Crea un espacio dentro del repositorio de GitHub que creaste para el portafolio de implementación (por ejemplo, una carpeta para el módulo de ML con una subcarpeta para este entregable).

Selecciona uno de los dos primeros 'Challenge' vistos en clase (Week01_Challenge.pdf o Week02_Challenge1.pdf) y programa un algoritmo que permita resolver el problema. Dicho algoritmo debe ser uno de los algoritmos vistos en el módulo (o que tu profesor de módulo autorice), y no puedes usar ninguna biblioteca o framework de aprendizaje máquina, ni de estadística avanzada. Lo que se busca es que implementes manualmente el algoritmo, no que importes un algoritmo ya implementado.

In [ ]:
```
#Importaremos las librerias para poder leer el documento
import pandas as pd
import numpy as np

#Haremos uso del primer Challenge, el cual contiene una base de datos llamac
#paso, importaremos este dataset y le asignaremos una variable

dataset = pd.read_csv('Valhalla23.csv')


#Ahora dividiremos el dataset en dos partes, usando 70% de los datos para nu
v70 = int(0.7 * len(dataset))
v = dataset[:v70]
v_test = dataset[v70:]

#Ahora asignaremos una variable para cada columna, de esta manera sera mas f
X = v['Celsius']
y = v['Valks']
```

Divide el set de datos del problema en dos subconjuntos, uno para entrenamiento y otro para prueba. Entrena tu modelo sobre el primer subconjunto, y por un mínimo de 100 iteraciones. Selecciona valores para la tasa de aprendizaje y para los parámetros iniciales, según tu criterio.

In [ ]:
```
#Dividir los datos en conjuntos, uno de test y uno de train para facilitar s
mitad = len(X) // 2
```

```
x_train = X[:mitad]   # Primera mitad para entrenamiento
x_test = X[mitad:]    # Segunda mitad para prueba
y_train = y[:mitad]
y_test = y[mitad:]

#Asignamos valores para ambos tethas y alpha

#Para tetha asignaremos valores de 1 para tener valores regulares como punto
tetha0 = 1
tetha1 = 1

#Asignaremos un alpha de 0.0001 para tener un aprendizaje lento pero mas seg
#la calidad de los datos
alpha = 0.0001

#Asignamos una variable que indique el numero de iteraciones
num_iteraciones = 150000

#Declaramos la funcion de hipotesis
htetha = lambda tetha0, tetha1, x: tetha0 + (tetha1 * x)

#Calcular el total de muestras en el conjunto de prueba (n)
n = len(x_train)

#Creamos dos variables para poder ir almacenando las iteraciones
theta0_values = []
theta1_values = []
#Iterar el proceso de ajuste de theta0 y theta1
for i in range(num_iteraciones):
    #Calcular la hipótesis
    h0 = htetha(tetha0, tetha1, x_train)

    #Calcular los errores para theta0
    delta0 = np.subtract(h0, y_train)
    delta0t = np.sum(delta0)

    #Actualizar theta0
    tetha0 = tetha0 - alpha * (delta0t/n)

    #Calcular los errores para theta1
    deltax = np.multiply(delta0, x_train)
    deltaxt = np.sum(deltax)

    #Actualizar theta1
    tetha1 = tetha1 - alpha * (deltaxt/n)
    theta0_values.append(tetha0)
    theta1_values.append(tetha1)

print(tetha0)
print(tetha1)
```

```
50.31919204538233
-2.9853878603624766
```

Prueba tu implementación. Para ello, utiliza el modelo entrenado para hacer predecir las salidas del subconjunto de prueba, y compara contra los datos reales en una gráfica.

