BIG DATA HADOOP & SPARK TRAINING

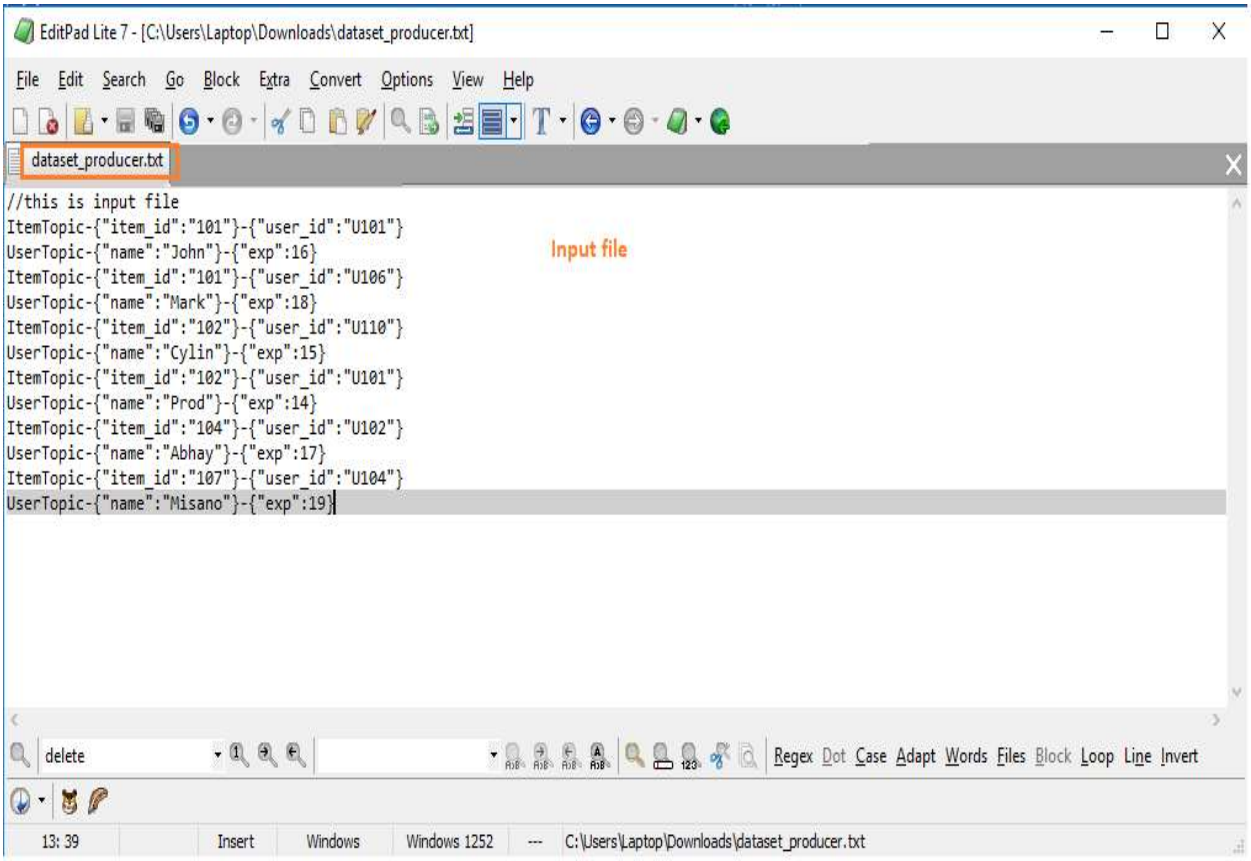
Assignment on Apache Kafka II

Rashmi Krishna

6/12/18

Contents

Input dataset for both the tasks



This file has two topics namely:

1. ItemTopic- It has item_id and user_id
2. UserTopic- It has user details like name and experience

Task 1: Create a java program MyKafkaProducer.java that takes a file name and delimiter as input arguments. It should read the content of file line by line. Fields in the file are in following order

1. Kafka Topic Name

2. Key

3. value

For every line, insert the key and value to the respective Kafka broker in a fire and forget mode.

After record is sent, it should print appropriate message on screen.

Pass dataset_producer.txt as the input file and -as delimiter.

LINK: https://drive.google.com/file/d/0B_Qjau8wv1KoSnR5eHpKOF9rTFU/view?usp=sharing

Program to perform this task is as below:

- Packages required to be imported are as follows:

```
import org.apache.kafka.clients.producer.KafkaProducer;

import org.apache.kafka.clients.producer.ProducerRecord;

import java.io.BufferedReader;

import java.io.FileReader;

import java.io.IOException;

import java.util.Properties;
```

- This is the class called “MyKafkaProducer” which takes two arguments (Input File name and delimiter) in the command line.

```
public class MyKafkaProducer {
 public static void main(String[] args) throws IOException{
  if (args.length != 2) {
   System.out.println("Please provide appropriate command line arguments");
   System.exit(-1);
  }
```

- We configure the properties for KafkaProducer:
  - We create a new instance of Properties called *props*.
  - Using this instance we add properties to kafkaProducer like, bootstrapserver/meta-data-brokerlist, key and value serializers.

```
  Properties props = new Properties();
  props.put("bootstrap.servers", "localhost:9092");
  props.put("key.serializer", "org.apache.kafka.common.serialization.StringSerializer");
  props.put("value.serializer", "org.apache.kafka.common.serialization.StringSerializer");
```

- We then instantiate the KafkaProducer class called producer, we have mentioned string in <> because both key and value are String.
- We add the properties instance (props)to KafkaProducer instance.
- We also instantiate ProducerRecord as producerRecord

```
  KafkaProducer<String, String> producer = new KafkaProducer<>(props);
  ProducerRecord<String, String> producerRecord = null;
```

- Now we take the data provided in the command line i.e. file name and delimiter and save them in the array of string variables called filename and delimiter

```
  String fileName = args[0];
  String delimiter = args[1];
```

