Mongo DB – AMONG US Assignment

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- Submission Date: 7/10/2022

Question 1.1 - Read in the data using the mongoimport command.

Command -

C:\Program Files\MongoDB\Server\5.0\bin>mongoimport --db AMONGUS --collection Game --file "C:\Users\Jagad\MS Program\Assignments\Module4_MongoDB_AmongUS\Among_Us_data.json" --jsonArray

Output Screenshot -

```
C:\Program Files\MongoDB\Server\5.0\bin>mongoimport --db AMONGUS --collection Game --file "C:\Users\Jagad\MS Program\Assignments\Module4_MongoDB_AmongUS\Among_Us_data.json" --jsonArray 2022-07-04T17:35:27.214-0700 connected to: mongodb://localhost/ 2022-07-04T17:35:27.712-0700 499 document(s) imported successfully. 0 document(s) failed to import.
```

C:\Program Files\MongoDB\Server\5.0\bin>

Question 1.2 - Display data for the match with "game" = "3"

Command -

AMONGUS> db.Game.find({"game":"3"}).pretty()

```
mongosh mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000
AMONGUS> db.Game.find({"game":"3"}).pretty()
    id: ObjectId("62c3874f8d233df3063f2d8e"),
    game: '
    Game_Feed: [
        Event: 1,
        Map: 'Polus',
        Outcome: '',
        Action: 'kills',
Player: 'BK',
        Role: '(Crew).'
        Role: '(Crew).',
'Game Feed': 'Keaton (Impostor) kills BK (Crew).',
        'Impostors Alive': 2,
        Score: '8-2'
        Map: 'Polus',
        Outcome: '',
        'Player/Team': 'Keaton',
        Action: 'finds body of',
        Player: 'BK',
        Role: '(Crew).'
        'Votes Off Code': 0,
        'Impostors Alive': 2,
        Score: '7-2'
        Event: 3,
        Map: 'Polus',
        Outcome: '',
        Action: 'skips voting.',
        Player: '',
        Role: ''
```

Question 2 – Explore Data - create a new collection with only the document relating to game 3.

Command -

AMONGUS> db.Game.aggregate([{ \$match: { "game":"3" } }, { \$out: "Game3" }])

AMONGUS> show collections Game Game3

```
mongosh mongodb://127.0.0.1:27017/?directConnection=true&serverSelectionTimeoutMS=2000
AMONGUS>
AMONGUS>
AMONGUS> db.Game.aggregate([ { $match: { "game":"3" } }, { $out: "Game3" } ])
AMONGUS> show collections
AMONGUS> db.Game3.find().pretty()
    _id: ObjectId("62c3874f8d233df3063f2d8e"),
    game:
    Game_Feed: [
        Event: 1,
        Map: 'Polus',
        Outcome: '',
        Action: 'kills',
        Player: 'BK',
        Role: '(Crew).',
        'Impostors Alive': 2,
        Score: '8-2'
        Event: 2,
        Map: 'Polus',
        Outcome: '',
        Action: 'finds body of',
        Player: 'BK',
        Role: '(Crew).',
        Day: 1,
        'Votes Off Code': ∅,
        'Crew Alive': 7,
        'Impostors Alive': 2,
        Score: '7-2'
```

Question 2.1 – Explore Data - Display the Game Feed data for the game in the new collection.

Command -

AMONGUS> db.Game3.aggregate([{ \$unwind: '\$Game_Feed' },{\$project: {'Game_Feed':1}}])

AMONGUS> db.Game3.aggregate([{ \$unwind: '\$Game_Feed' },{\$project: {'Game_Feed':1}}}]) id: ObjectId("62c3874f8d233df3063f2d8e"), Game_Feed: { Event: 1, Map: 'Polus', Outcome: '', 'Player/Team': 'Keaton', Action: 'kills', Player: 'BK', Role: '(Crew).', 'Game Feed': 'Keaton (Impostor) kills BK (Crew).', Day: 1, 'Votes Off Code': '', 'Vote ID': '' 'Day 1 vote': '', 'Crew Alive': 8, 'Impostors Alive': 2, Score: '8-2' }, _id: ObjectId("62c3874f8d233df3063f2d8e"), Game_Feed: { Event: 2, Map: 'Polus', Outcome: '', Action: 'finds body of', Player: 'BK', Role: '(Crew).', 'Game Feed': 'Keaton (Impostor) finds body of BK (Crew).', Day: 1, 'Votes Off Code': ∅, 'Vote ID': '3-1', 'Day 1 vote': 'Skipped Vote.', 'Crew Alive': 7, 'Impostors Alive': 2, Score: '7-2' _id: ObjectId("62c3874f8d233df3063f2d8e"), Game Feed: {

Question 2.2 – Display the last event in game 3.

