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Feature Recipes

Creating Fields

Create a Field with a name and a type

```
Field field = new Field("name", "String")
println field
```

```
name: String
```

Create a Geometry Field with a name and a geometry type and an optional projection

```
Field field = new Field("geom", "Point", "EPSG:4326")
println field
```

```
geom: Point(EPSG:4326)
```

Create a Field with a List of Strings (name, type, projection)

```
Field field = new Field(["geom", "Polygon", "EPSG:4326"])
println field
```

```
geom: Polygon(EPSG:4326)
```

Create a Field from a Map where keys are name, type, proj

```
Field field = new Field([
    "name": "geom",
    "type": "LineString",
    "proj": new Projection("EPSG:4326")
])
println field
```

```
geom: LineString(EPSG:4326)
```

Access a Field's properties

```
Field field = new Field("geom", "Point", "EPSG:4326")
println "Name = ${field.name}"
println "Type = ${field.typ}"
println "Projection = ${field.proj}"
println "Is Geometry = ${field.geometry}"
```

```
Name = geom
Type = Point
Projection = "EPSG:4326"
Is Geometry = true
```

Creating Schemas

Create a Schema from a list of Fields

```
Schema schema = new Schema("cities", [
    new Field("geom", "Point", "EPSG:4326"),
    new Field("id", "Integer"),
    new Field("name", "String")
])
println schema
```

```
cities geom: Point(EPSG:4326), id: Integer, name: String
```

Create a Schema from a list of Lists

```
Schema schema = new Schema("cities", [
    ["geom", "Point", "EPSG:4326"],
    ["id", "Integer"],
    ["name", "String"]
])
println schema
```

```
cities geom: Point(EPSG:4326), id: Integer, name: String
```

Create a Schema from a list of Maps

```
Schema schema = new Schema("cities", [
    [name: "geom", type: "Point", proj: "EPSG:4326"],
    [name: "id", type: "Integer"],
    [name: "name", type: "String"]
])
println schema
```

```
cities geom: Point(EPSG:4326), id: Integer, name: String
```

Create a Schema from a string

```
Schema schema = new Schema("cities", "geom:Point:srid=4326,id:Integer,name:String")
println schema
```

```
cities geom: Point(EPSG:4326), id: Integer, name: String
```

Getting Schema Properties

Get the Schema's name

```
Schema schema = new Schema("cities", [
    new Field("geom", "Point", "EPSG:4326"),
    new Field("id", "Integer"),
    new Field("name", "String")
], "https://github.com/jericks/geoscript-groovy-cookbook")
String name = schema.name
println name
```

```
cities
```

Get the Schema's geometry Field

```
Field geomField = schema.geom
println geomField
```

```
geom: Point(EPSG:4326)
```

Get the Schema's Projection

```
Projection proj = schema.proj  
println proj
```

```
EPSG:4326
```

Get the Schema's URI

```
String uri = schema.uri  
println uri
```

```
https://github.com/jericks/geoscript-groovy-cookbook
```

Get the Schema's specification string

```
String spec = schema.spec  
println spec
```

```
geom:Point:srid=4326,id:Integer,name:String
```

Getting Schema Fields

Get the Schema's Fields

```
Schema schema = new Schema("cities", [  
    new Field("geom", "Point", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
])  
List<Field> fields = schema.fields  
fields.each { Field field ->  
    println field  
}
```

```
geom: Point(EPSG:4326)  
id: Integer  
name: String
```

Get a Field

```
Field nameField = schema.field("name")
println nameField
```

```
name: String
```

Get a Field

```
Field idField = schema.get("id")
println idField
```

```
id: Integer
```

Check if a Schema has a Field

```
boolean hasArea = schema.has("area")
println "Has area Field? ${hasArea}"
```

```
boolean hasGeom = schema.has("geom")
println "Has geom Field? ${hasGeom}"
```

```
false
true
```

Modifying Schemas

Change the projection of a Schema

```
Schema schema = new Schema("cities", [
    new Field("geom", "Point", "EPSG:4326"),
    new Field("id", "Integer"),
    new Field("name", "String")
])
Schema reprojectedSchema = schema.reproject("EPSG:2927", "cities_spws")
```

```
cities_spws geom: Point(EPSG:2927), id: Integer, name: String
```

Change the geometry type of a Schema

```
Schema schema = new Schema("cities", [  
    new Field("geom", "Point", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
])  
Schema polygonSchema = schema.changeGeometryType("Polygon", "cities_buffer")
```

```
cities_buffer geom: Polygon(EPSG:4326), id: Integer, name: String
```

