

Project 3: The Mongo Mash

CECS 323: Database Fundamentals

Section 6

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Due Date: 12/15/2023

JSON Documents

Activities

```
[{
  "_id": {
    "$oid": "656fb2e7ebd447b48d6c26e9"
  },
  "name": "Archery"
},
{
  "_id": {
    "$oid": "656fb342ebd447b48d6c26ea"
  },
  "name": "Swimming"
},
{
  "_id": {
    "$oid": "656fb363ebd447b48d6c26eb"
  },
  "name": "Movie"
}]
```

Campers

```
[{
  "_id": {
    "$oid": "656fbbed2ebd447b48d6c26ef"
  },
  "name": "Ada",
  "birthday": {
    "$date": "2007-06-15T00:00:00.000Z"
  },
  "sessions": [
    {
      "sessionId": {
        "$oid": "656fea40ebd447b48d6c2705"
      },
      "sessionTitle": "Harry Potter Week",
      "unitName": "RavenClaw"
    }
  ]
},
{
  "_id": {
    "$oid": "656fb342ebd447b48d6c26ea"
  },
  "name": "Swimming"
},
{
  "_id": {
    "$oid": "656fb2e7ebd447b48d6c26e9"
  },
  "name": "Archery"
}]
```

```
{
  "_id": {
    "$oid": "656fbf4aebd447b48d6c26f0"
  },
  "name": "Sofia",
  "birthday": {
    "$date": "2008-09-28T00:00:00.000Z"
  },
  "sessions": [
    {
      "sessionId": {
        "$oid": "656fea40ebd447b48d6c2705"
      },
      "sessionTitle": "Harry Potter Week",
      "unitName": "RavenClaw"
    }
  ],
  {
    "_id": {
      "$oid": "656fbf96ebd447b48d6c26f1"
    },
    "name": "Iggy",
    "birthday": {
      "$date": "2007-11-10T00:00:00.000Z"
    },
    "sessions": [
      {
        "sessionId": {
          "$oid": "656fea40ebd447b48d6c2705"
        },
        "sessionTitle": "Harry Potter Week",
        "unitName": "HufflePuff"
      }
    ],
    {
      "_id": {
        "$oid": "656fbfd1ebd447b48d6c26f2"
      },
      "name": "Rosie",
      "birthday": {
```

```
"$date": "2009-05-23T00:00:00.000Z"
},
"sessions": [
{
"sessionId": {
"$oid": "656fea40ebd447b48d6c2705"
},
"sessionTitle": "Harry Potter Week",
"unitName": "HufflePuff"
}
]
}]
```

Employees

```
[{
  "_id": {
    "$oid": "65701475ebd447b48d6c270a"
  },
  "lastName": "Greer",
  "firstName": "Lila",
  "wage": {
    "$numberDecimal": "20.50"
  },
  "sessions": [
    {
      "sessionId": {
        "$oid": "656fea40ebd447b48d6c2705"
      },
      "sessionTitle": "Harry Potter Week",
      "campName": "Minerva"
    }
  ],
  {
    "_id": {
      "$oid": "65701491ebd447b48d6c270c"
    },
    "lastName": "Valdez",
    "firstName": "Marco",
    "wage": {
      "$numberDecimal": "18.75"
    },

```

```
"sessions": [  
  {  
    "sessionId": {  
      "$oid": "656fea40ebd447b48d6c2705"  
    },  
    "sessionTitle": "Harry Potter Week",  
    "campName": "Hermes",  
    "unitId": {  
      "$oid": "657015ceebd447b48d6c2713"  
    },  
    "unitName": "HufflePuff"  
  }  
],  
  {  
    "_id": {  
      "$oid": "657014b8ebd447b48d6c270e"  
    },  
    "lastName": "Thompson",  
    "firstName": "Teresa",  
    "wage": {  
      "$numberDecimal": "22.00"  
    },  
    "sessions": [  
      {  
        "sessionId": {  
          "$oid": "656fea40ebd447b48d6c2705"  
        },  
        "sessionTitle": "Harry Potter Week",  
        "campName": "Hera",  
        "unitId": {  
          "$oid": "657014e6ebd447b48d6c2711"  
        },  
        "unitName": "Ravenclaw"  
      }  
    ],  
    {  
      "_id": {  
        "$oid": "657014d6ebd447b48d6c2710"  
      },  
      "lastName": "Twist",
```

```
"firstName": "Aisha",
"wage": {
"$numberDecimal": "21.25"
},
"sessions": [
{
"sessionId": {
"$oid": "656fea40ebd447b48d6c2705"
},
"sessionTitle": "Harry Potter Week",
"campName": "Athena"
}
]
}]
```

