

MongoDB Aggregation Examples

- Ensure you have pymongo installed before running cells in this notebook

```
import pymongo
from bson.json_util import dumps
import pprint

# --> Update the URI with your username and password <--

uri = "mongodb://sarahh:12345@localhost:27017"
client = pymongo.MongoClient(uri)
mflixdb = client.mflixb
demodb = client.demodb
```

About Aggregates in PyMongo

- Aggregation uses *pipelines*.
- A **pipeline** is a sequence of stages through which documents proceed.
- Some of the different stages that can be used are:
 - match
 - project
 - sort
 - limit
 - unwind
 - group
 - lookup

\$match

```
c = mflixdb.movies.aggregate([
    {"$match": {"year": {"$lte": 1920}}},
])

print(dumps(c, indent=4))

[
  {
    "_id": {
      "$oid": "573a1390f29313caabcd42e8"
    },
    "plot": "A group of bandits stage a brazen train hold-up, only
to find a determined posse hot on their heels.",
    "genres": [
      "Short",
      "Western"
    ],
  },
]
```

```
    "runtime": 11,
    "cast": [
        "A.C. Abadie",
        "Gilbert M. 'Broncho Billy' Anderson",
        "George Barnes",
        "Justus D. Barnes"
    ],
    "poster":
    "https://m.media-amazon.com/images/M/MV5BMTU3NjE5NzYtYTYYNS00MDVmLWIwYjgtMmYwYWlxdDYyNzU2XkEyXkFqcGdeQXVyNzQzNzQxNzI@._V1_SY1000_SX677_AL_.jpg",
    "title": "The Great Train Robbery",
    "fullplot": "Among the earliest existing films in American cinema - notable as the first film that presented a narrative story to tell - it depicts a group of cowboy outlaws who hold up a train and rob the passengers. They are then pursued by a Sheriff's posse. Several scenes have color included - all hand tinted.",
    "languages": [
        "English"
    ],
    "released": {
        "$date": {
            "$numberLong": "-2085523200000"
        }
    },
    "directors": [
        "Edwin S. Porter"
    ],
    "rated": "TV-G",
    "awards": {
        "wins": 1,
        "nominations": 0,
        "text": "1 win."
    },
    "lastupdated": "2015-08-13 00:27:59.177000000",
    "year": 1903,
    "imdb": {
        "rating": 7.4,
        "votes": 9847,
        "id": 439
    },
    "countries": [
        "USA"
    ],
    "type": "movie",
    "tomatoes": {
        "viewer": {
            "rating": 3.7,
            "numReviews": 2559,
```

```

        "meter": 75
      },
      "fresh": 6,
      "critic": {
        "rating": 7.6,
        "numReviews": 6,
        "meter": 100
      },
      "rotten": 0,
      "lastUpdated": {
        "$date": "2015-08-08T19:16:10Z"
      }
    },
    "num_mflix_comments": 0
  },
  {
    "_id": {
      "$oid": "573a1390f29313caabcd446f"
    },
    "plot": "A greedy tycoon decides, on a whim, to corner the
world market in wheat. This doubles the price of bread, forcing the
grain's producers into charity lines and further into poverty. The
film...",
    "genres": [
      "Short",
      "Drama"
    ],
    "runtime": 14,
    "cast": [
      "Frank Powell",
      "Grace Henderson",
      "James Kirkwood",
      "Linda Arvidson"
    ],
    "num_mflix_comments": 1,
    "title": "A Corner in Wheat",
    "fullplot": "A greedy tycoon decides, on a whim, to corner the
world market in wheat. This doubles the price of bread, forcing the
grain's producers into charity lines and further into poverty. The
film continues to contrast the ironic differences between the lives of
those who work to grow the wheat and the life of the man who dabbles
in its sale for profit.",
    "languages": [
      "English"
    ],
    "released": {
      "$date": {
        "$numberLong": "-18950976000000"
      }
    }
  }

```

```

    },
    "directors": [
        "D.W. Griffith"
    ],
    "rated": "G",
    "awards": {
        "wins": 1,
        "nominations": 0,
        "text": "1 win."
    },
    "lastupdated": "2015-08-13 00:46:30.660000000",
    "year": 1909,
    "imdb": {
        "rating": 6.6,
        "votes": 1375,
        "id": 832
    },
    "countries": [
        "USA"
    ],
    "type": "movie",
    "tomatoes": {
        "viewer": {
            "rating": 3.6,
            "numReviews": 109,
            "meter": 73
        },
        "lastUpdated": {
            "$date": "2015-05-11T18:36:53Z"
        }
    },
    },
    {
        "_id": {
            "$oid": "573a1390f29313caabcd4803"
        },
        "plot": "Cartoon figures announce, via comic strip balloons,
that they will move - and move they do, in a wildly exaggerated
style.",
        "genres": [
            "Animation",
            "Short",
            "Comedy"
        ],
        "runtime": 7,
        "cast": [
            "Winsor McCay"
        ],
        "num_mflix_comments": 0,

```

```
    "poster":  
    "https://m.media-amazon.com/images/M/MV5BYzg2NjNhNTctMjUxMi00ZWU4LWI3ZjYtNTI0NTQxNThjZTk2XkEyXkFqcGdeQXVyNzg5OTk2OAA@._V1_SY1000_SX677_AL_.jpg",  
    "title": "Winsor McCay, the Famous Cartoonist of the N.Y. Herald and His Moving Comics",  
    "fullplot": "Cartoonist Winsor McCay agrees to create a large set of drawings that will be photographed and made into a motion picture. The job requires plenty of drawing supplies, and the cartoonist must also overcome some mishaps caused by an assistant. Finally, the work is done, and everyone can see the resulting animated picture.",  
    "languages": [  
        "English"  
    ],  
    "released": {  
        "$date": {  
            "$numberLong": "-1853539200000"  
        }  
    },  
    "directors": [  
        "Winsor McCay",  
        "J. Stuart Blackton"  
    ],  
    "writers": [  
        "Winsor McCay (comic strip \"Little Nemo in Slumberland\")",  
        "Winsor McCay (screenplay)"  
    ],  
    "awards": {  
        "wins": 1,  
        "nominations": 0,  
        "text": "1 win."  
    },  
    "lastupdated": "2015-08-29 01:09:03.030000000",  
    "year": 1911,  
    "imdb": {  
        "rating": 7.3,  
        "votes": 1034,  
        "id": 1737  
    },  
    "countries": [  
        "USA"  
    ],  
    "type": "movie",  
    "tomatoes": {  
        "viewer": {  
            "rating": 3.4,  
            "numReviews": 89,  

```

```

        "meter": 47
      },
      "lastUpdated": {
        "$date": "2015-08-20T18:51:24Z"
      }
    },
    {
      "_id": {
        "$oid": "573a1390f29313caabcd4eaf"
      },
      "plot": "A woman, with the aid of her police officer
sweetheart, endeavors to uncover the prostitution ring that has
kidnapped her sister, and the philanthropist who secretly runs it.",
      "genres": [
        "Crime",
        "Drama"
      ],
      "runtime": 88,
      "cast": [
        "Jane Gail",
        "Ethel Grandin",
        "William H. Turner",
        "Matt Moore"
      ],
      "num_mflix_comments": 1,
      "poster":
"https://m.media-amazon.com/images/M/MV5BYzk0YWQzMGYtYTM5MC00NjM2LWE5Y
zYtMjgyNDVhZDg1N2YzXkEyXkFqcGdeQXVyMzE0MjY5ODAA@._V1_SY1000_SX677_AL_.j
pg",
      "title": "Traffic in Souls",
      "lastupdated": "2015-09-15 02:07:14.247000000",
      "languages": [
        "English"
      ],
      "released": {
        "$date": {
          "$numberLong": "-1770508800000"
        }
      },
      "directors": [
        "George Loane Tucker"
      ],
      "rated": "TV-PG",
      "awards": {
        "wins": 1,
        "nominations": 0,
        "text": "1 win."
      },
    },
  ],