Change a Field definition of a Schema

```
Schema schema = new Schema("cities", [  
    new Field("geom", "Point", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
])  
Schema guidSchema = schema.changeField(schema.field('id'), new Field('guid', 'String'),  
    'cities_guid')
```

```
cities_guid geom: Point(EPSG:4326), guid: String, name: String
```

Change Field definitions of a Schema

```
Schema schema = new Schema("cities", [  
    new Field("geom", "Point", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
])  
Schema updatedSchema = schema.changeFields(  
    [  
        (schema.field('id')) : new Field('guid', 'String'),  
        (schema.field('name')) : new Field('description', 'String')  
    ], 'cities_updated')
```

```
cities_updated geom: Point(EPSG:4326), guid: String, description: String
```

Add a Field to a Schema

```
Schema schema = new Schema("countries", [  
    new Field("geom", "Polygon", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
])  
Schema updatedSchema = schema.addField(new Field("area", "Double"), "countries_area")
```

countries_area geom: Polygon(EPSG:4326), id: Integer, name: String, area: Double

Add a List of Fields to a Schema

```
Schema schema = new Schema("countries", [  
    new Field("geom", "Polygon", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
])  
Schema updatedSchema = schema.addFields([  
    new Field("area", "Double"),  
    new Field("perimeter", "Double"),  
], "countries_areaperimeter")
```

countries_areaperimeter geom: Polygon(EPSG:4326), id: Integer, name: String, area: Double, perimeter: Double

Remove a Field from a Schema

```
Schema schema = new Schema("countries", [  
    new Field("geom", "Polygon", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String"),  
    new Field("area", "Double")  
])  
Schema updatedSchema = schema.removeField(schema.field("area"), "countries_updated")
```

countries_updated geom: Polygon(EPSG:4326), id: Integer, name: String

Remove a List of Fields from a Schema

```
Schema schema = new Schema("countries", [  
    new Field("geom", "Polygon", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String"),  
    new Field("area", "Double")  
])  
Schema updatedSchema = schema.removeFields([  
    schema.field("area"),  
    schema.field("name")  
], "countries_updated")
```

```
countries_updated geom: Polygon(EPSG:4326), id: Integer
```

Create a new Schema from an existing Schema but only including a subset of Fields

```
Schema schema = new Schema("countries", [  
    new Field("geom", "Polygon", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String"),  
    new Field("area", "Double")  
])  
Schema updatedSchema = schema.removeFields([  
    schema.field("area"),  
    schema.field("name")  
], "countries_updated")
```

```
countries_updated geom: Polygon(EPSG:4326), name: String
```

Combining Schemas

Combining two Schemas results in a Map with two values: schema and fields. The schema property contains the new Schema. The fields property is List of two Maps which both contain a mapping between the fields of the original Schema and the newly created Schema.

Optional arguments to the Schema.addSchema method are:

- postfixAll: Whether to postfix all field names (true) or not (false). If true, all Fields from the this current Schema will have '1' at the end of their name while the other Schema's Fields will have '2'. Defaults to false.
- includeDuplicates: Whether or not to include duplicate fields names. Defaults to false. If a duplicate is found a '2' will be added.
- maxFieldNameLength: The maximum new Field name length (mostly to support shapefiles where Field names can't be longer than 10 characters)

- firstPostfix: The postfix string (default is '1') for Fields from the current Schema. Only applicable when postfixAll or includeDuplicates is true.
- secondPostfix: The postfix string (default is '2') for Fields from the other Schema. Only applicable when postfixAll or includeDuplicates is true.