- We read the contents of the input file, and save their contents arrays in different variables:
  - We save the topic name i.e. first part of array(0th index elements) in String variable topic and similarly we save key and value variables too.

```
try(BufferedReader br = new BufferedReader(new FileReader(fileName))) {
  for(String line; (line = br.readLine()) != null; ) {
    String[] tempArray = line.split(delimiter);
    String topic = tempArray[0];
    String key = tempArray[1];
    String value = tempArray[2];
```

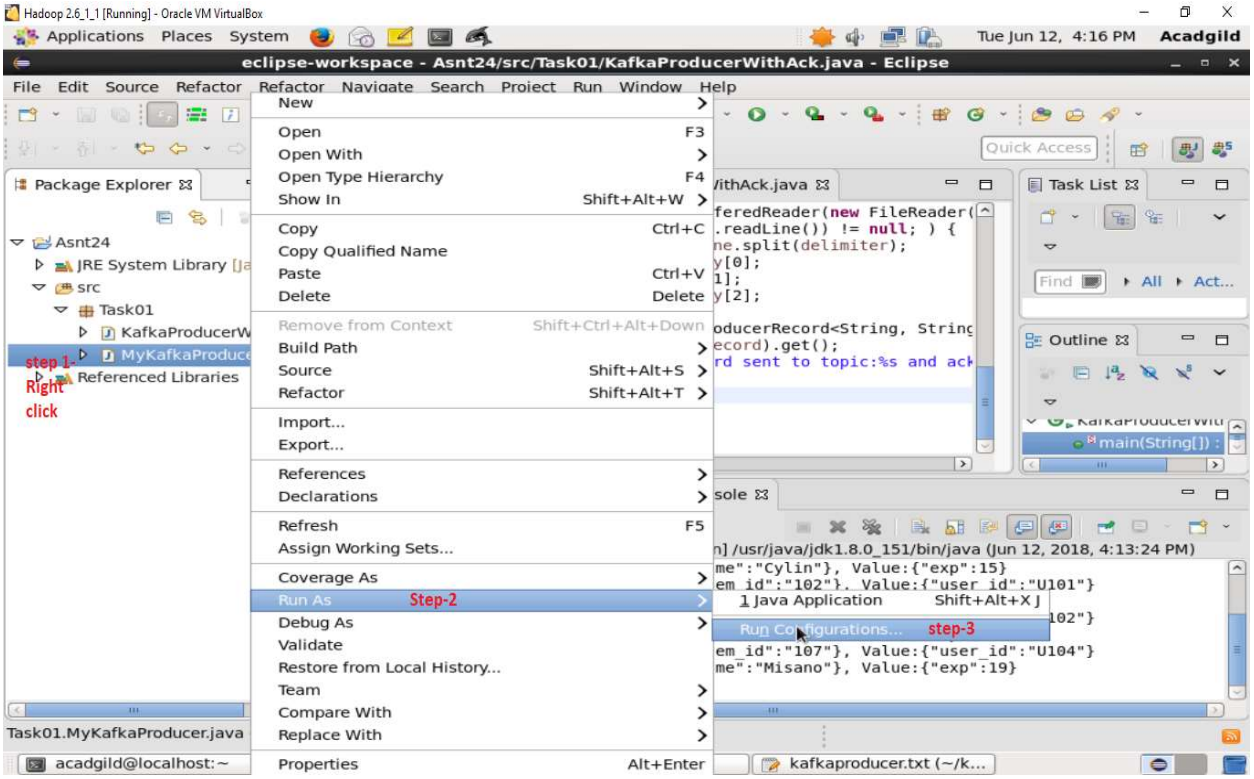
- Now, we pass the variables topic,key and value to producer record.
- We also print appropriate message which shows the topics,key and value contents.
- We finally, close the producer.

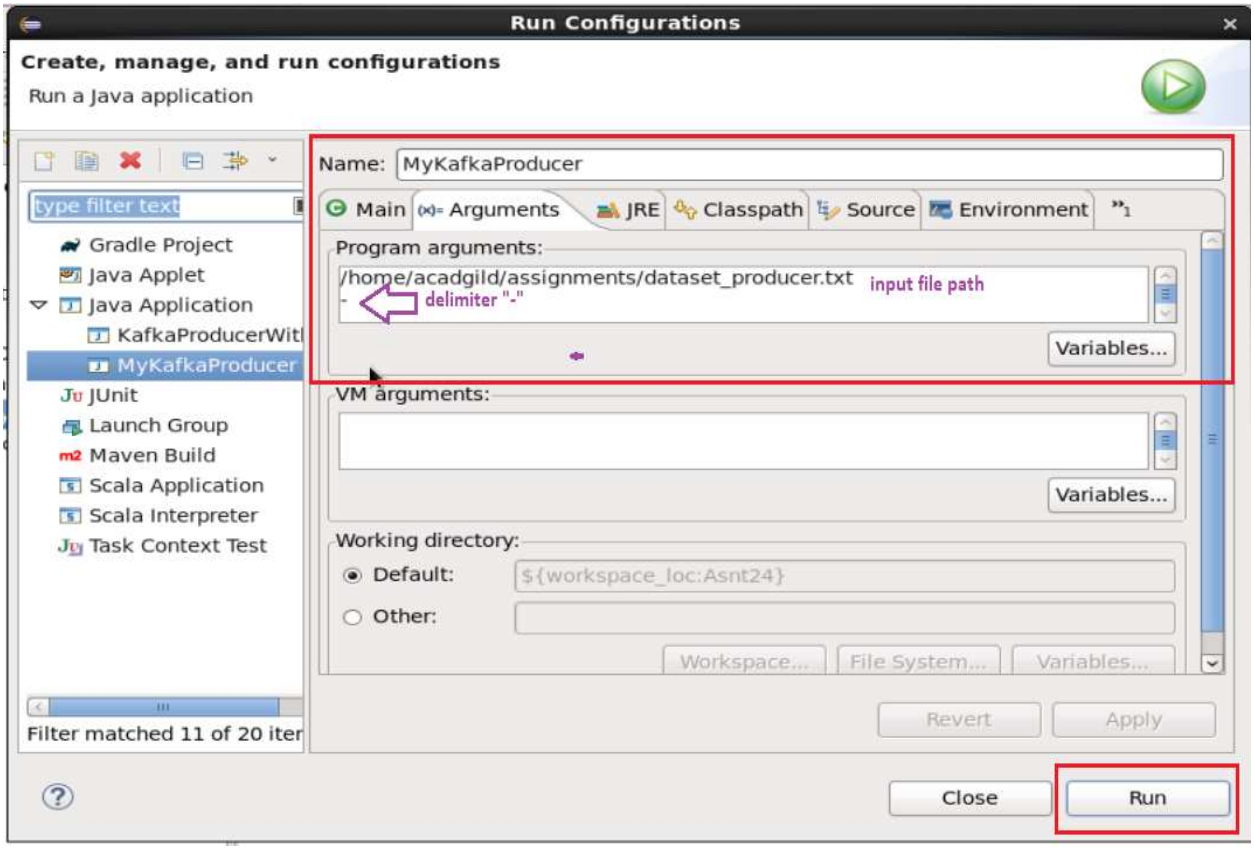
```
    producerRecord = new ProducerRecord<String, String>(topic, key, value);
    producer.send(producerRecord);
    System.out.printf("Record sent to topic:%s. Key:%s, Value:%s\n", topic, key, value);
  }  }  producer.close();  } }
```