```

```

    "year": 1913,
    "imdb": {
      "rating": 6,
      "votes": 371,
      "id": 3471
    },
    "countries": [
      "USA"
    ],
    "type": "movie",
    "tomatoes": {
      "viewer": {
        "rating": 3,
        "numReviews": 85,
        "meter": 57
      },
      "dvd": {
        "$date": "2008-08-26T00:00:00Z"
      },
      "lastUpdated": {
        "$date": "2015-08-10T18:33:55Z"
      }
    }
  },
  {
    "_id": {
      "$oid": "573a1390f29313caabcd50e5"
    },
    "plot": "The cartoonist, Winsor McCay, brings the Dinosaur
back to life in the figure of his latest creation, Gertie the
Dinosaur.",
    "genres": [
      "Animation",
      "Short",
      "Comedy"
    ],
    "runtime": 12,
    "cast": [
      "Winsor McCay",
      "George McManus",
      "Roy L. McCardell"
    ],
    "num_mflix_comments": 0,
    "poster":
https://m.media-amazon.com/images/M/MV5BMTQxNzI4ODQ3NF5BMl5BanBnXkFtZTgwNzY5NzMwMjE@.\_V1\_SY1000\_SX677\_AL\_.jpg,
    "title": "Gertie the Dinosaur",
    "fullplot": "Winsor Z. McCay bets another cartoonist that he
can animate a dinosaur. So he draws a big friendly herbivore called

```

Gertie. Then he get into his own picture. Gertie walks through the picture, eats a tree, meets her creator, and takes him carefully on her back for a ride."

```
    "languages": [
      "English"
    ],
    "released": {
      "$date": {
        "$numberLong": "-1745020800000"
      }
    },
    "directors": [
      "Winsor McCay"
    ],
    "writers": [
      "Winsor McCay"
    ],
    "awards": {
      "wins": 1,
      "nominations": 0,
      "text": "1 win."
    },
    "lastupdated": "2015-08-18 01:03:15.313000000",
    "year": 1914,
    "imdb": {
      "rating": 7.3,
      "votes": 1837,
      "id": 4008
    },
    "countries": [
      "USA"
    ],
    "type": "movie",
    "tomatoes": {
      "viewer": {
        "rating": 3.7,
        "numReviews": 29
      },
      "lastUpdated": {
        "$date": "2015-08-10T19:20:03Z"
      }
    }
  },
  {
    "_id": {
      "$oid": "573a1390f29313caabcd516c"
    },
    "plot": "Original advertising for the film describes it as a drama of primitive life on the shores of the North Pacific..."
  }
]
```



```
    "genres": [
      "Drama",
      "History"
    ],
    "runtime": 65,
    "cast": [
      "Stanley Hunt",
      "Sarah Constance Smith Hunt",
      "Mrs. George Walkus",
      "Paddy 'Malid"
    ],
    "num_mflix_comments": 1,
    "poster":
    "https://m.media-amazon.com/images/M/MV5BMjE3MjAyNzM5NV5BMl5BanBnXkFtZ
    TgwMjA50Tg5NjE@._V1_SY1000_SX677_AL_.jpg",
    "title": "In the Land of the Head Hunters",
    "lastupdated": "2015-09-16 12:11:37.770000000",
    "languages": [
      "English"
    ],
    "released": {
      "$date": {
        "$numberLong": "-1737849600000"
      }
    },
    "directors": [
      "Edward S. Curtis"
    ],
    "writers": [
      "Edward S. Curtis (story)"
    ],
    "awards": {
      "wins": 1,
      "nominations": 0,
      "text": "1 win."
    },
    "year": 1914,
    "imdb": {
      "rating": 5.8,
      "votes": 223,
      "id": 4150
    },
    "countries": [
      "USA"
    ],
    "type": "movie",
    "tomatoes": {
      "viewer": {
        "rating": 2.7,
```

```

        "numReviews": 64,
        "meter": 18
    },
    "dvd": {
        "$date": "2000-08-15T00:00:00Z"
    },
    "website": "http://www.milestonefilms.com/",
    "production": "World Film Corporation",
    "lastUpdated": {
        "$date": "2015-08-18T19:21:12Z"
    }
}
},
{
    "_id": {
        "$oid": "573a1390f29313caabcd5293"
    },
    "plot": "Young Pauline is left a lot of money when her wealthy
uncle dies. However, her uncle's secretary has been named as her
guardian until she marries, at which time she will officially
take ...",
    "genres": [
        "Action"
    ],
    "runtime": 199,
    "cast": [
        "Pearl White",
        "Crane Wilbur",
        "Paul Panzer",
        "Edward Jos\u00e8"
    ],
    "num_mflix_comments": 0,
    "poster":
https://m.media-amazon.com/images/M/MV5BMzgxDk1Mzk2Ml5BMl5BanBnXkFtZTgwMDg0NzkwMjE@.\_V1\_SY1000\_SX677\_AL\_.jpg,
    "title": "The Perils of Pauline",
    "fullplot": "Young Pauline is left a lot of money when her
wealthy uncle dies. However, her uncle's secretary has been named as
her guardian until she marries, at which time she will officially take
possession of her inheritance. Meanwhile, her \"guardian\" and his
confederates constantly come up with schemes to get rid of Pauline so
that he can get his hands on the money himself.",
    "languages": [
        "English"
    ],
    "released": {
        "$date": {
            "$numberLong": "-1760227200000"
        }
    }
}

```

```

    },
    "directors": [
        "Louis J. Gasnier",
        "Donald MacKenzie"
    ],
    "writers": [
        "Charles W. Goddard (screenplay)",
        "Basil Dickey (screenplay)",
        "Charles W. Goddard (novel)",
        "George B. Seitz",
        "Bertram Millhauser"
    ],
    "awards": {
        "wins": 1,
        "nominations": 0,
        "text": "1 win."
    },
    "lastupdated": "2015-09-12 00:01:18.647000000",
    "year": 1914,
    "imdb": {
        "rating": 7.6,
        "votes": 744,
        "id": 4465
    },
    "countries": [
        "USA"
    ],
    "type": "movie",
    "tomatoes": {
        "viewer": {
            "rating": 2.8,
            "numReviews": 9
        },
        "production": "Path\u00e8 Fr\u00e8res",
        "lastUpdated": {
            "$date": "2015-09-11T17:46:19Z"
        }
    },
    },
    {
        "_id": {
            "$oid": "573a1390f29313caabcd56df"
        },
        "plot": "An immigrant leaves his sweetheart in Italy to find a
better life across the sea in the grimy slums of New York. They are
eventually reunited and marry. But life in New York is hard and ...",
        "genres": [
            "Drama"
        ],
        "runtime": 78,

```

```
    "rated": "PASSED",
    "cast": [
        "George Beban",
        "Clara Williams",
        "J. Frank Burke",
        "Leo Willis"
    ],
    "title": "The Italian",
    "fullplot": "An immigrant leaves his sweetheart in Italy to
find a better life across the sea in the grimy slums of New York. They
are eventually reunited and marry. But life in New York is hard and
tragedy tarnishes their dream of a better life in the new world.",
    "languages": [
        "English"
    ],
    "released": {
        "$date": {
            "$numberLong": "-17356896000000"
        }
    },
    "directors": [
        "Reginald Barker"
    ],
    "writers": [
        "Thomas H. Ince (story)",
        "C. Gardner Sullivan (story)"
    ],
    "awards": {
        "wins": 1,
        "nominations": 0,
        "text": "1 win."
    },
    "lastupdated": "2015-07-27 00:07:43.2300000000",
    "year": 1915,
    "imdb": {
        "rating": 6.4,
        "votes": 175,
        "id": 5557
    },
    "countries": [
        "USA"
    ],
    "type": "movie",
    "tomatoes": {
        "viewer": {
            "rating": 4,
            "numReviews": 204,
            "meter": 60
        }
    },
    },
```

```

        "dvd": {
            "$date": "2008-08-26T00:00:00Z"
        },
        "lastUpdated": {
            "$date": "2015-07-24T19:30:02Z"
        }
    },
    "num_mflix_comments": 0
},
{
    "_id": {
        "$oid": "573a1390f29313caabcd587d"
    },
    "plot": "At 10 years old, Owens becomes a ragged orphan when
his sainted mother dies. The Conways, who are next door neighbors,
take Owen in, but the constant drinking by Jim soon puts Owen on
the ...",
    "genres": [
        "Biography",
        "Crime",
        "Drama"
    ],
    "runtime": 72,
    "rated": "PASSED",
    "cast": [
        "John McCann",
        "James A. Marcus",
        "Maggie Weston",
        "Harry McCoy"
    ],
    "num_mflix_comments": 1,
    "poster":
"https://m.media-amazon.com/images/M/MV5BNDkxZGU4NmMtODJlNy00YzA2LTg4ZGMtNGFlNzAyNzcwOTMlXkEyXkFqcGdeQXVyOTM3MjcYmjI@._V1_SY1000_SX677_AL_.jpg",
    "title": "Regeneration",
    "fullplot": "At 10 years old, Owens becomes a ragged orphan
when his sainted mother dies. The Conways, who are next door
neighbors, take Owen in, but the constant drinking by Jim soon puts
Owen on the street. By 17, Owen learns that might is right. By 25,
Owen is the leader of his own gang who spend most of their time
gambling and drinking. But Marie comes into the gangster area of town
and everything changes for Owen as he falls for Marie. But he cannot
tell her so, so he comes to her settlement to find education and
inspiration. But soon, his old way of life will rise to confront him
again.",
    "languages": [
        "English"
    ],