Command -

db.Game3.aggregate([{ \$unwind: '\$Game_Feed' },{\$project: {'Game_Feed':1}},{ \$match: { 'Game_Feed.Event': 10 }}])

```
AMONGUS> db.Game3.aggregate([{ $unwind: '$Game Feed' },{$project: {'Game Feed':1}},{ $match: { 'Game Feed.Event': 10 }}])
    _id: ObjectId("62c3874f8d233df3063f2d8e"),
   Game Feed: {
     Event: 10,
     Map: 'Polus',
     Outcome: '3-End',
     'Player/Team': '',
     Action: 'Crew Win - Voting',
     Player: '',
     Role: '',
     'Game Feed': 'Crew Win - Voting',
     Day: 4,
     'Vote ID': '',
     'Crew Alive': 5,
     'Impostors Alive': 0,
     Score: '5-0'
AMONGUS>
```

Question 2.3 – Who won game 3, imposters or crew?

Command -

db.Game3.aggregate([{ \$unwind: '\$Game_Feed' },{\$project: {'Game_Feed.Game Feed':1}}])

Answer - Crew wins by voting

```
AMONGUS> db.Game3.aggregate([{ $unwind: '$Game Feed' },{$project: {'Game Feed.Game Feed':1}}])
    id: ObjectId("62c3874f8d233df3063f2d8e"),
   Game Feed: { 'Game Feed': 'Keaton (Impostor) kills BK (Crew).' }
    _id: ObjectId("62c3874f8d233df3063f2d8e"),
   Game Feed: { 'Game Feed': 'Keaton (Impostor) finds body of BK (Crew).' }
    _id: ObjectId("62c3874f8d233df3063f2d8e"),
   Game Feed: { 'Game Feed': 'Crew skips voting.' }
    _id: ObjectId("62c3874f8d233df3063f2d8e"),
   Game Feed: { 'Game Feed': 'Keaton (Impostor) kills zlubars (Crew).' }
    id: ObjectId("62c3874f8d233df3063f2d8e"),
   Game Feed: { 'Game Feed': 'Mani (Crew) finds body of zlubars (Crew).' }
    _id: ObjectId("62c3874f8d233df3063f2d8e"),
   Game Feed: { 'Game Feed': 'Crew votes off Keaton (Impostor).' }
    id: ObjectId("62c3874f8d233df3063f2d8e"),
   Game Feed: { 'Game Feed': 'Dreamy (Impostor) kills wrapter (Crew).' }
    id: ObjectId("62c3874f8d233df3063f2d8e"),
   Game Feed: { 'Game Feed': 'Dreamy (Impostor) finds body of wrapter (Crew).' }
    _id: ObjectId("62c3874f8d233df3063f2d8e"),
   Game Feed: { 'Game Feed': 'Crew votes off Dreamy (Impostor).' }
    _id: ObjectId("62c3874f8d233df3063f2d8e"),
   Game Feed: { 'Game Feed': 'Crew Win - Voting' }
AMONGUS>
```

Question 2.4 – Who picked the black color in game 3? Was that player crew or imposter?

Command -

```
db.Game3.aggregate([{ $unwind: '$player_data' },{$project: {'player_data':1}},{ $match: { 'player_data.Color': 'Black' }}])
```

Answer – Impostor Keaton picked black color

Question 2.5 – How many voting events happened in game 3?

Command –

```
AMONGUS> db.Game3.aggregate([{ $unwind: '$voting_data' },{$project: {'voting_data.Vote_Event':1}},{$group: {_id:null,count:{$sum:1}}}])
```

Answer – 24 voting event occurred in Game 3

```
AMONGUS>

AMONGUS> db.Game3.aggregate([{ $unwind: '$voting_data' },{$project: {'voting_data.Vote_Event':1}},{$group: {_id:null,count:{$sum:1}}}])

[ { _id: null, count: 24 } ]

AMONGUS>
```

Question 2.6 – This task was focused on exploring a single document. As explained earlier the document is made of 4 main fields and three of those are nested and hold a lot of data.

