "user_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac332c"
    }
  },
  "bio": "Donec posuere metus vitae ipsum.",
  "city": "Dillenburg",
  "country": "Germany",
  "work": "Cost Accountant",
  "link": "https://so-net.ne.jp/nisl.png?suspendisse=venenatis&potenti
=lacinia&in=aenean&eleifend=sit&quam=amet&a=justo&odio=morbi&in=ut&hac
=odio&habitasse=cras&platea=mi&dictumst=pede&maecenas=malesuada&ut=
in&massa=imperdiet&quis=et&augue=commodo&luctus=vulputate&tincidunt=
justo&nulla=in&mollis=blandit&molestie=ultrices&lorem=enim&quisque=
lorem&ut=ipsum&erat=dolor&curabitur=sit&gravida=amet&nisi=consectetuer
&at=adipiscing&nibh=elit&in=proin&hac=interdum&habitasse=mauris"
},{
  "_id": {
    "$oid": "61758d2bf1ab2720ac217126"
  },
  "user_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac332d"
    }
  },
  "bio": "Nam nulla.",

```

```

"city": "Chironkamba",
"country": "Comoros",
"work": "Design Engineer",
"link": "http://behance.net/ac/lobortis/vel.jsp?sapien=consequat&
varius=lectus&ut=in&blandit=est&non=risus&interdum=auctor&in=sed&ante
=tristique&vestibulum=in&ante=tempus&ipsum=sit&primis=amet&in=sem&
faucibus=fusce&orci=consequat&luctus=nulla&et=nisl&ultrices=nunc&
posuere=nisl&cubilia=duis&curae=bibendum&duis=felis&faucibus=sed&
accumsan=interdum&odio=venenatis&curabitur=turpis&convallis=enim&duis
=blandit&consequat=mi&dui=in&nec=porttitor&nisi=pede&volutpat=justo&
eleifend=eu&donec=massa&ut=donec&dolor=dapibus&morbi=duis&vel=at&lectus
=velit&in=eu&quam=est&fringilla=congue&rhoncus=elementum&mauris=in&
enim=hac&leo=habitasse&rhoncus=platea&sed=dictumst&vestibulum=morbi
&sit=vestibulum&amet=velit&cursus=id&id=pretium&turpis=iaculis&integer
=diam&aliquet=erat&massa=fermentum&id=justo&lobortis=nec&convallis
=condimentum&tortor=neque&risus=sapien&dapibus=placemat&augue=ante&
vel=nulla&accumsan=justo&tellus=aliquam&nisi=quis&eu=turpis&orci=eget
&mauris=elit&lacinia=sodales&sapien=scelerisque&quis=mauris&libero=
sit&nullam=amet&sit=eros&amet=suspendisse&turpis=accumsan&elementum
=tortor&ligula=quis&vehicula=turpis&consequat=sed&morbi=ante&a=vivamus"
},{
  "_id": {
    "$oid": "61758d2bf1ab2720ac217127"
  },
  "user_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac332e"
    }
  },
  "bio": "Quisque arcu libero, rutrum ac, lobortis vel, dapibus at, diam.",
  "city": "Sumberjeruk",
  "country": "Indonesia",
  "work": "Software Consultant",
  "link": "http://drupal.org/justo/in/hac/habitasse/platea/dictumst/
etiam.aspx?tempus=volutpat&semper=erat&est=quisque&quam=erat&pharetra
=eros&magna=viverra&ac=eget&consequat=congue&metus=eget&sapien=semper
&ut=rutrum&nunc=nulla&vestibulum=nunc&ante=purus&ipsum=phasellus&primis

```