```

```
"released": {
  "$date": {
    "$numberLong": "-1713657600000"
  }
},
"directors": [
  "Raoul Walsh"
],
"writers": [
  "Owen Frawley Kildare (book)",
  "Raoul Walsh (adapted from the book: \"My Mamie Rose\")",
  "Carl Harbaugh (adapted from the book: \"My Mamie Rose\")"
],
"awards": {
  "wins": 1,
  "nominations": 0,
  "text": "1 win."
},
"lastupdated": "2015-08-14 01:28:18.957000000",
"year": 1915,
"imdb": {
  "rating": 6.8,
  "votes": 626,
  "id": 5960
},
"countries": [
  "USA"
],
"type": "movie",
"tomatoes": {
  "viewer": {
    "rating": 3.4,
    "numReviews": 395,
    "meter": 70
  },
  "dvd": {
    "$date": "2001-11-27T00:00:00Z"
  },
  "critic": {
    "rating": 9.2,
    "numReviews": 5,
    "meter": 100
  },
  "lastUpdated": {
    "$date": "2015-09-17T17:22:42Z"
  },
  "rotten": 0,
  "production": "Fox Film Corporation",
  "fresh": 5
}
```

```

    }
  },
  {
    "_id": {
      "$oid": "573a1390f29313caabcd5a93"
    },
    "plot": "Christ takes on the form of a pacifist count to end a senseless war.",
    "genres": [
      "Drama"
    ],
    "runtime": 78,
    "cast": [
      "Howard C. Hickman",
      "Enid Markey",
      "Lola May",
      "Kate Bruce"
    ],
    "num_mflix_comments": 0,
    "poster":
      "https://m.media-amazon.com/images/M/MV5BMjAwNTIxMjE5N15BMl5BanBnXkFtZTgwODc1MjglMzE@._V1_SY1000_SX677_AL_.jpg",
    "title": "Civilization",
    "fullplot": "Allegorical film about peace. A king starts a war, many of the women are against it, people are pressed into service. A count has constructed a submarine and gets the order to sink an ocean liner, that is also carrying - supposedly - ammunition for the enemy. The count refuses to fire the torpedos, and sinks the submarine. He survives, but in a limbo between death and life where he meets Jesus, who takes him over to preach peace. Naturally the king arrests him and sentences him to death for treason, but then Jesus shows him the real face of war.",
    "countries": [
      "USA"
    ],
    "released": {
      "$date": {
        "$numberLong": "-1690934400000"
      }
    },
    "directors": [
      "Reginald Barker",
      "Thomas H. Ince",
      "Raymond B. West",
      "Walter Edwards",
      "David Hartford",
      "Jay Hunt",
      "J. Parker Read Jr."
    ],
  },
],

```

```

    "writers": [
      "C. Gardner Sullivan"
    ],
    "awards": {
      "wins": 1,
      "nominations": 0,
      "text": "1 win."
    },
    "lastupdated": "2015-04-30 02:13:27.863000000",
    "year": 1916,
    "imdb": {
      "rating": 6.3,
      "votes": 162,
      "id": 6517
    },
    "type": "movie",
    "tomatoes": {
      "viewer": {
        "rating": 0,
        "numReviews": 7
      },
      "lastUpdated": {
        "$date": "2015-08-07T18:42:35Z"
      }
    }
  },
  {
    "_id": {
      "$oid": "573a1390f29313caabcd5ea4"
    },
    "plot": "A District Attorney's outspoken stand on abortion gets him in trouble with the local community.",
    "genres": [
      "Drama"
    ],
    "runtime": 62,
    "rated": "APPROVED",
    "cast": [
      "Tyrone Power Sr.",
      "Helen Riaume",
      "Marie Walcamp",
      "Cora Drew"
    ],
    "title": "Where Are My Children?",
    "fullplot": "While prosecuting a physician for the death of a client after an abortion, the district attorney discovers that his wife helped her society friends and the daughter of her maid obtain and pay for abortions from the physician (and was perhaps herself also a client.)",

```



```

    "languages": [
      "English"
    ],
    "released": {
      "$date": {
        "$numberLong": "-16936992000000"
      }
    },
    "directors": [
      "Phillips Smalley",
      "Lois Weber"
    ],
    "writers": [
      "Lucy Payton (from the story by)",
      "Franklin Hall (from the story by)",
      "Lois Weber",
      "Phillips Smalley"
    ],
    "awards": {
      "wins": 1,
      "nominations": 0,
      "text": "1 win."
    },
    "lastupdated": "2015-09-07 00:51:32.560000000",
    "year": 1916,
    "imdb": {
      "rating": 5.9,
      "votes": 247,
      "id": 7558
    },
    "countries": [
      "USA"
    ],
    "type": "movie",
    "tomatoes": {
      "viewer": {
        "rating": 3.1,
        "numReviews": 34,
        "meter": 50
      },
      "production": "MCA/Universal Pictures",
      "lastUpdated": {
        "$date": "2015-08-06T19:49:17Z"
      }
    },
    "num_mflix_comments": 0
  },
  {
    "_id": {

```

```
    "$oid": "573a1390f29313caabcd6223"
  },
  "plot": "Gwen's family is rich, but her parents ignore her and
most of the servants push her around, so she is lonely and unhappy.
Her father is concerned only with making money, and her mother ...",
  "genres": [
    "Comedy",
    "Drama",
    "Family"
  ],
  "runtime": 65,
  "cast": [
    "Mary Pickford",
    "Madlaine Traverse",
    "Charles Wellesley",
    "Gladys Fairbanks"
  ],
  "title": "The Poor Little Rich Girl",
  "fullplot": "Gwen's family is rich, but her parents ignore her
and most of the servants push her around, so she is lonely and
unhappy. Her father is concerned only with making money, and her
mother cares only about her social position. But one day a servant's
irresponsibility creates a crisis that causes everyone to rethink what
is important to them.",
  "languages": [
    "English"
  ],
  "released": {
    "$date": {
      "$numberLong": "-1667088000000"
    }
  },
  "directors": [
    "Maurice Tourneur"
  ],
  "writers": [
    "Eleanor Gates (play)",
    "Frances Marion (scenario)"
  ],
  "awards": {
    "wins": 1,
    "nominations": 0,
    "text": "1 win."
  },
  "lastupdated": "2015-07-27 00:11:31.387000000",
  "year": 1917,
  "imdb": {
    "rating": 6.9,
    "votes": 884,
```

```

        "id": 8443
      },
      "countries": [
        "USA"
      ],
      "type": "movie",
      "tomatoes": {
        "viewer": {
          "rating": 3.9,
          "numReviews": 137,
          "meter": 77
        },
        "production": "Artcraft",
        "lastUpdated": {
          "$date": "2015-08-21T18:00:25Z"
        }
      },
      "num_mflix_comments": 0
    },
    {
      "_id": {
        "$oid": "573a1390f29313caabcd6377"
      },
      "plot": "A rich young Easterner who has always wanted to live in \"the Wild West\" plans to move to a Western town. Unknown to him, the town's \"wild\" days are long gone, and it is an orderly, ...",
      "genres": [
        "Comedy",
        "Western",
        "Romance"
      ],
      "runtime": 72,
      "cast": [
        "Douglas Fairbanks",
        "Eileen Percy",
        "Calvert Carter",
        "Charles Stevens"
      ],
      "title": "Wild and Woolly",
      "fullplot": "A rich young Easterner who has always wanted to live in \"the Wild West\" plans to move to a Western town. Unknown to him, the town's \"wild\" days are long gone, and it is an orderly, civilized place now. The townsmen, not wanting to lose a rich potential resident, contrive to make over the town to suit the young man's fantasy.",
      "languages": [
        "English"
      ],
      "released": {