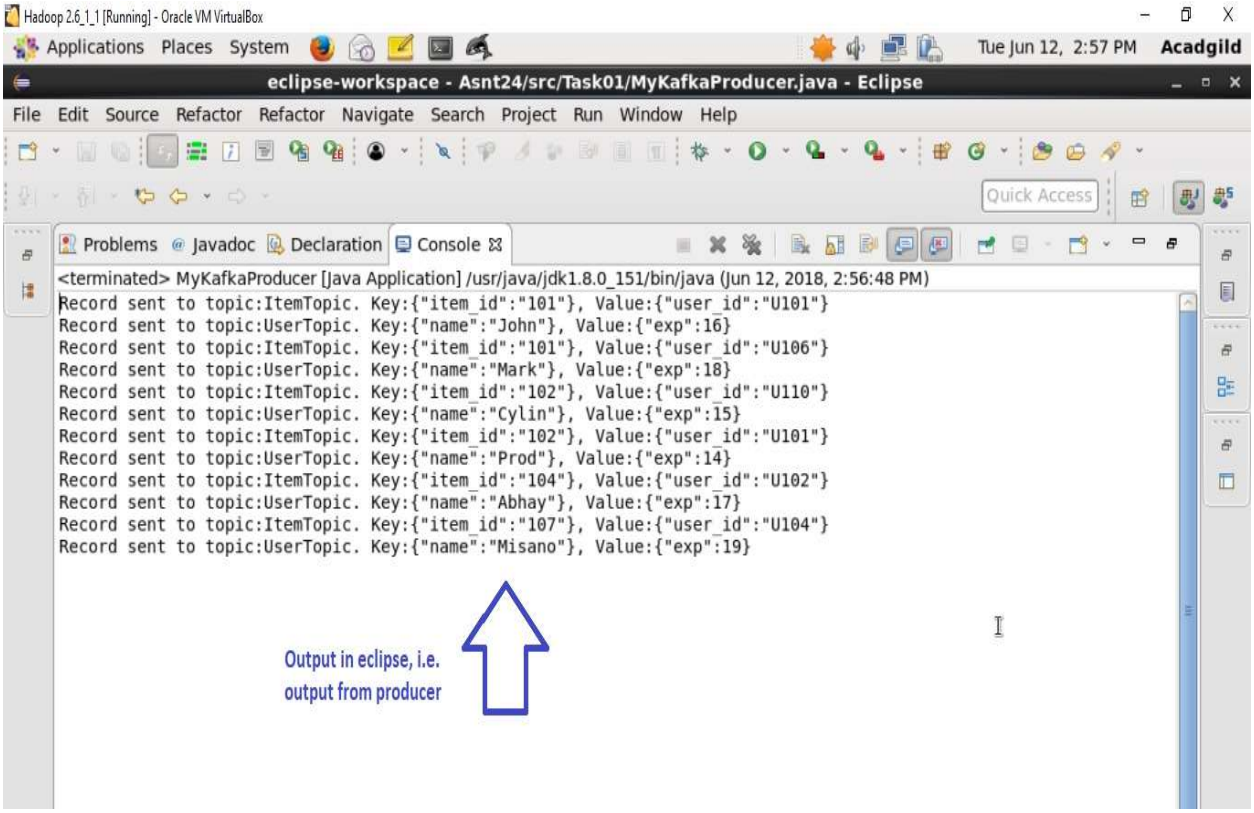
- **We start zookeeper and kafka server using the below commands:**
  - ## starting zookeeper

    bin/zookeeper-server-start.sh config/zookeeper.properties
  - ## starting kafka server

    bin/kafka-server-start.sh config/server.properties
- Now, we run this program in eclipse, by giving the arguments in “Run Configurations” as shown below:


Hadoop 2.6_1_1 [Running] - Oracle VM VirtualBox
Applications Places System
Tue Jun 12, 4:16 PM
Acadgild
eclipse-workspace - Asnt24/src/Task01/KafkaProducerWithAck.java - Eclipse
File Edit Source Refactor Refactor Navigate Search Project Run Window Help
Package Explorer
Asnt24
JRE System Library
src
Task01
KafkaProducerW
MyKafkaProduce
Referenced Libraries
step 1-
Right
click
New
Open F3
Open With
Open Type Hierarchy F4
Show In Shift+Alt+W
Copy Ctrl+C
Copy Qualified Name
Paste Ctrl+V
Delete Delete
Remove from Context Shift+Ctrl+Alt+Down
Build Path
Source Shift+Alt+S
Refactor Shift+Alt+T
Import...
Export...
References
Declarations
Refresh F5
Assign Working Sets...
Coverage As
Run As Step-2
Debug As
Validate
Restore from Local History...
Team
Compare With
Replace With
Properties Alt+Enter
Task01.MyKafkaProducer.java
acadgild@localhost:~
Quick Access
Task List
Find All Act...
Outline
main(String[])
sole
1 Java Application Shift+Alt+X J
Run Configurations... step-3
kafkaproducer.txt (~/k...