Combine two Schemas with no duplicate fields and no postfixes to field names

```
Schema shopSchema = new Schema("shops", [
    new Field("geom", "Point", "EPSG:4326"),
    new Field("id", "Integer"),
    new Field("name", "String")
])

Schema cafeSchema = new Schema("cafes", [
    new Field("geom", "Point", "EPSG:4326"),
    new Field("id", "Integer"),
    new Field("name", "String"),
    new Field("address", "String")
])

Map result = shopSchema.addSchema(cafeSchema, "business")

Schema combinedSchema = result.schema
println combinedSchema
```

```
business geom: Point(EPSG:4326), id: Integer, name: String, address: String
```

```
Map<String,String> shopSchemaFieldMapping = result.fields[0]
println shopSchemaFieldMapping
```

```
[geom:geom, id:id, name:name]
```

```
Map<String,String> cafeSchemaSchemaFieldMapping = result.fields[1]
println cafeSchemaSchemaFieldMapping
```

```
[address:address]
```

```
Schema shopSchema = new Schema("shops", [  
    new Field("geom", "Point", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
])  
  
Schema cafeSchema = new Schema("cafes", [  
    new Field("geom", "Point", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String"),  
    new Field("address", "String")  
])  
  
Map result = shopSchema.addSchema(cafeSchema, "business", postfixAll: true,  
includeDuplicates: false)  
  
Schema combinedSchema = result.schema  
println combinedSchema
```

```
business geom: Point(EPSG:4326), id1: Integer, name1: String, id2: Integer, name2:  
String, address2: String
```

```
Map<String,String> shopSchemaFieldMapping = result.fields[0]  
println shopSchemaFieldMapping
```

```
[geom:geom, id:id1, name:name1]
```

```
Map<String,String> cafeSchemaSchemaFieldMapping = result.fields[1]  
println cafeSchemaSchemaFieldMapping
```

```
[id:id2, name:name2, address:address2]
```

Creating Features from a Schema

Create a Feature from a Schema with a Map of values

```
Schema schema = new Schema("cities", [
    new Field("geom", "Point", "EPSG:4326"),
    new Field("id", "Integer"),
    new Field("name", "String")
])
Feature feature = schema.feature([
    id: 1,
    name: 'Seattle',
    geom: new Point( -122.3204, 47.6024)
], "city.1")
println feature
```

```
cities.city.1 geom: POINT (-122.3204 47.6024), id: 1, name: Seattle
```

Create a Feature from a Schema with a List of values. The order of the values must match the order of the Fields.

```
Schema schema = new Schema("cities", [
    new Field("geom", "Point", "EPSG:4326"),
    new Field("id", "Integer"),
    new Field("name", "String")
])
Feature feature = schema.feature([
    new Point( -122.3204, 47.6024),
    1,
    'Seattle'
], "city.1")
println feature
```

```
cities.city.1 geom: POINT (-122.3204 47.6024), id: 1, name: Seattle
```

Create a Feature from a Schema with another Feature.

```
Schema schema = new Schema("cities", [  
    new Field("geom", "Point", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
])  
Feature feature1 = new Feature([  
    id: 1,  
    name: 'Seattle',  
    geom: new Point( -122.3204, 47.6024)  
], "city.1", schema)  
println feature1  
Feature feature2 = schema.feature(feature1)  
println feature2
```

```
cities.city.1 geom: POINT (-122.3204 47.6024), id: 1, name: Seattle  
cities.city.1 geom: POINT (-122.3204 47.6024), id: 1, name: Seattle
```

Create an empty Feature from a Schema.

```
Schema schema = new Schema("cities", [  
    new Field("geom", "Point", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
])  
Feature feature = schema.feature()  
println feature
```

```
cities.fid-47d5d92c_159eb7b7bad_-7ffe geom: null, id: null, name: null
```

Creating Features

Create an empty Feature from a Map of values and a Schema.

```
Schema schema = new Schema("cities", [  
    new Field("geom", "Point", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
])  
Feature feature = new Feature([  
    id: 1,  
    name: "Seattle",  
    geom: new Point(-122.3204, 47.6024)  
], "city.1", schema)  
println feature
```

```
cities.city.1 geom: POINT (-122.3204 47.6024), id: 1, name: Seattle
```

Create an empty Feature from a List of values and a Schema.

```
Schema schema = new Schema("cities", [  
    new Field("geom", "Point", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
])  
Feature feature = new Feature([  
    new Point(-122.3204, 47.6024),  
    1,  
    "Seattle"  
], "city.1", schema)  
println feature
```

```
cities.city.1 geom: POINT (-122.3204 47.6024), id: 1, name: Seattle
```

Create an empty Feature from a Map of values. The Schema is inferred from the values.

```
Feature feature = new Feature([  
    id: 1,  
    name: "Seattle",  
    geom: new Point(-122.3204, 47.6024)  
], "city.1")  
println feature
```

```
feature.city.1 id: 1, name: Seattle, geom: POINT (-122.3204 47.6024)
```

Getting Feature Properties

Get a Feature's ID

```
Schema schema = new Schema("cities", [  
    new Field("geom", "Point", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
])  
Feature feature = new Feature([  
    new Point(-122.3204, 47.6024),  
    1,  
    "Seattle"  
], "city.1", schema)  
  
String id = feature.id  
println id
```

city.1

Get a Feature's Geometry

```
Geometry geometry = feature.geom  
println geometry
```