```

```

        "$date": {
            "$numberLong": "-16574976000000"
        }
    },
    "directors": [
        "John Emerson"
    ],
    "writers": [
        "Horace B. Carpenter (story)",
        "John Emerson",
        "Anita Loos"
    ],
    "awards": {
        "wins": 1,
        "nominations": 0,
        "text": "1 win."
    },
    "lastupdated": "2015-06-05 00:40:35.137000000",
    "year": 1917,
    "imdb": {
        "rating": 6.9,
        "votes": 388,
        "id": 8775
    },
    "countries": [
        "USA"
    ],
    "type": "movie",
    "num_mflix_comments": 0
},
{
    "_id": {
        "$oid": "573a1390f29313caabcd63d6"
    },
    "plot": "Two peasant children, Mytyl and Tyltyl, are led by Berylune, a fairy, to search for the Blue Bird of Happiness. Berylune gives Tyltyl a cap with a diamond setting, and when Tyltyl turns the...",
    "genres": [
        "Fantasy"
    ],
    "runtime": 75,
    "cast": [
        "Tula Belle",
        "Robin Macdougall",
        "Edwin E. Reed",
        "Emma Lowry"
    ],
    "num_mflix_comments": 0,

```

```
    "poster":  
    "https://m.media-amazon.com/images/M/MV5BMjNlMTNmNzItMTZlMS00YzJkLTk1MzktYzIyMzllOGFmZmRlXkEyXkFqcGdeQXVyMzE0MjY5ODAA@._V1_SY1000_SX677_AL_.jpg",  
    "title": "The Blue Bird",  
    "fullplot": "Two peasant children, Mytyl and Tytyl, are led by Berylune, a fairy, to search for the Blue Bird of Happiness. Berylune gives Tytyl a cap with a diamond setting, and when Tytyl turns the diamond, the children become aware of and conversant with the souls of a Dog and Cat, as well as of Fire, Water, Bread, Light, and other presumably inanimate things. The troupe thus sets off to find the elusive Blue Bird of Happiness.",  
    "languages": [  
        "English"  
    ],  
    "released": {  
        "$date": {  
            "$numberLong": "-1633305600000"  
        }  
    },  
    "directors": [  
        "Maurice Tourneur"  
    ],  
    "writers": [  
        "Maurice Maeterlinck (play)",  
        "Charles Maigne"  
    ],  
    "awards": {  
        "wins": 1,  
        "nominations": 0,  
        "text": "1 win."  
    },  
    "lastupdated": "2015-07-20 00:32:04.810000000",  
    "year": 1918,  
    "imdb": {  
        "rating": 6.6,  
        "votes": 446,  
        "id": 8891  
    },  
    "countries": [  
        "USA"  
    ],  
    "type": "movie",  
    "tomatoes": {  
        "viewer": {  
            "rating": 3.6,  
            "numReviews": 607,  
            "meter": 60  
        }  
    },
```

```

        "dvd": {
            "$date": "2005-09-06T00:00:00Z"
        },
        "lastUpdated": {
            "$date": "2015-08-21T18:10:22Z"
        }
    },
    {
        "_id": {
            "$oid": "573a1391f29313caabcd68d0"
        },
        "plot": "A penniless young man tries to save an heiress from
kidnappers and help her secure her inheritance.",
        "genres": [
            "Comedy",
            "Short",
            "Action"
        ],
        "runtime": 22,
        "rated": "TV-G",
        "cast": [
            "Harold Lloyd",
            "Mildred Davis",
            "'Snub' Pollard",
            "Peggy Cartwright"
        ],
        "poster":
https://m.media-amazon.com/images/M/MV5BNzE1OWRlNDgtMTllNi00NTZiLWIyNTktYTk0MDY1ZWUwYTc5XkEyXkFqcGdeQXVyMjUxODE0MDY@.\_V1\_SY1000\_SX677\_AL\_.jpg,
        "title": "From Hand to Mouth",
        "fullplot": "As a penniless man worries about how he will
manage to eat, he is joined by a young waif and her dog, who are in
the same predicament. Meanwhile, across town a dishonest lawyer is
working with a gang of criminals, trying to swindle an innocent young
heiress out of her inheritance. As the heiress is on her way home from
the lawyer's office, she notices the young man and the waif in the
midst of their latest problem with the authorities, and she rescues
them. Later on, the young man will have an unexpected opportunity to
repay her for her kindness.",
        "languages": [
            "English"
        ],
        "released": {
            "$date": {
                "$numberLong": "-1578268800000"
            }
        },
        "directors": [

```

```

        "Alfred J. Goulding",
        "Hal Roach"
    ],
    "writers": [
        "H.M. Walker (titles)"
    ],
    "awards": {
        "wins": 0,
        "nominations": 1,
        "text": "1 nomination."
    },
    "lastupdated": "2015-04-17 00:16:14.220000000",
    "year": 1919,
    "imdb": {
        "rating": 7,
        "votes": 639,
        "id": 10146
    },
    "countries": [
        "USA"
    ],
    "type": "movie",
    "tomatoes": {
        "viewer": {
            "rating": 3.3,
            "numReviews": 71,
            "meter": 55
        },
        "production": "Path\u00e8 Exchange",
        "lastUpdated": {
            "$date": "2015-08-21T18:45:11Z"
        }
    },
    "num_mflix_comments": 0
},
{
    "_id": {
        "$oid": "573a1391f29313caabcd6d40"
    },
    "plot": "A tipsy doctor encounters his patient sleepwalking on
a building ledge, high above the street.",
    "genres": [
        "Comedy",
        "Short"
    ],
    "runtime": 26,
    "rated": "PASSED",
    "cast": [
        "Harold Lloyd",

```

```
        "Roy Brooks",
        "Mildred Davis",
        "Wallace Howe"
    ],
    "num_mflix_comments": 1,
    "poster":
    "https://m.media-amazon.com/images/M/MV5B0DliMjc3ODctYjh0C00MDM5LTgzNmUtMjQ1MmViNDQ0NzlhXkEyXkFqcGdeQXVyNTM3MDMyMDQ@._V1_SY1000_SX677_AL_.jpg",
    "title": "High and Dizzy",
    "fullplot": "After a long wait, a young doctor finally has a patient come to his office. She is a young woman whose father has brought her to be treated for sleep-walking, but the father becomes annoyed with the doctor, and takes his daughter away. Soon afterward, the young doctor shares in a drinking binge with another doctor who has built a still in his office. After a series of misadventures, the two of them wind up in the same hotel where the daughter and her father are staying, leading to some hazardous predicaments.",
    "languages": [
        "English"
    ],
    "released": {
        "$date": {
            "$numberLong": "-1561334400000"
        }
    },
    "directors": [
        "Hal Roach"
    ],
    "writers": [
        "Frank Terry (story)",
        "H.M. Walker (titles)"
    ],
    "awards": {
        "wins": 0,
        "nominations": 1,
        "text": "1 nomination."
    },
    "lastupdated": "2015-08-11 00:35:33.717000000",
    "year": 1920,
    "imdb": {
        "rating": 7,
        "votes": 646,
        "id": 11293
    },
    "countries": [
        "USA"
    ],
    "type": "movie",
```



```

    "tomatoes": {
      "viewer": {
        "rating": 3.4,
        "numReviews": 30,
        "meter": 70
      },
      "lastUpdated": {
        "$date": "2015-06-27T19:17:10Z"
      }
    }
  },
  {
    "_id": {
      "$oid": "573a1391f29313caabcd6e2a"
    },
    "plot": "A newly wedded couple attempt to build a house with a prefabricated kit, unaware that a rival sabotaged the kit's component numbering.",
    "genres": [
      "Short",
      "Comedy"
    ],
    "runtime": 25,
    "cast": [
      "Buster Keaton",
      "Sybil Seely"
    ],
    "num_mflix_comments": 0,
    "title": "One Week",
    "fullplot": "Buster and Sybil exit a chapel as newlyweds. Among the gifts is a portable house you easily put together in one week. It doesn't help that Buster's rival for Sybil switches the numbers on the crates containing the house parts.",
    "languages": [
      "English"
    ],
    "released": {
      "$date": {
        "$numberLong": "-1556841600000"
      }
    },
    "directors": [
      "Edward F. Cline",
      "Buster Keaton"
    ],
    "rated": "TV-G",
    "awards": {
      "wins": 1,
      "nominations": 0,