Rotations

```
[{
  "_id": {
    "$oid": "65701644ebd447b48d6c2714"
  },
  "sessionId": {
    "$oid": "656fea40ebd447b48d6c2705"
  },
  "title": "Monday Morning",
  "startTime": {
    "$date": "2023-12-01T08:00:00.000Z"
  },
  "endTime": {
    "$date": "2023-12-01T12:00:00.000Z"
  },
  "schedule": [
    {
      "unitId": {
        "$oid": "657014e6ebd447b48d6c2711"
      },
      "unitName": "RavenClaw",
      "staffId": {
        "$oid": "657013b0ebd447b48d6c2709"
      },
      "staffCampName": "Minerva",
      "activityId": {
        "$oid": "656fb2e7ebd447b48d6c26e9"
      }
    }
  ]
}]
```

```
,
"activityName": "Archery"
}
],
},
{
  "_id": {
    "$oid": "6570164eebd447b48d6c2715"
  },
  "sessionId": {
    "$oid": "656fea40ebd447b48d6c2705"
  },
  "title": "Monday Afternoon",
  "startTime": {
    "$date": "2023-12-01T13:00:00.000Z"
  },
  "endTime": {
    "$date": "2023-12-01T17:00:00.000Z"
  },
  "schedule": [
    {
      "unitId": {
        "$oid": "657015ceebd447b48d6c2713"
      },
      "unitName": "HufflePuff",
      "staffId": {
        "$oid": "657014c8ebd447b48d6c270f"
      },
      "staffCampName": "Athena",
      "activityId": {
        "$oid": "656fb342ebd447b48d6c26ea"
      },
      "activityName": "Swimming"
    }
  ],
},
{
  "_id": {
    "$oid": "65701659ebd447b48d6c2716"
  },
  "sessionId": {
    "$oid": "656fea40ebd447b48d6c2705"
  },

```

```
,
"title": "Tuesday Morning",
"startTime": {
"$date": "2023-12-02T08:00:00.000Z"
},
"endTime": {
"$date": "2023-12-02T12:00:00.000Z"
},
"schedule": [
{
"unitId": {
"$oid": "657014e6ebd447b48d6c2711"
},
"unitName": "RavenClaw",
"staffId": {
"$oid": "657014c8ebd447b48d6c270f"
},
"staffCampName": "Athena",
"activityId": {
"$oid": "656fb342ebd447b48d6c26ea"
},
"activityName": "Swimming"
},
{
"unitId": {
"$oid": "657015ceebd447b48d6c2713"
},
"unitName": "HufflePuff",
"staffId": {
"$oid": "657013b0ebd447b48d6c2709"
},
"staffCampName": "Minerva",
"activityId": {
"$oid": "656fb2e7ebd447b48d6c26e9"
},
"activityName": "Archery"
}
]
},
{
"_id": {
"$oid": "65701668ebd447b48d6c2717"
```



```
,
"sessionId": {
"$oid": "656fea40ebd447b48d6c2705"
},
"title": "Wednesday Morning",
"startTime": {
"$date": "2023-12-03T08:00:00.000Z"
},
"endTime": {
"$date": "2023-12-03T12:00:00.000Z"
},
"schedule": []
},
{
  "_id": {
    "$oid": "65701685ebd447b48d6c2718"
  },
  "sessionId": {
    "$oid": "656fea40ebd447b48d6c2705"
  },
  "title": "Wednesday Evening",
  "startTime": {
    "$date": "2023-12-03T18:00:00.000Z"
  },
  "endTime": {
    "$date": "2023-12-03T21:00:00.000Z"
  },
  "schedule": [
    {
      "unitId": {
        "$oid": "657015ceebd447b48d6c2713"
      },
      "unitName": "HufflePuff",
      "staffId": {
        "$oid": "65701486ebd447b48d6c270b"
      },
      "staffCampName": "Hermes",
      "activityId": {
        "$oid": "656fb363ebd447b48d6c26eb"
      },
      "activityName": "Movie"
    },
  ],
}
```

```
{
  "unitId": {
    "$oid": "657014e6ebd447b48d6c2711"
  },
  "unitName": "RavenClaw",
  "staffId": {
    "$oid": "6570149debd447b48d6c270d"
  },
  "staffCampName": "Hera",
  "activityId": {
    "$oid": "656fb2e7ebd447b48d6c26e9"
  },
  "activityName": "Archery"
}
]
```