Run Configurations
Create, manage, and run configurations
Run a Java application
type filter text
Gradle Project
Java Applet
Java Application
KafkaProducerWit
MyKafkaProducer
JUnit
Launch Group
Maven Build
Scala Application
Scala Interpreter
Task Context Test
Filter matched 11 of 20 iter
Name: MyKafkaProducer
Main
Arguments
JRE
Classpath
Source
Environment
Program arguments:
/home/acadgild/assignments/dataset_producer.txt
input file path
-
delimiter "-"
Variables...
VM arguments:
Variables...
Working directory:
Default:
${workspace_loc:Asnt24}
Other:
Workspace...
File System...
Variables...
Revert
Apply
Close
Run



- Now, we run the console consumer commands on terminal to view the output of the program, using the below command:
    - **To read contents of ItemTopic**

```
./bin/kafka-console-consumer.sh --topic ItemTopic --from-beginning \
--zookeeper localhost:2181 --property print.key=true
```

    - **To read contents of UserTopic**

```
./bin/kafka-console-consumer.sh --topic UserTopic --from-beginning \
--zookeeper localhost:2181 \
--property print.key=true
```

```
[acadgild@localhost kafka_2.12-0.10.1.1]$ ./bin/kafka-console-consumer.sh --topic ItemTopic --from-beginning \
> --zookeeper localhost:2181 \
> --property print.key=true
Using the ConsoleConsumer with old consumer is deprecated and will be removed in a future major release. Consider using the new c
onsumer by passing [bootstrap-server] instead of [zookeeper].
{"item_id":"101"}       {"user_id":"U101"}
{"item_id":"101"}       {"user_id":"U106"}
{"item_id":"102"}       {"user_id":"U110"}
{"item_id":"102"}       {"user_id":"U101"}
{"item_id":"104"}       {"user_id":"U102"}
{"item_id":"107"}       {"user_id":"U104"}
^CProcessed a total of 6 messages
You have new mail in /var/spool/mail/acadgild
```

output from console consumer. This is showing contents of "ItemTopic"

```
[acadgild@localhost kafka_2.12-0.10.1.1]$ ./bin/kafka-console-consumer.sh --topic UserTopic --from-beginning \
> --zookeeper localhost:2181 \
> --property print.key=true
Using the ConsoleConsumer with old consumer is deprecated and will be removed in a future major release. Consider using the new c
onsumer by passing [bootstrap-server] instead of [zookeeper].
{"name":"John"} {"exp":16}
{"name":"Mark"} {"exp":18}
{"name":"Cylin"}        {"exp":15}
{"name":"Prod"} {"exp":14}
{"name":"Abhay"}        {"exp":17}
{"name":"Misano"}       {"exp":19}
```

Output from console consumer.This is showing contents of "UserTopic"

Task 2: Modify the previous program MyKafkaProducer.java and create a new Java program KafkaProducerWithAck.java. This should perform the same task as of KafkaProducer.java with some modification. When passing any data to a topic, it should wait for acknowledgement. After acknowledgement is received from the broker, it should print the key and value which has been written to a specified topic. The application should attempt for 3 retries before giving any exception.

Pass dataset_producer.txt as the input file and -as delimiter.

Program to perform this task is as below:

- Imports required for the program is given below:

```
import org.apache.kafka.clients.producer.KafkaProducer;

import org.apache.kafka.clients.producer.ProducerRecord;

import java.io.BufferedReader;

import java.io.FileReader;

import java.io.IOException;

import java.util.Properties;

import java.util.concurrent.ExecutionException;
```

- This is the class called "KafkaProducerWithAck" which takes two arguments (Input File name and delimiter) in the command line.

```
public class KafkaProducerWithAck {

  public static void main(String[] args) throws IOException, InterruptedException,
ExecutionException{

    if (args.length != 2) {

      System.out.println("Please provide appropriate command line arguments");

      System.exit(-1);

    }
```

- We configure the properties for KafkaProducer:
  - We create a new instance of Properties called *props*.
  - Using this instance we add properties to kafkaProducer like, bootstrapserver/meta-data-brokerlist, key and value serializers,acks and retries.
    - **Acks "all"-** this means that the producer will receive a success response from the broker once all in-sync replicas received the message.
    - **Retries 3**- When the producer receives an error message from the server, the error could be transient (e.g., a lack of leader for a partition). In this case, the value of the retries parameter will control how many times the producer will retry sending the message before giving up and notifying the client of an issue.

```
Properties props = new Properties();

props.put("bootstrap.servers", "localhost:9092");

props.put("acks", "all");

props.put("retries", 3);

props.put("key.serializer", "org.apache.kafka.common.serialization.StringSerializer");

props.put("value.serializer", "org.apache.kafka.common.serialization.StringSerializer");
```

- We then instantiate the KafkaProducer class called producer, we have mentioned string in <> because both key and value are String.
- We add the properties instance (props)to KafkaProducer instance.
- We also instantiate ProducerRecord as producerRecord

```
KafkaProducer<String, String> producer = new KafkaProducer<>(props);

ProducerRecord<String, String> producerRecord = null;
```

- Now we take the data provided in the command line i.e. file name and delimiter and save them in the array of string variables called filename and delimiter

```
String fileName = args[0];

String delimiter = args[1];
```

- We read the contents of the input file, and save their contents arrays in different variables:
    - We save the topic name i.e. first part of array(0th index elements) in String variable topic and similarly we save key and value variables too.

```
try(BufferedReader br = new BufferedReader(new FileReader(fileName))) {

  for(String line; (line = br.readLine()) != null; ) {

    String[] tempArray = line.split(delimiter);

    String topic = tempArray[0];

    String key = tempArray[1];

    String value = tempArray[2];
```

- Now, we pass the variables topic,key and value to producer record.
- We also print appropriate message which shows the topics,key and value contents.
- We finally, close the producer