```

```

    "text": "1 win.",
    },
    "lastupdated": "2015-05-07 01:07:01.633000000",
    "year": 1920,
    "imdb": {
      "rating": 8.3,
      "votes": 3942,
      "id": 11541
    },
    "countries": [
      "USA"
    ],
    "type": "movie",
    "tomatoes": {
      "viewer": {
        "rating": 4.3,
        "numReviews": 752,
        "meter": 91
      },
      "lastUpdated": {
        "$date": "2015-09-13T18:22:19Z"
      }
    }
  },
  {
    "_id": {
      "$oid": "573a1391f29313caabcd6ea2"
    },
    "plot": "The simple-minded son of a rich financier must find
his own way in the world.",
    "genres": [
      "Comedy"
    ],
    "runtime": 77,
    "cast": [
      "Edward Jobson",
      "Beulah Booker",
      "Edward Connelly",
      "Edward Alexander"
    ],
    "num_mflix_comments": 0,
    "poster":
"https://m.media-amazon.com/images/M/MV5BZDni0DA3NzQtNTBmZS00NTM3LWJlO
GMtMDg2NzFiNDU2M2M3XkEyXkFqcGdeQXVyMjUxODE0MDY@._V1_SY1000_SX677_AL_.j
pg",
    "title": "The Saphead",
    "fullplot": "Nick Van Alstyne owns the Henrietta silver mine
and is very rich. His son Bertie is naive and spoiled. His daughter
Rose is married to shady investor Mark. Mark wrecks Bertie's wedding

```

plans by making him take the blame for Mark's illegitimate daughter. Mark also nearly ruins the family business by selling off Henrietta stock at too low a price. Bertie, of all people, must come to the rescue on the trading floor.",

```
    "countries": [
      "USA"
    ],
    "released": {
      "$date": {
        "$numberLong": "-1556841600000"
      }
    },
    "directors": [
      "Herbert Blach\u00e8s",
      "Winchell Smith"
    ],
    "writers": [
      "Bronson Howard (original play \"The Henrietta\")",
      "Victor Mapes (play)",
      "June Mathis (scenario)",
      "Winchell Smith (play)"
    ],
    "awards": {
      "wins": 0,
      "nominations": 1,
      "text": "1 nomination."
    },
    "lastupdated": "2015-06-20 00:38:08.303000000",
    "year": 1920,
    "imdb": {
      "rating": 6.2,
      "votes": 1020,
      "id": 11652
    },
    "type": "movie",
    "tomatoes": {
      "viewer": {
        "rating": 3.3,
        "numReviews": 435,
        "meter": 49
      },
      "dvd": {
        "$date": "2000-01-11T00:00:00Z"
      },
      "lastUpdated": {
        "$date": "2015-06-23T19:23:34Z"
      }
    }
  },
},
```

```

{
  "_id": {
    "$oid": "573a139cf29313caabcf560f"
  },
  "plot": "Two people kiss.",
  "genres": [
    "Short",
    "Romance"
  ],
  "runtime": 1,
  "title": "The Kiss",
  "countries": [
    "USA"
  ],
  "fullplot": "A couple make love, in the 19th century sense.
Then he grooms his moustache, and gives her a kiss. On the lips!",
  "num_mflix_comments": 0,
  "cast": [
    "May Irwin",
    "John C. Rice"
  ],
  "directors": [
    "William Heise"
  ],
  "writers": [
    "John J. McNally (play)"
  ],
  "awards": {
    "wins": 1,
    "nominations": 0,
    "text": "1 win."
  },
  "lastupdated": "2015-08-07 00:29:36.180000000",
  "year": 1896,
  "imdb": {
    "rating": 5.9,
    "votes": 1739,
    "id": 139738
  },
  "type": "movie",
  "tomatoes": {
    "viewer": {
      "rating": 4,
      "numReviews": 235,
      "meter": 87
    },
    "dvd": {
      "$date": "1999-05-04T00:00:00Z"
    }
  },

```

```
        "lastUpdated": {
            "$date": "2015-08-22T19:24:09Z"
        }
    },
    {
        "_id": {
            "$oid": "573a139ff29313caabd01709"
        },
        "countries": [
            "USA"
        ],
        "genres": [
            "Western"
        ],
        "runtime": 80,
        "cast": [
            "Em-koy-e-tie",
            "Hunting Horse",
            "Esther LeBarre",
            "Wanada Parker"
        ],
        "title": "The Daughter of Dawn",
        "lastupdated": "2015-09-03 00:33:47.333000000",
        "languages": [
            "English"
        ],
        "released": {
            "$date": {
                "$numberLong": "-1554249600000"
            }
        },
        "directors": [
            "Norbert A. Myles"
        ],
        "writers": [
            "Richard Banks (story)",
            "Norbert A. Myles"
        ],
        "awards": {
            "wins": 1,
            "nominations": 0,
            "text": "1 win."
        },
        "year": 1920,
        "imdb": {
            "rating": 6.4,
            "votes": 30,
            "id": 191066
        }
    }
]
```

```

    },
    "type": "movie",
    "tomatoes": {
      "viewer": {
        "rating": 0,
        "numReviews": 2
      },
      "lastUpdated": {
        "$date": "2015-09-10T19:02:18Z"
      }
    },
    "num_mflix_comments": 0
  },
  {
    "_id": {
      "$oid": "573a13a0f29313caabd041db"
    },
    "plot": "Two people kiss.",
    "genres": [
      "Short",
      "Romance"
    ],
    "runtime": 1,
    "title": "The Kiss",
    "countries": [
      "USA"
    ],
    "fullplot": "A couple make love, in the 19th century sense.
Then he grooms his moustache, and gives her a kiss. On the lips!",
    "num_mflix_comments": 1,
    "cast": [
      "May Irwin",
      "John C. Rice"
    ],
    "directors": [
      "William Heise"
    ],
    "writers": [
      "John J. McNally (play)"
    ],
    "awards": {
      "wins": 1,
      "nominations": 0,
      "text": "1 win."
    },
    "lastupdated": "2015-08-30 04:39:01.160000000",
    "year": 1896,
    "imdb": {
      "rating": 5.9,

```

```

        "votes": 1759,
        "id": 139738
    },
    "type": "movie"
},
{
    "_id": {
        "$oid": "573a13a5f29313caabd13572"
    },
    "plot": "Cartoon figures announce, via comic strip balloons,
that they will move - and move they do, in a wildly exaggerated
style.",
    "genres": [
        "Animation",
        "Short",
        "Comedy"
    ],
    "runtime": 7,
    "cast": [
        "Winsor McCay"
    ],
    "poster":
"https://m.media-amazon.com/images/M/MV5BYzg2NjNhNTctMjUxMi00ZWU4LWI3ZjYtNTI0NTQxNThjZTk2XkEyXkFqcGdeQXVyNzg5OTk2OAA@._V1_SY1000_SX677_AL_.jpg",
    "title": "Winsor McCay, the Famous Cartoonist of the N.Y.
Herald and His Moving Comics",
    "fullplot": "Cartoonist Winsor McCay agrees to create a large
set of drawings that will be photographed and made into a motion
picture. The job requires plenty of drawing supplies, and the
cartoonist must also overcome some mishaps caused by an assistant.
Finally, the work is done, and everyone can see the resulting animated
picture.",
    "languages": [
        "English"
    ],
    "released": {
        "$date": {
            "$numberLong": "-1853539200000"
        }
    },
    "directors": [
        "Winsor McCay",
        "J. Stuart Blackton"
    ],
    "writers": [
        "Winsor McCay (comic strip \"Little Nemo in
Slumberland\")",
        "Winsor McCay (screenplay)"
    ]
}