Sessions:

```
[{
  "_id": {
    "$oid": "656fea40ebd447b48d6c2705"
  },
  "startDate": {
    "$date": "2023-12-01T00:00:00.000Z"
  },
  "endDate": {
    "$date": "2023-12-05T00:00:00.000Z"
  },
  "title": "Harry Potter Week",
  "cost": {
    "$numberDecimal": "100.00"
  },
  "capacity": 20,
  "staff": [
    {
      "_id": {
        "$oid": "657013b0ebd447b48d6c2709"
      },
      "employeeId": {
        "$oid": "65701475ebd447b48d6c270a"
      },
      "campName": "Minerva",
    }
  ]
}]
```

```
"roles": [
  "Director"
],
{
  "_id": {
    "$oid": "65701486ebd447b48d6c270b"
  },
  "employeeId": {
    "$oid": "65701491ebd447b48d6c270c"
  },
  "campName": "Hermes",
  "roles": [
    "Counselor",
    "Lifeguard"
  ],
},
{
  "_id": {
    "$oid": "6570149debd447b48d6c270d"
  },
  "employeeId": {
    "$oid": "657014b8ebd447b48d6c270e"
  },
  "campName": "Hera",
  "roles": [
    "Counselor"
  ],
},
{
  "_id": {
    "$oid": "657014c8ebd447b48d6c270f"
  },
  "employeeId": {
    "$oid": "657014d6ebd447b48d6c2710"
  },
  "campName": "Athena",
  "roles": [
    "Counselor",
    "Lifeguard"
  ],
}
```

```
],
"units": [
{
  "_id": {
    "$oid": "657014e6ebd447b48d6c2711"
  },
  "unitName": "RavenClaw",
  "staffId": {
    "$oid": "6570149debd447b48d6c270d"
  },
  "staffCampName": "Hera",
  "campers": [
    {
      "camperId": {
        "$oid": "656fbed2ebd447b48d6c26ef"
      },
      "camperName": "Ada"
    },
    {
      "camperId": {
        "$oid": "656fbf4aebd447b48d6c26f0"
      },
      "camperName": "Sofia"
    }
  ],
  "unitName": "HufflePuff",
  "staffId": {
    "$oid": "65701486ebd447b48d6c270b"
  },
  "staffCampName": "Hermes",
  "campers": [
    {
      "camperId": {
        "$oid": "656fbf96ebd447b48d6c26f1"
      },
      "camperName": "Iggy"
    }
  ],
}
```

```
{  
  "camperId": {  
    "$oid": "656fbfd1ebd447b48d6c26f2"  
  },  
  "camperName": "Rosie"  
},  
  
[,  
  
"campers": [  
  {  
    "camperId": {  
      "$oid": "656fbcd2ebd447b48d6c26ef"  
    },  
    "camperName": "Ada"  
  },  
  
  {  
    "camperId": {  
      "$oid": "656fbf4aebd447b48d6c26f0"  
    },  
    "camperName": "Sofia"  
  },  
  
  {  
    "camperId": {  
      "$oid": "656fbf96ebd447b48d6c26f1"  
    },  
    "camperName": "Iggy"  
  },  
  
  {  
    "camperId": {  
      "$oid": "656fbfd1ebd447b48d6c26f2"  
    },  
    "camperName": "Rosie"  
  }  
],  
  
"rotations": [  
  {  
    "rotationId": {  
      "$oid": "65701644ebd447b48d6c2714"  
    },  
    "title": "Monday Morning"  
  },  

```

```
{
  "rotationId": {
    "$oid": "6570164eebd447b48d6c2715"
  },
  "title": "Monday Afternoon"
},
{
  "rotationId": {
    "$oid": "65701659ebd447b48d6c2716"
  },
  "title": "Tuesday Morning"
},
{
  "rotationId": {
    "$oid": "65701668ebd447b48d6c2717"
  },
  "title": "Wednesday Morning"
},
{
  "rotationId": {
    "$oid": "65701685ebd447b48d6c2718"
  },
  "title": "Wednesday Evening"
}
]
}]
```