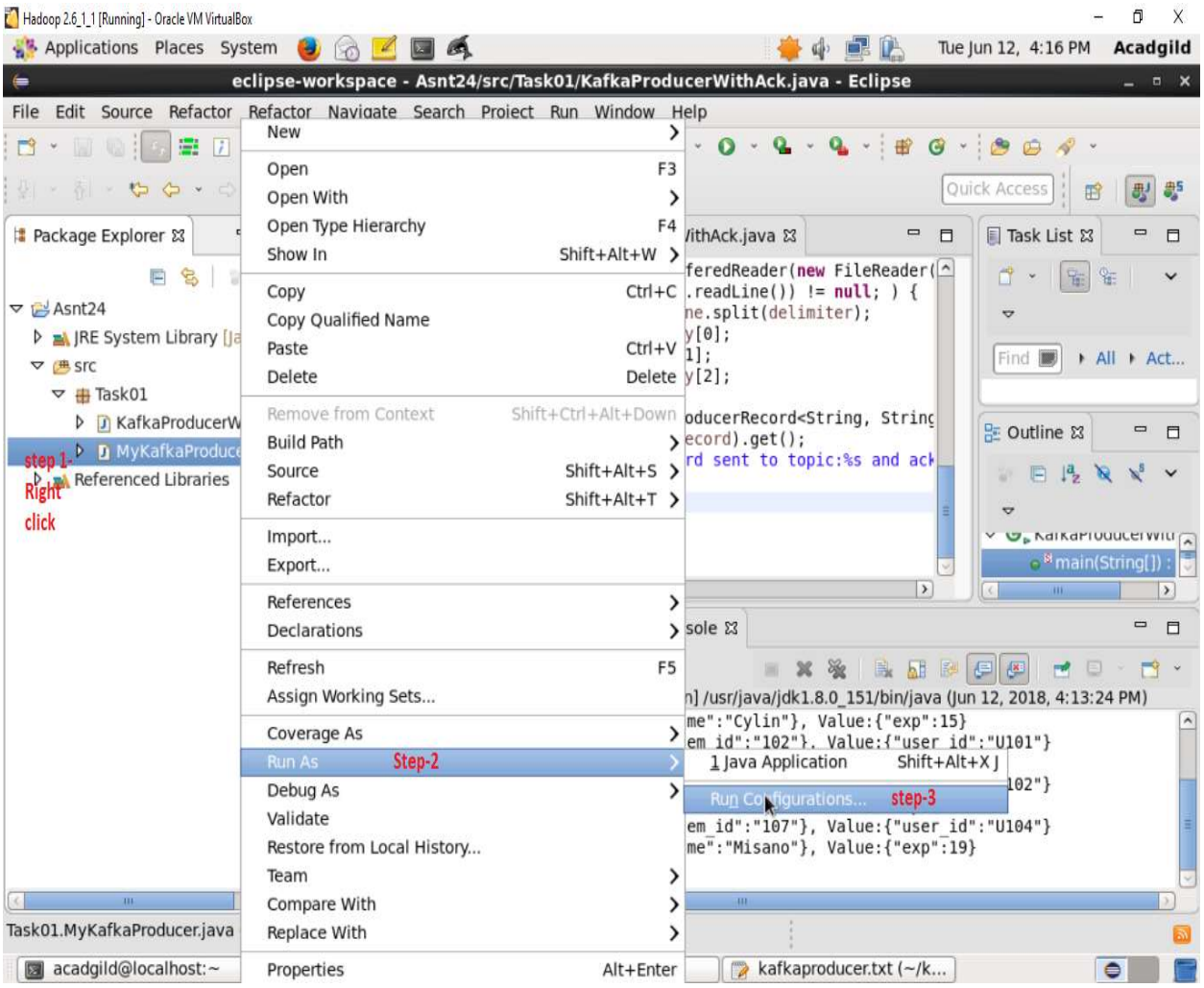
```
producerRecord = new ProducerRecord<String, String>(topic, key, value);

producer.send(producerRecord).get();

System.out.printf("Record sent to topic:%s and acknowledged as well. Key:%s, Value:%s\n", topic, key, value);

}  }  producer.close();  } }
```

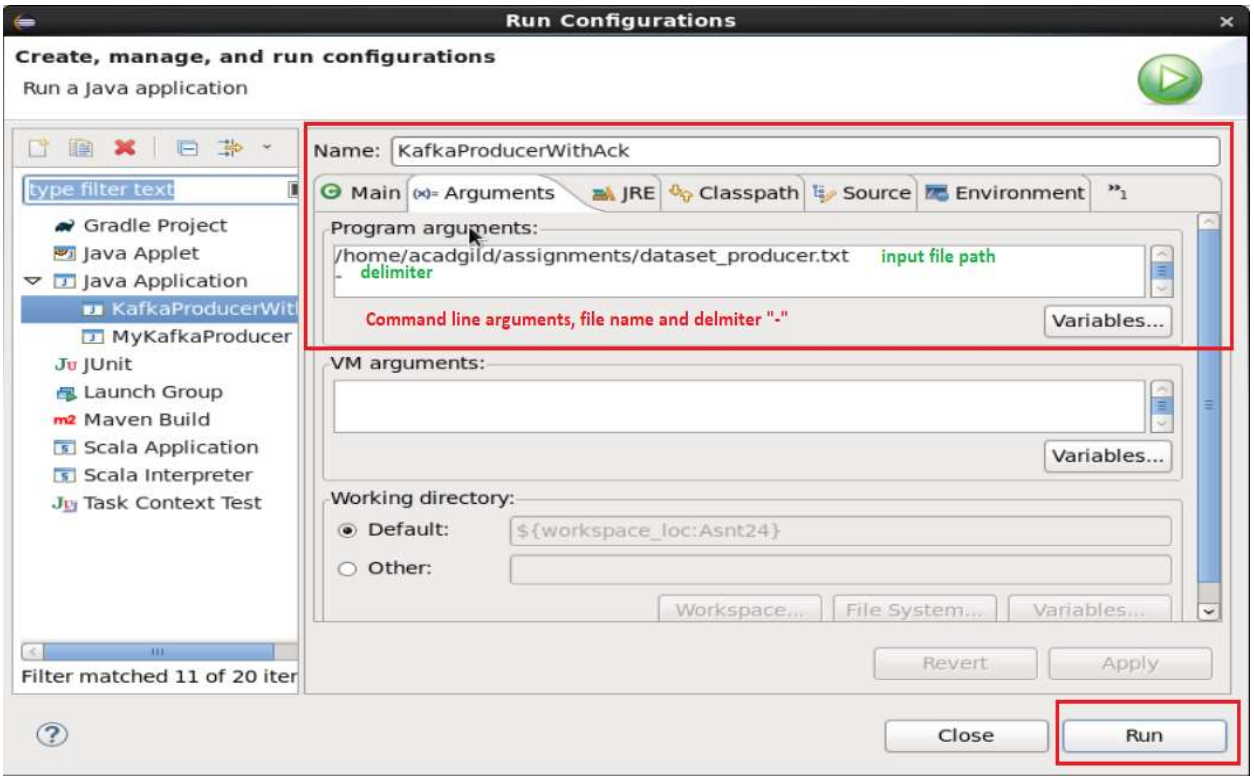
- **We start zookeeper and kafka server using the below commands:**
  - ## starting zookeeper