POINT (-122.3204 47.6024)

Get a Feature's Bounds

```
Bounds bounds = feature.bounds  
println bounds
```

(-122.3204,47.6024,-122.3204,47.6024,EPSG:4326)

Get a Feature's attributes

```
Map attributes = feature.attributes  
println attributes
```

[geom:POINT (-122.3204 47.6024), id:1, name:Seattle]

Getting Feature Attributes

Get an attribute from a Feature using a Field name

```
Schema schema = new Schema("cities", [  
    new Field("geom", "Point", "EPSG:4326"),  
    new Field("id", "Integer"),  
    new Field("name", "String")  
])  
Feature feature = new Feature([  
    new Point(-122.3204, 47.6024),  
    1,  
    "Seattle"  
], "city.1", schema)  
  
int id = feature.get("id")  
println id
```

1

Get an attribute from a Feature using a Field

```
String name = feature.get(schema.field("name"))  
println name
```

Seattle

Set an attribute of a Feature using a Field name and a new value

```
feature.set("name", "Tacoma")  
println feature["name"]
```

Tacoma

Set an attribute of a Feature using a Field and a new value

```
feature.set(schema.field("name"), "Mercer Island")  
println feature["name"]
```

Mercer Island

Set attributes of a Feature using a Map of new values

```
feature.set([id: 2])
println feature["id"]
```

2

Set a new Geometry value

```
feature.geom = new Point(-122.2220, 47.5673)
println feature.geom
```

POINT (-122.222 47.5673)

Reading and Writing Features

GeoJSON

Get a GeoJSON String from a Feature

```
Schema schema = new Schema("cities", [
    new Field("geom", "Point", "EPSG:4326"),
    new Field("id", "Integer"),
    new Field("name", "String")
])
Feature feature = new Feature([
    new Point(-122.3204, 47.6024),
    1,
    "Seattle"
], "city.1", schema)

String geojson = feature.geoJSON
println geojson
```

```
{"type":"Feature","geometry":{"type":"Point","coordinates":[-
122.3204,47.6024]},"properties":{"id":1,"name":"Seattle"},"id":"city.1"}
```

Write a Feature to GeoJSON

```
Schema schema = new Schema("cities", [
    new Field("geom", "Point", "EPSG:4326"),
    new Field("id", "Integer"),
    new Field("name", "String")
])
Feature feature = new Feature([
    new Point(-122.3204, 47.6024),
    1,
    "Seattle"
], "city.1", schema)

GeoJSONWriter writer = new GeoJSONWriter()
String geojson = writer.write(feature)
println geojson
```

```
{"type":"Feature","geometry":{"type":"Point","coordinates":[-122.3204,47.6024]},
"properties":{"id":1,"name":"Seattle"},"id":"city.1"}
```

Get a Feature from GeoJSON

```
String geojson = '{"type":"Feature","geometry":{"type":"Point","coordinates":[-122.3204,47.6024]},
"properties":{"id":1,"name":"Seattle"},"id":"city.1"}'
Feature feature = Feature.fromGeoJSON(geojson)
println feature
```

```
feature.city.1 id: 1, name: Seattle, geometry: POINT (-122.3204 47.6024)
```

Read a Feature from GeoJSON

```
GeoJSONReader reader = new GeoJSONReader()
String geojson = '{"type":"Feature","geometry":{"type":"Point","coordinates":[-122.3204,47.6024]},
"properties":{"id":1,"name":"Seattle"},"id":"city.1"}'
Feature feature = reader.read(geojson)
println feature
```

```
feature.city.1 id: 1, name: Seattle, geometry: POINT (-122.3204 47.6024)
```

GeoBuf

Get a GeoBuf String from a Feature

```
Schema schema = new Schema("cities", [
    new Field("geom", "Point", "EPSG:4326"),
    new Field("id", "Integer"),
    new Field("name", "String")
])
Feature feature = new Feature([
    new Point(-122.3204, 47.6024),
    1,
    "Seattle"
], "city.1", schema)

String geobuf = feature.geobuf
println geobuf
```

```
0a0269640a046e616d65100218062a1d0a0c08001a089fd8d374c0ebb22d6a0218016a090a075365617474
6c65
```