```

```

    ],
    "awards": {
        "wins": 1,
        "nominations": 0,
        "text": "1 win."
    },
    "lastupdated": "2015-08-31 01:05:38.577000000",
    "year": 1911,
    "imdb": {
        "rating": 7.3,
        "votes": 1036,
        "id": 1737
    },
    "countries": [
        "USA"
    ],
    "type": "movie",
    "num_mflix_comments": 0
}
]

```

match and project

```

c = mflixdb.movies.aggregate([
    {"$match": {"year": {"$lte": 1920}}},
    {"$project": {"_id": 0, "title": 1, "cast": 1}},
])

print(dumps(c, indent=4))

[
  {
    "cast": [
      "A.C. Abadie",
      "Gilbert M. 'Broncho Billy' Anderson",
      "George Barnes",
      "Justus D. Barnes"
    ],
    "title": "The Great Train Robbery"
  },
  {
    "cast": [
      "Frank Powell",
      "Grace Henderson",
      "James Kirkwood",
      "Linda Arvidson"
    ],
    "title": "A Corner in Wheat"
  },
  {

```



```

        "cast": [
            "Winsor McCay"
        ],
        "title": "Winsor McCay, the Famous Cartoonist of the N.Y.
Herald and His Moving Comics"
    },
    {
        "cast": [
            "Jane Gail",
            "Ethel Grandin",
            "William H. Turner",
            "Matt Moore"
        ],
        "title": "Traffic in Souls"
    },
    {
        "cast": [
            "Winsor McCay",
            "George McManus",
            "Roy L. McCardell"
        ],
        "title": "Gertie the Dinosaur"
    },
    {
        "cast": [
            "Stanley Hunt",
            "Sarah Constance Smith Hunt",
            "Mrs. George Walkus",
            "Paddy 'Malid"
        ],
        "title": "In the Land of the Head Hunters"
    },
    {
        "cast": [
            "Pearl White",
            "Crane Wilbur",
            "Paul Panzer",
            "Edward Jos\u00e8"
        ],
        "title": "The Perils of Pauline"
    },
    {
        "cast": [
            "George Beban",
            "Clara Williams",
            "J. Frank Burke",
            "Leo Willis"
        ],
        "title": "The Italian"
    }

```

```
},
{
  "cast": [
    "John McCann",
    "James A. Marcus",
    "Maggie Weston",
    "Harry McCoy"
  ],
  "title": "Regeneration"
},
{
  "cast": [
    "Howard C. Hickman",
    "Enid Markey",
    "Lola May",
    "Kate Bruce"
  ],
  "title": "Civilization"
},
{
  "cast": [
    "Tyrone Power Sr.",
    "Helen Riaume",
    "Marie Walcamp",
    "Cora Drew"
  ],
  "title": "Where Are My Children?"
},
{
  "cast": [
    "Mary Pickford",
    "Madlaine Traverse",
    "Charles Wellesley",
    "Gladys Fairbanks"
  ],
  "title": "The Poor Little Rich Girl"
},
{
  "cast": [
    "Douglas Fairbanks",
    "Eileen Percy",
    "Calvert Carter",
    "Charles Stevens"
  ],
  "title": "Wild and Woolly"
},
{
  "cast": [
    "Tula Belle",
```

```

        "Robin Macdougall",
        "Edwin E. Reed",
        "Emma Lowry"
    ],
    "title": "The Blue Bird"
},
{
    "cast": [
        "Harold Lloyd",
        "Mildred Davis",
        "'Snub' Pollard",
        "Peggy Cartwright"
    ],
    "title": "From Hand to Mouth"
},
{
    "cast": [
        "Harold Lloyd",
        "Roy Brooks",
        "Mildred Davis",
        "Wallace Howe"
    ],
    "title": "High and Dizzy"
},
{
    "cast": [
        "Buster Keaton",
        "Sybil Seely"
    ],
    "title": "One Week"
},
{
    "cast": [
        "Edward Jobson",
        "Beulah Booker",
        "Edward Connelly",
        "Edward Alexander"
    ],
    "title": "The Saphead"
},
{
    "title": "The Kiss",
    "cast": [
        "May Irwin",
        "John C. Rice"
    ]
},
{
    "cast": [

```

```

        "Em-koy-e-tie",
        "Hunting Horse",
        "Esther LeBarre",
        "Wanada Parker"
    ],
    "title": "The Daughter of Dawn"
},
{
    "title": "The Kiss",
    "cast": [
        "May Irwin",
        "John C. Rice"
    ]
},
{
    "cast": [
        "Winsor McCay"
    ],
    "title": "Winsor McCay, the Famous Cartoonist of the N.Y.
Herald and His Moving Comics"
}
]

```

match project limit and sort

```

c = mflixdb.movies.aggregate([
    {"$match": {"year": {"$lte": 1920}}},
    {"$sort": {"title": 1}},
    {"$limit": 5},
    {"$project": {"_id": 0, "title": 1, "cast": 1}},
])

print(dumps(c, indent=4))

[
  {
    "cast": [
      "Frank Powell",
      "Grace Henderson",
      "James Kirkwood",
      "Linda Arvidson"
    ],
    "title": "A Corner in Wheat"
  },
  {
    "cast": [
      "Howard C. Hickman",
      "Enid Markey",
      "Lola May",
      "Kate Bruce"
    ]
  }
]

```

```

    ],
    "title": "Civilization"
  },
  {
    "cast": [
      "Harold Lloyd",
      "Mildred Davis",
      "'Snub' Pollard",
      "Peggy Cartwright"
    ],
    "title": "From Hand to Mouth"
  },
  {
    "cast": [
      "Winsor McCay",
      "George McManus",
      "Roy L. McCardell"
    ],
    "title": "Gertie the Dinosaur"
  },
  {
    "cast": [
      "Harold Lloyd",
      "Roy Brooks",
      "Mildred Davis",
      "Wallace Howe"
    ],
    "title": "High and Dizzy"
  }
]

```

Unwind

```

c = mflixdb.movies.aggregate([
  {"$match": {"year": {"$lte": 1920}}},
  {"$sort": {"title": 1}},
  {"$limit": 5},
  {"$unwind": "$cast"},
  {"$project": {"_id": 0, "title": 1, "cast": 1, "rating":
"$imdb.rating"}}},
])

print(dumps(c, indent=4))

[
  {
    "cast": "Frank Powell",
    "title": "A Corner in Wheat",
    "rating": 6.6
  },

```

```
{
  "cast": "Grace Henderson",
  "title": "A Corner in Wheat",
  "rating": 6.6
},
{
  "cast": "James Kirkwood",
  "title": "A Corner in Wheat",
  "rating": 6.6
},
{
  "cast": "Linda Arvidson",
  "title": "A Corner in Wheat",
  "rating": 6.6
},
{
  "cast": "Howard C. Hickman",
  "title": "Civilization",
  "rating": 6.3
},
{
  "cast": "Enid Markey",
  "title": "Civilization",
  "rating": 6.3
},
{
  "cast": "Lola May",
  "title": "Civilization",
  "rating": 6.3
},
{
  "cast": "Kate Bruce",
  "title": "Civilization",
  "rating": 6.3
},
{
  "cast": "Harold Lloyd",
  "title": "From Hand to Mouth",
  "rating": 7
},
{
  "cast": "Mildred Davis",
  "title": "From Hand to Mouth",
  "rating": 7
},
{
  "cast": "'Snub' Pollard",
  "title": "From Hand to Mouth",
  "rating": 7
}
```

```

    },
    {
      "cast": "Peggy Cartwright",
      "title": "From Hand to Mouth",
      "rating": 7
    },
    {
      "cast": "Winsor McCay",
      "title": "Gertie the Dinosaur",
      "rating": 7.3
    },
    {
      "cast": "George McManus",
      "title": "Gertie the Dinosaur",
      "rating": 7.3
    },
    {
      "cast": "Roy L. McCardell",
      "title": "Gertie the Dinosaur",
      "rating": 7.3
    },
    {
      "cast": "Harold Lloyd",
      "title": "High and Dizzy",
      "rating": 7
    },
    {
      "cast": "Roy Brooks",
      "title": "High and Dizzy",
      "rating": 7
    },
    {
      "cast": "Mildred Davis",
      "title": "High and Dizzy",
      "rating": 7
    },
    {
      "cast": "Wallace Howe",
      "title": "High and Dizzy",
      "rating": 7
    }
  ]
}