If you were to redesign this database to make it easier to query, what changes would you make to the structure? Explain your design decisions. Do not modify the structure, simply explain the changes you want to make and justify them.

Answer – Create 4 collections. Game collection will have references to other collections via Game id. Using multiple collections should make the queries efficient.

Game • id

- Game Feed id
- Player_Data_ID
- Voting_Data_ID

Game Feed

- Game id
- Game Feed id
- Event

Player Data

- Game id
- Player_Data

Voting Data

- Game id
- Voting_data

Question 3.1 - Overall aggregation - How many events in total do you have data for, in this collection (across all games)? An event as explained earlier is a record of development in the game.

```
Command – AMONGUS> db.Game.aggregate([{ $unwind: '$Game_Feed' },{$project: {'Game_Feed':1}},{$group: {_id:null,count:{$sum:1}}}])
```

Answer – Total of 5889 events exist in all games

```
AMONGUS> db.Game.aggregate([{ $unwind: '$Game_Feed' },{$project: {'Game_Feed':1}},{$group: {_id:null,count:{$sum:1}}}])
[ { _id: null, count: 5889 } ]
AMONGUS>
```

Question 3.2 - Overall aggregation - How many matches did the crew win versus how many matches did the impostors win?

```
Command – AMONGUS>db.Game.aggregate([{ $unwind: '$Game_Feed' },{$project: {'Game_Feed':1}},{$match:{'Game_Feed.Outcome':{ $regex: "End$"}}},{ $group: { _id: { Action: "$Game_Feed.Action" }, totalwins: { $$sum:1} } }])
```

Answer –

- 1. Crew Wins 323 (279+44)
- 2. Imposter Wins 176 (2+174)

```
AMONGUS> db.Game.aggregate([{ $unwind: '$Game_Feed' },{$project: {'Game_Feed':1}},{$match:{'Game_Feed.Outcome':{ $regex: "End$"}}},{ $group: { _id: { Action: "$Game_Feed.Action" }, totalwins: { $sum: 1} } }])
[
{ _id: { Action: 'Impostor Win - Sabotage' }, totalwins: 2 },
{ _id: { Action: 'Crew Win - Voting' }, totalwins: 279 },
{ _id: { Action: 'Impostor Win - Kills' }, totalwins: 174 },
{ _id: { Action: 'Crew Win - Tasks' }, totalwins: 44 }
}
AMONGUS>
```

Question 3.3 - Overall aggregation - Find out how many matches were played on each map. Your output should contain the names of maps and the number of games played on each map.

```
Command – db.Game.aggregate([{ $unwind: '$Game_Feed' },{$project: {'Game_Feed':1}},{$match:{'Game_Feed.Outcome':{$regex: "End$"}}},{ $group: { _id: { Action: "$Game_Feed.Map" }, MatchesPlayedOnMaps: { $sum:1} } }])
```

Answer – # of Matches played on each map is

- 1. The Skeld 88 Matches
- 2. MIRA HQ 7 Matches
- 3. Polus 404 Matches

```
AMONGUS> db.Game.aggregate([{ $unwind: '$Game_Feed' },{$project: {'Game_Feed':1}},{$match:{'Game_Feed.Outcome':{$regex: "End$"}}},{ $group: { _id: { Action: "$Game_Feed.Map" }, MatchesPlayedOnMaps: { $sum:1} } }])
[
{ _id: { Action: 'The Skeld' }, MatchesPlayedOnMaps: 88 },
    { _id: { Action: 'MIRA HQ' }, MatchesPlayedOnMaps: 7 },
    { _id: { Action: 'Polus' }, MatchesPlayedOnMaps: 404 }
}
AMONGUS>
```

Question 3.4 - Overall aggregation - How many times in total across all games did the crew skip a vote?