    bin/zookeeper-server-start.sh config/zookeeper.properties
  - ## starting kafka server

    bin/kafka-server-start.sh config/server.properties

- Now, we run this program in eclipse, by giving the arguments in "Run Configurations" as shown below:




Run Configurations
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Run a Java application
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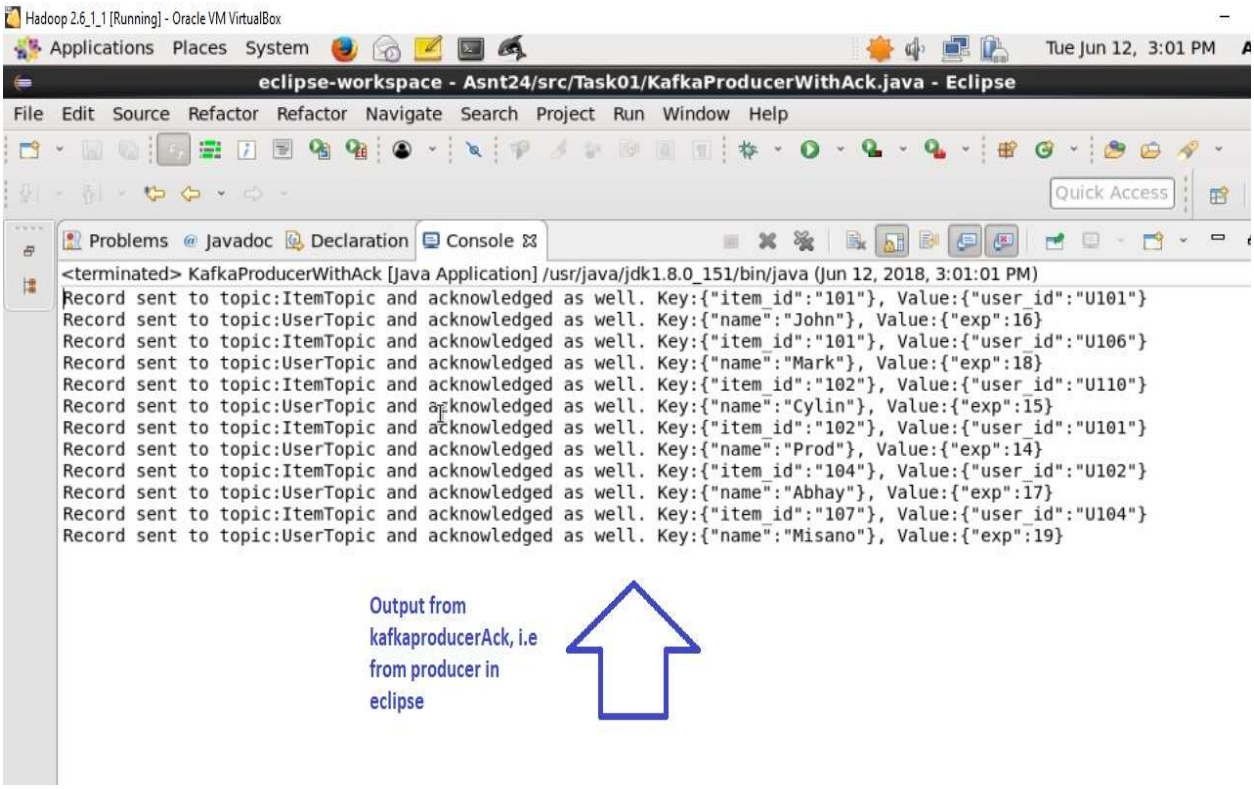
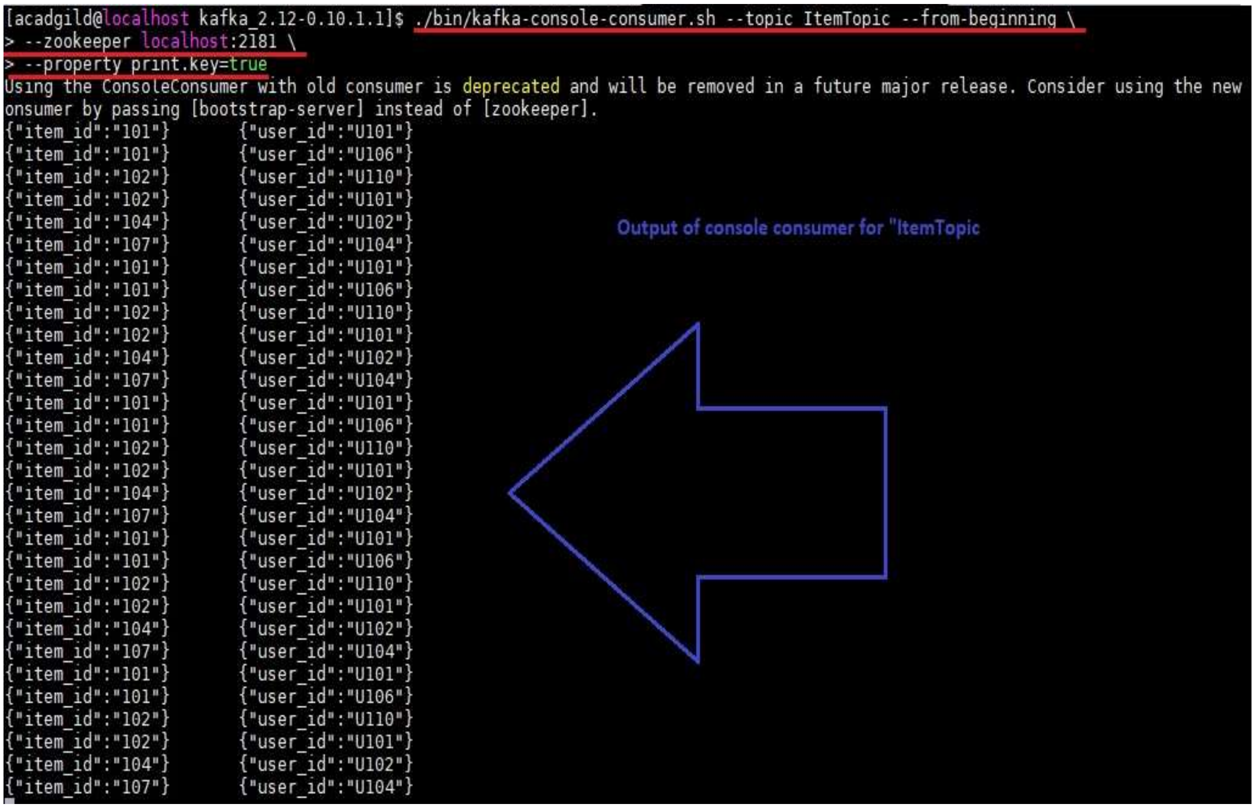
Gradle Project
Java Applet
Java Application
KafkaProducerWit
MyKafkaProducer
JUnit
Launch Group
Maven Build
Scala Application
Scala Interpreter
Task Context Test
Filter matched 11 of 20 iter
Name: KafkaProducerWithAck
Main
Arguments
JRE
Classpath
Source
Environment
Program arguments:
/home/acadgild/assignments/dataset_producer.txt
input file path
- delimiter
Command line arguments, file name and delmiter "-"
Variables...
VM arguments:
Variables...
Working directory:
Default:
${workspace_loc:Asnt24}
Other:
Workspace...
File System...
Variables...
Revert
Apply
Close
Run