Python Code

```
from pymongo import MongoClient
from pprint import pprint # for "pretty printing"
from bson import ObjectId

def connect():
    CONNECTION_STRING = "mongodb://localhost:27017"
    client = MongoClient(CONNECTION_STRING)
    # change this string to match the name of the database you created in Mongo
    return client['project3']
```

```

if __name__ == "__main__":
    db = connect()

    # The Python API for working with Mongo is very similar to in the Mongosh shell.
    # However, we must use dictionary indexing like "db['customers']" instead of
    "db.customers".

    # This is unnecessary, but I like to separate the pipeline stages from the actual
    aggregate function call.

    cont = True
    while(cont):
        option = input("Main Menu\n1. Employee Lookup\n2. Session Schedule Summary\n3. Unit
        Report\nEnter any other value to quit\nEnter: ")

        if option == '1':
            employee_name = input("Enter an employee's name: ")

            first, last = employee_name.split()
            employee_lookup = [
                {
                    '$match': {
                        'firstName': first,
                        'lastName': last
                    }
                }
            ]

            # Run the pipeline.
            results = db["employees"].aggregate(employee_lookup)
            #print a "summary" view: their ID, full name, wage; and for each session they are
            working,
            #the the title of that session, the employee's staff name for the session,
            #and the name of the unit they are supervising
            for employee in results:
                print(f"Summary:\nID: {employee['_id']}\nFull Name: {employee['firstName']}
                {employee['lastName']}\nWage: {employee['wage']}\nSession:
                {employee['sessions'][0].get('sessionTitle')}\nStaff Name:
                {employee['sessions'][0].get('campName')}\n")
            try:
                print(f"Unit: {employee['unitId']} and {employee['unitName']}")

```

```

except KeyError:
print("No units")

#Retrieve all scheduled activities for that specific activity at that specific
session.
#For each scheduling of the activity, print out the title of the rotation it is
scheduled during,
#the camp name of the staff that is supervising, and the name of the unit that is
participating

if option == '2':
session_id = input("Enter session ID: ")
activity = input("Enter activity name: ")

session_activity_lookup = [
{
'$match': {
'sessionId': ObjectId(session_id)
}
}, {
'$unwind': {
'path': '$schedule'
}
}, {
'$match': {
'schedule.activityName': activity
}
}
]

results = db["rotations"].aggregate(session_activity_lookup)

for rotations in results:
print(f"Summary for {activity}\nTitle: {rotations['title']}\nCamp Name:
{rotations['schedule'].get('staffCampName')}\n")
#Input the name of a unit and the name of a session. Print out a summary of that unit
at the session:
#the name of the unit, and the number of minutes at each different activity during the
session.
#(That is, if Unit A scheduled Archery at Monday Morning (9-11am) and Tuesday
Afternoon (2-3pm),
#they spent 180 total minutes at Archery.)

```



```
if option == '3':
sessionTitle = input("Enter the session title to look up: ")
unitName = input("Enter the unit name to look up in the session: ")

unit_lookup = [
{
'$match': {
'title': sessionTitle
}
}, {
'$unwind': {
'path': '$units'
}
}, {
'$lookup': {
'from': 'rotations',
'localField': 'units._id',
'foreignField': 'schedule.unitId',
'as': 'unitRotations'
}
}, {
'$unwind': {
'path': '$unitRotations'
}
}, {
'$unwind': {
'path': '$unitRotations.schedule'
}
}, {
'$match': {
'unitRotations.schedule.unitName': unitName
}
}, {
'$project': {
'activityName': '$unitRotations.schedule.activityName',
'duration': {
'$divide': [
{
'$subtract': [
'$unitRotations.endTime', '$unitRotations.startTime'
]
}, 60000
}
}
```

```

]
}
}
}, {
'$group': {
'_id': '$activityName',
'totalDuration': {
'$sum': '$duration'
}
}
}
}
]

results = db["sessions"].aggregate(unit_lookup)

print(f"Summary\nUnit Name: {unitName}\n")
for units in results:
print(f"Activity: {units['_id']} for a total duration of {units['totalDuration']}
minutes\n")

else:
cont = False

```