Get a Feature from a GeoBuf String

```
String geobuf =
'0a0269640a046e616d65100218062a1d0a0c08001a089fd8d374c0ebb22d6a0218016a090a075365617474
46c65'
Feature feature = Feature.fromGeobuf(geobuf)
println feature
```

```
features.0 geom: POINT (-122.3204 47.6024), id: 1, name: Seattle
```

Write a Feature to a GeoBuf String

```
Schema schema = new Schema("cities", [
    new Field("geom", "Point", "EPSG:4326"),
    new Field("id", "Integer"),
    new Field("name", "String")
])
Feature feature = new Feature([
    new Point(-122.3204, 47.6024),
    1,
    "Seattle"
], "city.1", schema)

GeobufWriter writer = new GeobufWriter()
String geobuf = writer.write(feature)
println geobuf
```

```
0a0269640a046e616d65100218062a1d0a0c08001a089fd8d374c0ebb22d6a0218016a090a0753656174746c65
```

Read a Feature from a GeoBuf String

```
GeobufReader reader = new GeobufReader()
String geobuf =
'0a0269640a046e616d65100218062a1d0a0c08001a089fd8d374c0ebb22d6a0218016a090a0753656174746c65'
Feature feature = reader.read(geobuf)
println feature
```

```
features.0 geom: POINT (-122.3204 47.6024), id: 1, name: Seattle
```

GeoRSS

Get a GeoRSS String from a Feature

```
Schema schema = new Schema("cities", [
    new Field("geom", "Point", "EPSG:4326"),
    new Field("id", "Integer"),
    new Field("name", "String")
])
Feature feature = new Feature([
    new Point(-122.3204, 47.6024),
    1,
    "Seattle"
], "city.1", schema)

String georss = feature.geoRSS
println georss
```

```
<entry xmlns:georss='http://www.georss.org/georss'
xmlns='http://www.w3.org/2005/Atom'><title>city.1</title><summary>[geom:POINT (-
122.3204 47.6024), id:1, name:Seattle]</summary><updated>Sun Jan 29 18:27:35 UTC
2017</updated><georss:point>47.6024 -122.3204</georss:point></entry>
```

Get a Feature from a GeoRSS String

```
String georss = "<entry xmlns:georss='http://www.georss.org/georss'
xmlns='http://www.w3.org/2005/Atom'>
  <title>city.1</title>
  <summary>[geom:POINT (-122.3204 47.6024), id:1, name:Seattle]</summary>
  <updated>Sat Jan 28 15:51:47 PST 2017</updated>
  <georss:point>47.6024 -122.3204</georss:point>
</entry>
\"

Feature feature = Feature.fromGeoRSS(georss)
println feature
```

```
georss.fid-47d5d92c_159eb7b7bad_-8000 title: city.1, summary: [geom:POINT (-122.3204
47.6024), id:1, name:Seattle], updated: Sat Jan 28 15:51:47 PST 2017, geom: POINT (-
122.3204 47.6024)
```

Write a Feature to a GeoRSS String

```
Schema schema = new Schema("cities", [
  new Field("geom", "Point", "EPSG:4326"),
  new Field("id", "Integer"),
  new Field("name", "String")
])
Feature feature = new Feature([
  new Point(-122.3204, 47.6024),
  1,
  "Seattle"
], "city.1", schema)

GeoRSSWriter writer = new GeoRSSWriter()
String georss = writer.write(feature)
println georss
```

```
<entry xmlns:georss='http://www.georss.org/georss'
xmlns='http://www.w3.org/2005/Atom'><title>city.1</title><summary>[geom:POINT (-
122.3204 47.6024), id:1, name:Seattle]</summary><updated>Sun Jan 29 18:27:35 UTC
2017</updated><georss:point>47.6024 -122.3204</georss:point></entry>
```

Read a Feature from a GeoRSS String

```
GeoRSSReader reader = new GeoRSSReader()
String georss = """<entry xmlns:georss='http://www.georss.org/georss'
xmlns='http://www.w3.org/2005/Atom'>
  <title>city.1</title>
  <summary>[geom:POINT (-122.3204 47.6024), id:1, name:Seattle]</summary>
  <updated>Sat Jan 28 15:51:47 PST 2017</updated>
  <georss:point>47.6024 -122.3204</georss:point>
</entry>
"""

Feature feature = reader.read(georss)
println feature
```

```
georss.fid-47d5d92c_159eb7b7bad_-7fff title: city.1, summary: [geom:POINT (-122.3204
47.6024), id:1, name:Seattle], updated: Sat Jan 28 15:51:47 PST 2017, geom: POINT (-
122.3204 47.6024)
```