Hadoop 2.6_1_1 [Running] - Oracle VM VirtualBox
Applications Places System
Tue Jun 12, 3:01 PM
eclipse-workspace - Asnt24/src/Task01/KafkaProducerWithAck.java - Eclipse
File Edit Source Refactor Refactor Navigate Search Project Run Window Help
Quick Access
Problems Javadoc Declaration Console
<terminated> KafkaProducerWithAck [Java Application] /usr/java/jdk1.8.0_151/bin/java (Jun 12, 2018, 3:01:01 PM)
Record sent to topic:ItemTopic and acknowledged as well. Key:{"item_id":"101"}, Value:{"user_id":"U101"}
Record sent to topic:UserTopic and acknowledged as well. Key:{"name":"John"}, Value:{"exp":16}
Record sent to topic:ItemTopic and acknowledged as well. Key:{"item_id":"101"}, Value:{"user_id":"U106"}
Record sent to topic:UserTopic and acknowledged as well. Key:{"name":"Mark"}, Value:{"exp":18}
Record sent to topic:ItemTopic and acknowledged as well. Key:{"item_id":"102"}, Value:{"user_id":"U110"}
Record sent to topic:UserTopic and acknowledged as well. Key:{"name":"Cylin"}, Value:{"exp":15}
Record sent to topic:ItemTopic and acknowledged as well. Key:{"item_id":"102"}, Value:{"user_id":"U101"}
Record sent to topic:UserTopic and acknowledged as well. Key:{"name":"Prod"}, Value:{"exp":14}
Record sent to topic:ItemTopic and acknowledged as well. Key:{"item_id":"104"}, Value:{"user_id":"U102"}
Record sent to topic:UserTopic and acknowledged as well. Key:{"name":"Abhay"}, Value:{"exp":17}
Record sent to topic:ItemTopic and acknowledged as well. Key:{"item_id":"107"}, Value:{"user_id":"U104"}
Record sent to topic:UserTopic and acknowledged as well. Key:{"name":"Misano"}, Value:{"exp":19}
Output from kafkaproducerAck, i.e from producer in eclipse