```

Grouping

What is the average IMDB rating of all movies by year? sort the data by year.

```
c = mflixdb.movies.aggregate([
```

```
    {"$group": {"_id": {"release year": "$year"}, "Avg Rating":  
{"$avg": "$imdb.rating"}}},  
    {"$sort" : {"_id": 1}}
```

```
])  
print(dumps(c, indent = 2))
```

```
[  
  {  
    "_id": {  
      "release year": 1896  
    },  
    "Avg Rating": 5.9  
  },  
  {  
    "_id": {  
      "release year": 1903  
    },  
    "Avg Rating": 7.4  
  },  
  {  
    "_id": {  
      "release year": 1909  
    },  
    "Avg Rating": 6.6  
  },  
  {  
    "_id": {  
      "release year": 1911  
    },  
    "Avg Rating": 7.3  
  },  
  {  
    "_id": {  
      "release year": 1913  
    },  
    "Avg Rating": 6.0  
  },  
  {  
    "_id": {  
      "release year": 1914  
    },  
    "Avg Rating": 6.8999999999999995  
  },  
  {  
    "_id": {  
      "release year": 1915  
    },  
    "Avg Rating": 6.6  
  },  
]
```



```
{
  "_id": {
    "release year": 1916
  },
  "Avg Rating": 6.1
},
{
  "_id": {
    "release year": 1917
  },
  "Avg Rating": 6.9
},
{
  "_id": {
    "release year": 1918
  },
  "Avg Rating": 6.6
},
{
  "_id": {
    "release year": 1919
  },
  "Avg Rating": 7.0
},
{
  "_id": {
    "release year": 1920
  },
  "Avg Rating": 6.9750000000000005
},
{
  "_id": {
    "release year": 1921
  },
  "Avg Rating": 7.4
},
{
  "_id": {
    "release year": 1922
  },
  "Avg Rating": 7.2
},
{
  "_id": {
    "release year": 1923
  },
  "Avg Rating": 7.15
},
{
```

```
    "_id": {
      "release year": 1924
    },
    "Avg Rating": 7.333333333333333
  },
  {
    "_id": {
      "release year": 1925
    },
    "Avg Rating": 7.3999999999999995
  },
  {
    "_id": {
      "release year": 1926
    },
    "Avg Rating": 7.3500000000000005
  },
  {
    "_id": {
      "release year": 1927
    },
    "Avg Rating": 7.225
  },
  {
    "_id": {
      "release year": 1928
    },
    "Avg Rating": 7.2375
  },
  {
    "_id": {
      "release year": 1929
    },
    "Avg Rating": 7.057142857142857
  },
  {
    "_id": {
      "release year": 1930
    },
    "Avg Rating": 6.9700000000000001
  },
  {
    "_id": {
      "release year": 1931
    },
    "Avg Rating": 7.2150000000000001
  },
  {
    "_id": {
```

```
    "release year": 1932
  },
  "Avg Rating": 7.377777777777778
},
{
  "_id": {
    "release year": 1933
  },
  "Avg Rating": 7.185
},
{
  "_id": {
    "release year": 1934
  },
  "Avg Rating": 7.173913043478261
},
{
  "_id": {
    "release year": 1935
  },
  "Avg Rating": 7.203225806451614
},
{
  "_id": {
    "release year": 1936
  },
  "Avg Rating": 7.183333333333334
},
{
  "_id": {
    "release year": 1937
  },
  "Avg Rating": 7.261290322580645
},
{
  "_id": {
    "release year": 1938
  },
  "Avg Rating": 7.286842105263157
},
{
  "_id": {
    "release year": 1939
  },
  "Avg Rating": 7.529999999999999
},
{
  "_id": {
    "release year": 1940
```

```
    },
    "Avg Rating": 7.116666666666667
  },
  {
    "_id": {
      "release year": 1941
    },
    "Avg Rating": 7.25
  },
  {
    "_id": {
      "release year": 1942
    },
    "Avg Rating": 7.316666666666666
  },
  {
    "_id": {
      "release year": 1943
    },
    "Avg Rating": 7.2625
  },
  {
    "_id": {
      "release year": 1944
    },
    "Avg Rating": 7.452173913043478
  },
  {
    "_id": {
      "release year": 1945
    },
    "Avg Rating": 7.131034482758621
  },
  {
    "_id": {
      "release year": 1946
    },
    "Avg Rating": 7.397058823529412
  },
  {
    "_id": {
      "release year": 1947
    },
    "Avg Rating": 7.2250000000000005
  },
  {
    "_id": {
      "release year": 1948
    },
  },
```

```
    "Avg Rating": 7.223214285714286
  },
  {
    "_id": {
      "release year": 1949
    },
    "Avg Rating": 7.175000000000001
  },
  {
    "_id": {
      "release year": 1950
    },
    "Avg Rating": 7.0618181818181816
  },
  {
    "_id": {
      "release year": 1951
    },
    "Avg Rating": 7.2407407407407405
  },
  {
    "_id": {
      "release year": 1952
    },
    "Avg Rating": 7.286666666666666
  },
  {
    "_id": {
      "release year": 1953
    },
    "Avg Rating": 7.104615384615385
  },
  {
    "_id": {
      "release year": 1954
    },
    "Avg Rating": 7.21063829787234
  },
  {
    "_id": {
      "release year": 1955
    },
    "Avg Rating": 7.240298507462687
  },
  {
    "_id": {
      "release year": 1956
    },
    "Avg Rating": 7.219402985074627
  }
```

```
},
{
  "_id": {
    "release year": 1957
  },
  "Avg Rating": 7.098591549295775
},
{
  "_id": {
    "release year": 1958
  },
  "Avg Rating": 7.1160000000000005
},
{
  "_id": {
    "release year": 1959
  },
  "Avg Rating": 7.1281690140845075
},
{
  "_id": {
    "release year": 1960
  },
  "Avg Rating": 7.205479452054795
},
{
  "_id": {
    "release year": 1961
  },
  "Avg Rating": 7.116176470588235
},
{
  "_id": {
    "release year": 1962
  },
  "Avg Rating": 7.167142857142857
},
{
  "_id": {
    "release year": 1963
  },
  "Avg Rating": 6.994202898550725
},
{
  "_id": {
    "release year": 1964
  },
  "Avg Rating": 7.21860465116279
},
},
```

```
{
  "_id": {
    "release year": 1965
  },
  "Avg Rating": 7.257142857142856
},
{
  "_id": {
    "release year": 1966
  },
  "Avg Rating": 6.950574712643679
},
{
  "_id": {
    "release year": 1967
  },
  "Avg Rating": 7.009876543209876
},
{
  "_id": {
    "release year": 1968
  },
  "Avg Rating": 7.096629213483146
},
{
  "_id": {
    "release year": 1969
  },
  "Avg Rating": 7.0607476635514015
},
{
  "_id": {
    "release year": 1970
  },
  "Avg Rating": 7.079166666666667
},
{
  "_id": {
    "release year": 1971
  },
  "Avg Rating": 7.228301886792453
},
{
  "_id": {
    "release year": 1972
  },
  "Avg Rating": 7.0719008264462815
},
{
```

```
    "_id": {
      "release year": 1973
    },
    "Avg Rating": 7.074107142857143
  },
  {
    "_id": {
      "release year": 1974
    },
    "Avg Rating": 7.218446601941747
  },
  {
    "_id": {
      "release year": 1975
    },
    "Avg Rating": 7.043925233644861
  },
  {
    "_id": {
      "release year": 1976
    },
    "Avg Rating": 6.931896551724138
  },
  {
    "_id": {
      "release year": 1977
    },