Answer – The crew skipped voting 692 times

```
AMONGUS> db.Game.aggregate([{ $unwind: '$Game_Feed' },{$project: {'Game_Feed':1}},{$match:{'Game_Feed.Game Feed':'Crew skips voting.'}},{$group: {_id:null,count:{$sum:1}}}])
[ { _id: null, count: 692 } ]
AMONGUS>
```

Question 3.5 - Overall aggregation - How many times in total across all matches does the crew vote against imposters?

```
Command – AMONGUS>db.Game.aggregate([{ $unwind: '$Game_Feed' },{$project: {'Game_Feed':1}},{$match:{'Game_Feed.Outcome':{ $regex: "End$"}}},{ $group: { _id: { Action: "$Game_Feed.Action" }, totalwins: { $$sum:1} } }])
```

Answer – The crew wins voting 279 times

Question 3.6 - Overall aggregation - The questions you answered in this task were all related to high-level aggregations across the entire collection. In your opinion, is the game more or less hard for impostors? Justify your answer with suitable insights from the data.

Command -

db.Game.aggregate([{ \$unwind: '\$Game_Feed' },{\$project: {'Game_Feed':1}},{\$match:{'Game_Feed.Outcome':{ \$regex: "End\$"}}},{ \$group: { _id: { Action: "\$Game_Feed.Action" }, totalwins: { \$sum:1} } }])

Answer – Imposter won 35.27% (176 out of 499) of the time and Crew won 64.7% (323 out of 499). Since the odds of winning by Crew is ~65%, the game is hard for imposters.

Question 4.1 - Player-level aggregation - Find the number of unique players in the data set.

Command -

- db.Game.distinct('player_data.name')
- 2. db.Game.distinct('player_data.name').length

Answer – 108 players exist in all Games

```
AMONGUS> db.Game.distinct('player_data.name').length
108
AMONGUS>
```

```
AMONGUS> db.Game.distinct('player data.name')
                  'Aberdasher', 'AbeyBaby',
                                                   'Adrien',
  'Ahamkara',
                 'Ambiance', 'Andrew',
                                'Barnabus',
                                'DoubleFried',
                                                   'Dreamy',
  'DuckMyInt',
                 'Eirik',
                 'FoxBox',
                                'GGards',
  'GrahamLRR',
                                'JohnnyCatz',
  'Kibler',
                 'Kyle',
                                                   'LadyAtarka',
  'LeeSharpe',
  'Mullibok',
                  'MurkLurker', 'Murklurker',
                                                   'PANCAKE',
                 'Riley',
                                'Ryuu',
                 'SamSherman', 'ScaldingHotSoup', 'Scott',
  'Stranjak',
                                                   'Trotske',
                 'Zyla',
                                'flutter',
                                                   'hafu',
                                'julie',
                                                   'niphette',
 ... 8 more items
AMONGUS>
```

Question 4.3 - Player-level aggregation - Who is the best crew member?

Command

```
    db.Game.aggregate([{ $unwind: '$voting_data' },{$project:
    {'voting_data.Vote':1}},{$match:{'voting_data.Vote':{$regex: "Impostor voted
    off.$"}}},{$match:{'voting_data.Vote':{$regex: "^2-"}}},{ $group: { _id: { Action: "$voting_data.Vote" },
    BestCrew: { $sum:1} } },{$sort:{BestCrew: -1}} ])
```

Answer – BK is the best Crew who voted out Imposters 54 times

```
AMONGUS> db.Game.aggregate([{ $unwind: '$voting data' },{$project: {'voting data.Vote':1}},{$match:{'voting data.Vote':{$regex: "Impostor voted off.$"}}},{$match:{'voting data.Vote':{$regex:
,{ $group: { _id: { Action: "$voting data.Vote" }, BestCrew: { $sum:1} } },{$sort:{BestCrew: -1}} ])
   _id: { Action: '2-BK-Impostor voted off.' }, BestCrew: 54 },
   id: { Action: '2-dokomoy-Impostor voted off.' }, BestCrew: 44 },
   _id: { Action: '2-Sam-Impostor voted off.' }, BestCrew: 43 },
   id: { Action: '2-Pheylop-Impostor voted off.' }, BestCrew: 42 },
   id: { Action: '2-Ahamkara-Impostor voted off.' }, BestCrew: 34 };
   id: { Action: '2-Keaton-Impostor voted off.' }, BestCrew: 34 },
   id: { Action: '2-Andrew-Impostor voted off.' }, BestCrew: 31 },
   id: { Action: '2-LSV-Impostor voted off.' }, BestCrew: 28 },
    id: { Action: '2-zlubars-Impostor voted off.' }, BestCrew: 28 },
   _id: { Action: '2-Pojo-Impostor voted off.' }, BestCrew: 25 },
    _id: { Action: '2-jorbs-Impostor voted off.' }, BestCrew: 25 },
   id: { Action: '2-Bloody-Impostor voted off.' }, BestCrew: 25 },
   id: { Action: '2-Mani-Impostor voted off.' }, BestCrew: 25 },
   id: { Action: '2-bsweitz-Impostor voted off.' }, BestCrew: 23 },
   id: { Action: '2-Oltanya-Impostor voted off.' }, BestCrew: 22 },
   id: { Action: '2-LadyAtarka-Impostor voted off.' }, BestCrew: 21 },
   id: { Action: '2-Zhoola-Impostor voted off.' }, BestCrew: 20 },
   _id: { Action: '2-Ian-Impostor voted off.' }, BestCrew: 19 },
   _id: { Action: '2-Scott-Impostor voted off.' }, BestCrew: 19 },
    id: { Action: '2-DoubleFried-Impostor voted off.' },
   BestCrew: 17
Type "it" for more
```