- Now, we run the console consumer commands on terminal to view the output of the program, using the below command:
    - **To read contents of ItemTopic**

```
./bin/kafka-console-consumer.sh --topic ItemTopic --from-beginning \
--zookeeper localhost:2181 --property print.key=true
```



```
[acadgild@localhost kafka_2.12-0.10.1.1]$ ./bin/kafka-console-consumer.sh --topic ItemTopic --from-beginning \
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> --property print.key=true
Using the ConsoleConsumer with old consumer is deprecated and will be removed in a future major release. Consider using the new
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{"item_id":"104"}       {"user_id":"U102"}
{"item_id":"107"}       {"user_id":"U104"}
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{"item_id":"102"}       {"user_id":"U110"}
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{"item_id":"107"}       {"user_id":"U104"}
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{"item_id":"104"}       {"user_id":"U102"}
{"item_id":"107"}       {"user_id":"U104"}
{"item_id":"101"}       {"user_id":"U101"}
{"item_id":"101"}       {"user_id":"U106"}
{"item_id":"102"}       {"user_id":"U110"}
{"item_id":"102"}       {"user_id":"U101"}
{"item_id":"104"}       {"user_id":"U102"}
{"item_id":"107"}       {"user_id":"U104"}
{"item_id":"101"}       {"user_id":"U101"}
{"item_id":"101"}       {"user_id":"U106"}
{"item_id":"102"}       {"user_id":"U110"}
{"item_id":"102"}       {"user_id":"U101"}
{"item_id":"104"}       {"user_id":"U102"}
{"item_id":"107"}       {"user_id":"U104"}
```
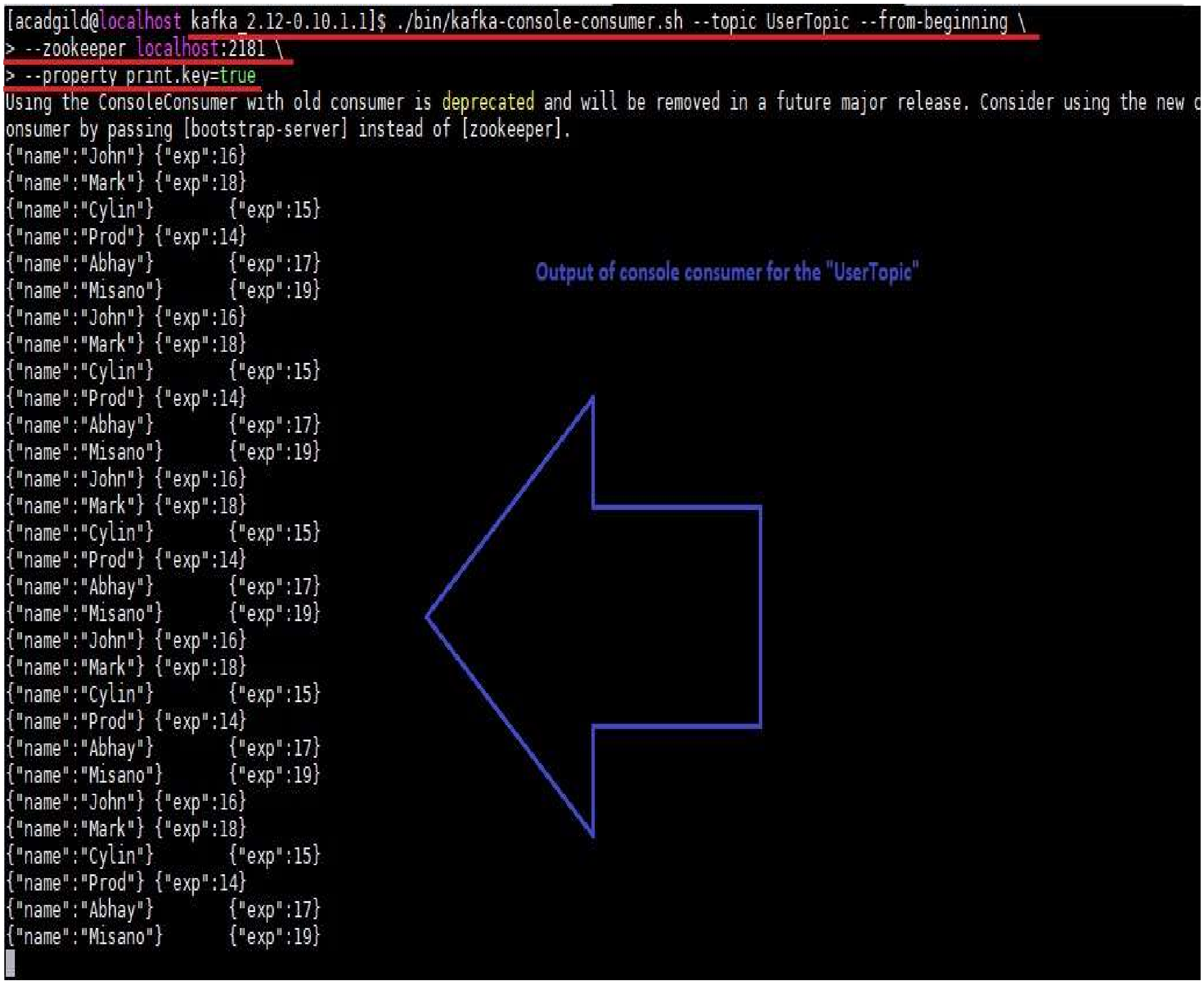

Output of console consumer for "ItemTopic

- **To read contents of UserTopic**

```
./bin/kafka-console-consumer.sh --topic UserTopic --from-beginning \
--zookeeper localhost:2181 \
--property print.key=true
```



```
[acadgild@localhost kafka_2.12-0.10.1.1]$ ./bin/kafka-console-consumer.sh --topic UserTopic --from-beginning \
> --zookeeper localhost:2181 \
> --property print.key=true
Using the ConsoleConsumer with old consumer is deprecated and will be removed in a future major release. Consider using the new c
onsumer by passing [bootstrap-server] instead of [zookeeper].
{"name":"John"} {"exp":16}
{"name":"Mark"} {"exp":18}
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{"name":"Abhay"}        {"exp":17}
{"name":"Misano"}       {"exp":19}
{"name":"John"} {"exp":16}
{"name":"Mark"} {"exp":18}
{"name":"Cylin"}        {"exp":15}
{"name":"Prod"} {"exp":14}
{"name":"Abhay"}        {"exp":17}
{"name":"Misano"}       {"exp":19}
{"name":"John"} {"exp":16}
{"name":"Mark"} {"exp":18}
{"name":"Cylin"}        {"exp":15}
{"name":"Prod"} {"exp":14}
{"name":"Abhay"}        {"exp":17}
{"name":"Misano"}       {"exp":19}
{"name":"John"} {"exp":16}
{"name":"Mark"} {"exp":18}
{"name":"Cylin"}        {"exp":15}
{"name":"Prod"} {"exp":14}
{"name":"Abhay"}        {"exp":17}
{"name":"Misano"}       {"exp":19}
{"name":"John"} {"exp":16}
{"name":"Mark"} {"exp":18}
{"name":"Cylin"}        {"exp":15}
{"name":"Prod"} {"exp":14}
{"name":"Abhay"}        {"exp":17}
{"name":"Misano"}       {"exp":19}
```