    "Avg Rating": 7.05655737704918
  },
  {
    "_id": {
      "release year": 1978
    },
    "Avg Rating": 6.775
  },
  {
    "_id": {
      "release year": 1979
    },
    "Avg Rating": 6.901526717557252
  },
  {
    "_id": {
      "release year": 1980
    },
    "Avg Rating": 6.638922155688623
  },
  {
    "_id": {
```



```
    "release year": 1981
  },
  "Avg Rating": 6.7005952380952385
},
{
  "_id": {
    "release year": 1982
  },
  "Avg Rating": 6.777401129943502
},
{
  "_id": {
    "release year": 1983
  },
  "Avg Rating": 6.774534161490683
},
{
  "_id": {
    "release year": 1984
  },
  "Avg Rating": 6.636683417085427
},
{
  "_id": {
    "release year": 1985
  },
  "Avg Rating": 6.722751322751322
},
{
  "_id": {
    "release year": 1986
  },
  "Avg Rating": 6.617894736842106
},
{
  "_id": {
    "release year": 1987
  },
  "Avg Rating": 6.636036036036036
},
{
  "_id": {
    "release year": 1988
  },
  "Avg Rating": 6.511553784860558
},
{
  "_id": {
    "release year": 1989
```

```
    },
    "Avg Rating": 6.679741379310345
  },
  {
    "_id": {
      "release year": 1990
    },
    "Avg Rating": 6.652
  },
  {
    "_id": {
      "release year": 1991
    },
    "Avg Rating": 6.610084033613446
  },
  {
    "_id": {
      "release year": 1992
    },
    "Avg Rating": 6.6977777777777785
  },
  {
    "_id": {
      "release year": 1993
    },
    "Avg Rating": 6.608394160583941
  },
  {
    "_id": {
      "release year": 1994
    },
    "Avg Rating": 6.62327868852459
  },
  {
    "_id": {
      "release year": 1995
    },
    "Avg Rating": 6.600806451612903
  },
  {
    "_id": {
      "release year": 1996
    },
    "Avg Rating": 6.569041769041768
  },
  {
    "_id": {
      "release year": 1997
    },
    "Avg Rating": 6.6029612756264235
  }
```

```
},
{
  "_id": {
    "release year": 1998
  },
  "Avg Rating": 6.638791423001949
},
{
  "_id": {
    "release year": 1999
  },
  "Avg Rating": 6.620582524271844
},
{
  "_id": {
    "release year": 2000
  },
  "Avg Rating": 6.518588640275388
},
{
  "_id": {
    "release year": 2001
  },
  "Avg Rating": 6.5663398692810455
},
{
  "_id": {
    "release year": 2002
  },
  "Avg Rating": 6.547749196141479
},
{
  "_id": {
    "release year": 2003
  },
  "Avg Rating": 6.5318407960199005
},
{
  "_id": {
    "release year": 2004
  },
  "Avg Rating": 6.656342182890856
},
{
  "_id": {
    "release year": 2005
  },
  "Avg Rating": 6.582748948106592
},
},
```

```
{
  "_id": {
    "release year": 2006
  },
  "Avg Rating": 6.597286821705427
},
{
  "_id": {
    "release year": 2007
  },
  "Avg Rating": 6.585555555555556
},
{
  "_id": {
    "release year": 2008
  },
  "Avg Rating": 6.552994350282486
},
{
  "_id": {
    "release year": 2009
  },
  "Avg Rating": 6.506543075245365
},
{
  "_id": {
    "release year": 2010
  },
  "Avg Rating": 6.512832369942197
},
{
  "_id": {
    "release year": 2011
  },
  "Avg Rating": 6.453415453527435
},
{
  "_id": {
    "release year": 2012
  },
  "Avg Rating": 6.484486373165618
},
{
  "_id": {
    "release year": 2013
  },
  "Avg Rating": 6.491477787851315
},
{
```

```
    "_id": {
      "release year": 2014
    },
    "Avg Rating": 6.57874531835206
  },
  {
    "_id": {
      "release year": 2015
    },
    "Avg Rating": 6.951388888888889
  },
  {
    "_id": {
      "release year": 2016
    },
    "Avg Rating": null
  },
  {
    "_id": {
      "release year": "1981\u00e8"
    },
    "Avg Rating": 8.0
  },
  {
    "_id": {
      "release year": "1986\u00e8"
    },
    "Avg Rating": 7.7
  },
  {
    "_id": {
      "release year": "1987\u00e8"
    },
    "Avg Rating": 8.9
  },
  {
    "_id": {
      "release year": "1988\u00e8"
    },
    "Avg Rating": 7.7
  },
  {
    "_id": {
      "release year": "1994\u00e81998"
    },
    "Avg Rating": 8.2
  },
  {
    "_id": {
```

```
    "release year": "1995\u00e8"
  },
  "Avg Rating": 9.0
},
{
  "_id": {
    "release year": "1996\u00e8"
  },
  "Avg Rating": 8.4
},
{
  "_id": {
    "release year": "1997\u00e8"
  },
  "Avg Rating": 7.2
},
{
  "_id": {
    "release year": "1999\u00e8"
  },
  "Avg Rating": 8.9
},
{
  "_id": {
    "release year": "2000\u00e8"
  },
  "Avg Rating": 7.5
},
{
  "_id": {
    "release year": "2002\u00e8"
  },
  "Avg Rating": 7.5
},
{
  "_id": {
    "release year": "2003\u00e8"
  },
  "Avg Rating": 8.4
},
{
  "_id": {
    "release year": "2005\u00e8"
  },
  "Avg Rating": 8.4
},
{
  "_id": {
    "release year": "2006\u00e8"
```

```
    },  
    "Avg Rating": 7.2  
  },  
  {  
    "_id": {  
      "release year": "2006\u00e82007"  
    },  
    "Avg Rating": 9.0  
  },  
  {  
    "_id": {  
      "release year": "2006\u00e82012"  
    },  
    "Avg Rating": 8.5  
  },  
  {  
    "_id": {  
      "release year": "2007\u00e8"  
    },  
    "Avg Rating": 8.533333333333333  
  },  
  {  
    "_id": {  
      "release year": "2009\u00e8"  
    },  
    "Avg Rating": 8.3  
  },  
  {  
    "_id": {  
      "release year": "2010\u00e8"  
    },  
    "Avg Rating": 8.2  
  },  
  {  
    "_id": {  
      "release year": "2011\u00e8"  
    },  
    "Avg Rating": 7.75  
  },  
  {  
    "_id": {  
      "release year": "2012\u00e8"  
    },  
    "Avg Rating": 7.5  
  },  
  {  
    "_id": {  
      "release year": "2014\u00e8"  
    },  
    "Avg Rating": 7.25  
  }
```

```

    }
  ]

# What is the average IMDB rating of all movies by year? sort the data
by avg rating in decreasing order.

c = mflixdb.movies.aggregate([
    {"$group": {"_id": {"release year": "$year"}, "Avg Rating":
{"$avg": "$imdb.rating"}}},
    {"$sort" : {"Avg Rating": -1, "_id": 1}}

])
print(dumps(c, indent = 2))

```

Lookup

```

data = demodb.customers.aggregate([
    {
        "$lookup": {
            "from": "orders",
            "localField": "custid",
            "foreignField": "custid",
            "as": "orders"
        }
    },
    {"$project": {"_id": 0, "address": 0}}
])
print(dumps(data, indent = 2))

```

Reformatting Queries

```

match = {"$match": {"year": {"$lte": 1920}}}
limit = {"$limit": 5}
project = {"$project": {"_id":0, "title": 1, "cast": 1, "rating":
"$imdb.rating"}}

agg = mflixdb.movies.aggregate([match, limit, project])
print(dumps(agg, indent=2))

```