Question 4.3 - Player-level aggregation - Who is the worst crew member?

Command

```
db.Game.aggregate([{ $unwind: '$voting_data' },{$project: {'voting_data.Vote':1}},{$match:{'voting_data.Vote':{$regex: "Crew voted off.$"}}},{$match:{'voting_data.Vote':{$regex: "^1-"}}},{ $group: { _id: { Action: "$voting_data.Vote" }, WorstCrew: { $sum:1} } },{$sort:{WorstCrew: -1}} ])
```

Answer – Sam is the worst Crew who voted out crew 16 times

```
MONGUS> db.Game.aggregate([{ $unwind: '$voting_data' },{$project: {'voting_data.Vote':1}},{$match:{'voting_data.Vote':{$regex: "Crew_voted_off.$"}}},{$match:{'voting_data.Vote':($regex: "^1-"}}},{$
 roup: { id: { Action: "$voting data.Vote" }, WorstCrew: { $sum:1} } },{$sort:{WorstCrew: -1}} ])
  id: { Action: '1-Sam-Crew voted off.' }, WorstCrew: 16 },
   _id: { Action: '1-LSV-Crew voted off.' }, WorstCrew: 13 },
   id: { Action: '1-dokomoy-Crew voted off.' }, WorstCrew: 13 },
  id: { Action: '1-Andrew-Crew voted off.' }, WorstCrew: 13 },
   id: { Action: '1-BK-Crew voted off.' }, WorstCrew: 12 },
   _id: {    Action: '1-DBatterskull-Crew voted off.'    },    WorstCrew: 10    },
   id: { Action: '1-Pheylop-Crew voted off.' }, WorstCrew: 10 },
   id: { Action: '1-Mani-Crew voted off.' }, WorstCrew: 10 },
   _id: { Action: '1-Barnabus-Crew voted off.' }, WorstCrew: 9 },
   id: { Action: '1-Scott-Crew voted off.' }, WorstCrew: 9 },
   _id: { Action: '1-bsweitz-Crew voted off.' }, WorstCrew: 8 },
   id: { Action: '1-Chosaucer-Crew voted off.' }, WorstCrew: 8 },
   id: { Action: '1-Ahamkara-Crew voted off.' }, WorstCrew: 8 },
   _id: { Action: '1-Gaby-Crew voted off.' }, WorstCrew: 8 },
   id: { Action: '1-Bloody-Crew voted off.' }, WorstCrew: 8 },
   id: { Action: '1-BennyB-Crew voted off.' }, WorstCrew: 7 },
   id: { Action: '1-zlubars-Crew voted off.' }, WorstCrew: 7 },
   _id: { Action: '1-Pojo-Crew voted off.' }, WorstCrew: 7 },
  id: { Action: '1-Ian-Crew voted off.' }, WorstCrew: 7 },
  id: { Action: '1-Keaton-Crew voted off.' }, WorstCrew: 6 }
```

Question 6 - In tasks 4 and 5 you create some player-wise statistics. Explain statistics that you might want to explore (other than the ones that were calculated earlier) during the exercise of selecting players.

Who is the best Imposter

Who is the worst Imposter

Which play fields helped Imposter win most games

Which play fields helped Crew win most games