```

=in&in=felis&faucibus=donec&orci=semper&luctus=sapien&et=a&ultrices
=libero&posuere=nam&cubilia=dui&curae=proin&mauris=leo&viverra=odio&
diam=porttitor&vitae=id&quam=consequat&suspendisse=in&potenti=consequat
&nullam=ut&porttitor=nulla&lacus=sed&at=accumsan&turpis=felis&donec=
ut&posuere=at&metus=dolor&vitae=quis&ipsum=odio&aliquam=consequat&non
=varius&mauris=integer&morbi=ac&non=leo&lectus=pellentesque&aliquam=
ultrices&sit=mattis&amet=odio&diam=donec&in=vitae&magna=nisi&bibendum
=nam&imperdiet=ultrices&nullam=libero&orci=non&pede=mattis&venenatis=
pulvinar&non=nulla&sodales=pede&sed=ullamcorper&tincidunt=augue&eu=a&
felis=suscipit&fusce=nulla&posuere=elit&felis=ac&sed=nulla&lacus=sed&
morbi=vel&sem=enim&mauris=sit&laoreet=amet&ut=nunc&rhoncus=viverra&
aliquet=dapibus&pulvinar=nulla&sed=suscipit&nisl=ligula&nunc=in&rhoncu
s=lacus&dui=curabitur&vel=at&sem=ipsum&sed=ac&sagittis=tellus&nam=semper
&congue=interdum&risus=mauris&semper=ullamcorper"
},{
  "_id": {
    "$oid": "61758d2bf1ab2720ac217128"
  },
  "user_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac332f"
    }
  },
  "bio": "In tempor, turpis nec euismod scelerisque, quam turpis
adipiscing lorem, vitae mattis nibh ligula nec sem. Duis aliquam
convallis nunc.",
  "city": "Maria Aurora",
  "country": "Philippines",
  "work": "Financial Advisor",
  "link": "https://wikia.com/posuere/cubilia/curae.xml?imperdiet=eros&
sapien=elementum&urna=pellentesque&pretium=quisque&nisl=porta&ut=
volutpat&volutpat=erat&sapien=quisque&arcu=erat&sed=eros&augue=viverra
&aliquam=eget&erat=congue&volutpat=eget&in=semper&congue=rutrum&
etiam=nulla&justo=nunc&etiam=purus&pretium=phasellus&iaculis=in&justo
=felis&in=donec&hac=semper&habitasse=sapien&platea=a&dictumst=libero&
etiam=nam&faucibus=dui&cursus=proin&urna=leo&ut=odio&tellus=porttitor
&nulla=id&ut=consequat&erat=in&id=consequat&mauris=ut&vulputate=nulla

```

```

&elementum=sed&nullam=accumsan&varius=felis&nulla=ut&facilisi=at&cras
=dolor&non=quis&velit=odio&nec=consequat&nisi=varius&vulputate=integer
&nonummy=ac&maecenas=leo&tincidunt=pellentesque&lacus=ultrices&at=
mattis&velit=odio&vivamus=donec"
}]

```

```

{
  "acknowledged" : true,
  "insertedIds" : [
    ObjectId("61758d2bf1ab2720ac21711f"),
    ObjectId("61758d2bf1ab2720ac217120"),
    ObjectId("61758d2bf1ab2720ac217121"),
    ObjectId("61758d2bf1ab2720ac217122"),
    ObjectId("61758d2bf1ab2720ac217123"),
    ObjectId("61758d2bf1ab2720ac217124"),
    ObjectId("61758d2bf1ab2720ac217125"),
    ObjectId("61758d2bf1ab2720ac217126"),
    ObjectId("61758d2bf1ab2720ac217127"),
    ObjectId("61758d2bf1ab2720ac217128")
  ]
}

```

Figure 3.13: Acknowledgement for insertion into 'User.Home'.

The following is the code for the 'Education' entity, while Figure 3.14 shows the acknowledgement message received on inserting the values.

```

[ {
  "_id": {
    "$oid": "617590f0f1ab2720ac217129"
  },
  "user_id": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac3326"
    }
  }
}

```

```

    },
    "institute": "University of Science and Technology Sana'a",
    "grad_year": 2002
  },{
    "_id": {
      "$oid": "617590f0f1ab2720ac21712a"
    },
    "user_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3327"
      }
    },
    "institute": "University of Central Lancashire",
    "grad_year": 2008
  },{
    "_id": {
      "$oid": "617590f0f1ab2720ac21712b"
    },
    "user_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3328"
      }
    },
    "institute": "Kogi State University",
    "grad_year": 2007
  },{
    "_id": {
      "$oid": "617590f0f1ab2720ac21712c"
    },
    "user_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3329"
      }
    },
    "institute": "State University of New York Upstate Medical University ",

```

```

    "grad_year": 2005
  },{
    "_id": {
      "$oid": "617590f0f1ab2720ac21712d"
    },
    "user_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332a"
      }
    },
    "institute": "University of Bologna",
    "grad_year": 1994
  },{
    "_id": {
      "$oid": "617590f0f1ab2720ac21712e"
    },
    "user_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332b"
      }
    },
    "institute": "Virginia College",
    "grad_year": 2012
  },{
    "_id": {
      "$oid": "617590f0f1ab2720ac21712f"
    },
    "user_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332c"
      }
    },
    "institute": "Universiti Kebangsaan Malaysia",
    "grad_year": 1985
  },{

```



```

    "_id": {
      "$oid": "617590f0f1ab2720ac217130"
    },
    "user_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332d"
      }
    },
    "institute": "Indira Gandhi National Open University",
    "grad_year": 2006
  },{
    "_id": {
      "$oid": "617590f0f1ab2720ac217131"
    },
    "user_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332e"
      }
    },
    "institute": "Fachhochschule Furtwangen, Hochschule für Technik und Wirtschaft",
    "grad_year": 1996
  },{
    "_id": {
      "$oid": "617590f0f1ab2720ac217132"
    },
    "user_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332f"
      }
    },
    "institute": "Universidad Bolivariana",
    "grad_year": 2007
  }]

```

```

{
    "acknowledged" : true,
    "insertedIds" : [
        ObjectId("617590f0f1ab2720ac217129"),
        ObjectId("617590f0f1ab2720ac21712a"),
        ObjectId("617590f0f1ab2720ac21712b"),
        ObjectId("617590f0f1ab2720ac21712c"),
        ObjectId("617590f0f1ab2720ac21712d"),
        ObjectId("617590f0f1ab2720ac21712e"),
        ObjectId("617590f0f1ab2720ac21712f"),
        ObjectId("617590f0f1ab2720ac217130"),
        ObjectId("617590f0f1ab2720ac217131"),
        ObjectId("617590f0f1ab2720ac217132")
    ]
}

```

Figure 3.14: Acknowledgement for insertion into 'Education'.

The following is the code for the 'Friends' entity, while Figure 3.15 shows the acknowledgement message received on inserting the values.

```

[
  {
    "_id": {
      "$oid": "617599aff1ab2720ac217133"
    },
    "friend_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3326"
      }
    },
    "friend_of": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3327"
      }
    }
  }
]

```

```

    },
    "name": "Henrie Beaze",
    "follow_status": "Yes"
  },{
    "_id": {
      "$oid": "617599aff1ab2720ac217134"
    },
    "friend_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3327"
      }
    },
    "friend_of": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3328"
      }
    },
    "name": "Lesly Clubbe",
    "follow_status": "Yes"
  },{
    "_id": {
      "$oid": "617599aff1ab2720ac217135"
    },
    "friend_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3328"
      }
    },
    "friend_of": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3329"
      }
    },
    "name": "Inger Landreth",

```

```

    "follow_status": "No"
  },{
    "_id": {
      "$oid": "617599aff1ab2720ac217136"
    },
    "friend_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac3329"
      }
    },
    "friend_of": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332a"
      }
    },
    "name": "Tilda Andrusyak",
    "follow_status": "Yes"
  },{
    "_id": {
      "$oid": "617599aff1ab2720ac217137"
    },
    "friend_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332a"
      }
    },
    "friend_of": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332b"
      }
    },
    "name": "Calhoun Colly",
    "follow_status": "No"
  },{

```

```

    "_id": {
      "$oid": "617599aff1ab2720ac217138"
    },
    "friend_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332b"
      }
    },
    "friend_of": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332c"
      }
    },
    "name": "Bertrando Szach",
    "follow_status": "Yes"
  },{
    "_id": {
      "$oid": "617599aff1ab2720ac217139"
    },
    "friend_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332c"
      }
    },
    "friend_of": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332d"
      }
    },
    "name": "Ashien Jeremiah",
    "follow_status": "No"
  },{
    "_id": {
      "$oid": "617599aff1ab2720ac21713a"
    }
  }

```

```

    },
    "friend_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332d"
      }
    },
    "friend_of": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332e"
      }
    },
    "name": "Robbin Aiers",
    "follow_status": "Yes"
  }, {
    "_id": {
      "$oid": "617599aff1ab2720ac21713b"
    },
    "friend_id": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332e"
      }
    },
    "friend_of": {
      "$ref": "User",
      "$id": {
        "$oid": "617398d4ce3cd7dfabac332f"
      }
    },
    "name": "Eugen Mouan",
    "follow_status": "No"
  }, {
    "_id": {
      "$oid": "617599aff1ab2720ac21713c"
    },
    "friend_id": {

```

```

    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac332f"
    }
  },
  "friend_of": {
    "$ref": "User",
    "$id": {
      "$oid": "617398d4ce3cd7dfabac3326"
    }
  },
  "name": "Miguela Burril",
  "follow_status": "Yes"
}]

```

```

{
  "acknowledged" : true,
  "insertedIds" : [
    ObjectId("617599aff1ab2720ac217133"),
    ObjectId("617599aff1ab2720ac217134"),
    ObjectId("617599aff1ab2720ac217135"),
    ObjectId("617599aff1ab2720ac217136"),
    ObjectId("617599aff1ab2720ac217137"),
    ObjectId("617599aff1ab2720ac217138"),
    ObjectId("617599aff1ab2720ac217139"),
    ObjectId("617599aff1ab2720ac21713a"),
    ObjectId("617599aff1ab2720ac21713b"),
    ObjectId("617599aff1ab2720ac21713c")
  ]
}

```

Figure 3.15: Acknowledgement for insertion into 'Friends'.

Chapter 4

Contributions

1. Kartika Nair - PES1UG19CS213
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 - Hours Spent - 4
2. Krithika Ragothaman - PES1UG19CS231
 - Mapping, Implementation, Population
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3. Maitreyi P - PES1UG19CS254
 - Mapping, Implementation, Population
 - Hours Spent - 4