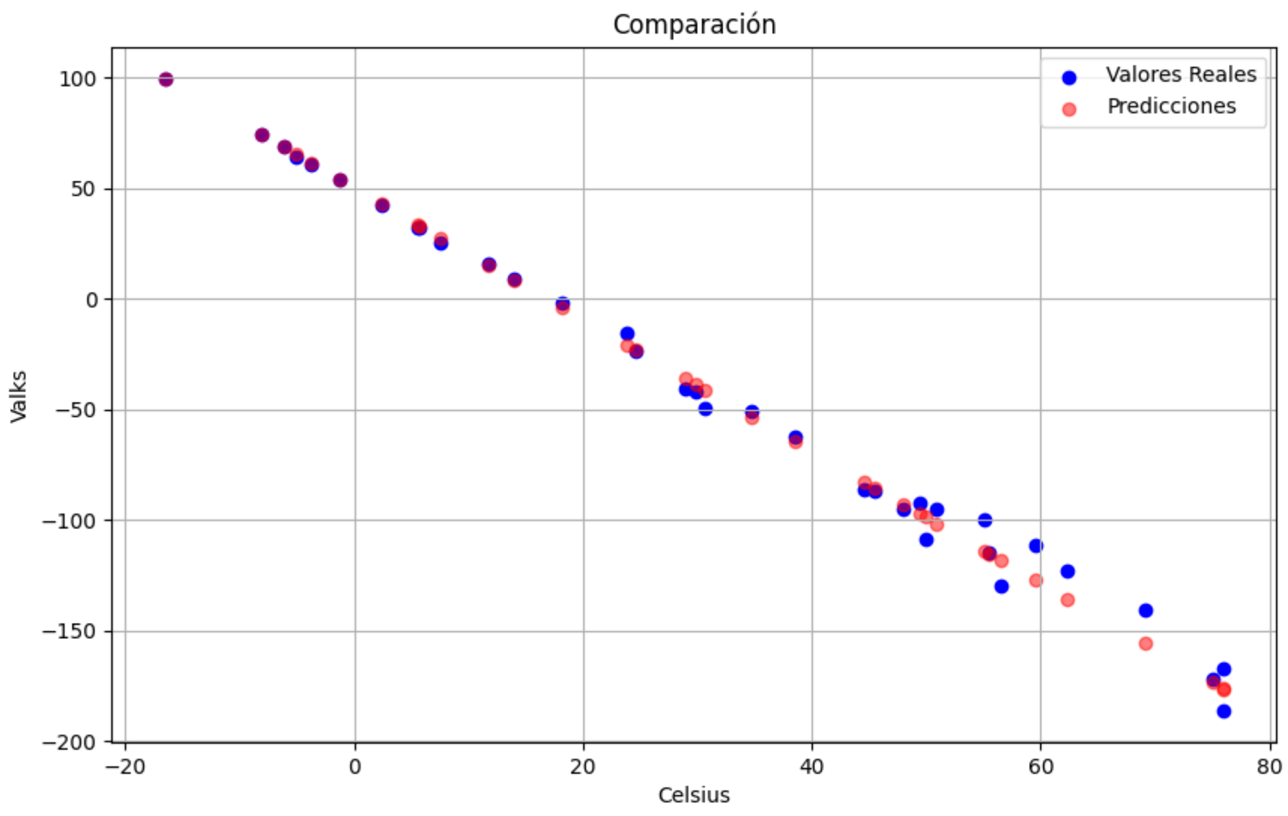
In [ ]:
```
#Importamos la libreria de matplotlib para poder hacer la grafica
import matplotlib.pyplot as plt

#Utilizamos el modelo entrenado para hacer predicciones
y_pred = htetha(tetha0, tetha1, x_test)

#Imprimir los valores finales de theta0 y theta1
print("Valor final de theta0:")
print(tetha0)
print("Valor final de theta1: ")
print(tetha1)

plt.figure(figsize=(10, 6))
plt.scatter(x_test, y_test, color='blue', label='Valores Reales', marker='o'
plt.scatter(x_test, y_pred, color='red', label='Predicciones', marker='o', a
plt.xlabel('Celsius')
plt.ylabel('Valks')
plt.title('Comparación')
plt.legend()
plt.grid(True)
```

```
Valor final de theta0:
50.31919204538233
Valor final de theta1:
-2.9853878603624766
```



Calcula el valor de la función de costo para el subconjunto de entrenamiento, y para el subconjunto de prueba.

In [ ]:

```
#Valores de test y train
y_pred_train = htetha(tetha0, tetha1, x_train)
y_pred_test = htetha(tetha0, tetha1, x_test)

#Calcular la funcion de costo para train
mse_train = np.mean((y_train - y_pred_train) ** 2)

#Calcular la función de costo para  test
mse_test = np.mean((y_test - y_pred_test) ** 2)

print("Costo de entrenamiento:")
print(mse_train)

print("\nCosto de prueba:")
print(mse_test)
```

```
Costo de entrenamiento:
40.057650053697856

Costo de prueba:
43.23056712805323
```

Para facilitar la revisión, entrega dos archivos. El primero debe ser un Jupyter Notebook con todo el desarrollo (código comentado). El segundo debe ser un PDF del Jupyter Notebook. Para esto último, utiliza el comando nbconvert --to html para exportar el notebook a HTML y poder guardar el PDF más fácilmente (https://github.com/jupyter/nbconvert). Ten en cuenta que debes cargar tu directorio de Drive y dar la ruta al archivo, por lo que el comando completo sería:

!jupyter nbconvert --to html /content/drive/MyDrive/ColabNotebooks/archivo.ipynb

In [ ]:
```
!jupyter nbconvert --to html '/content/drive/MyDrive/ColabNotebooks/Varhalla
```

```
[NbConvertApp] WARNING | pattern '/content/drive/MyDrive/ColabNotebooks/Varh
alla1.ipynb' matched no files
This application is used to convert notebook files (*.ipynb)
        to various other formats.

        WARNING: THE COMMANDLINE INTERFACE MAY CHANGE IN FUTURE RELEASES.

Options
=======
The options below are convenience aliases to configurable class-options,
as listed in the "Equivalent to" description-line of the aliases.
To see all configurable class-options for some <cmd>, use:
    <cmd> --help-all

--debug
    set log level to logging.DEBUG (maximize logging output)
    Equivalent to: [--Application.log_level=10]
--show-config
    Show the application's configuration (human-readable format)
    Equivalent to: [--Application.show_config=True]
--show-config-json
    Show the application's configuration (json format)
    Equivalent to: [--Application.show_config_json=True]
--generate-config
    generate default config file
    Equivalent to: [--JupyterApp.generate_config=True]
-y
    Answer yes to any questions instead of prompting.
    Equivalent to: [--JupyterApp.answer_yes=True]
--execute
    Execute the notebook prior to export.
    Equivalent to: [--ExecutePreprocessor.enabled=True]
--allow-errors
    Continue notebook execution even if one of the cells throws an error and
include the error message in the cell output (the default behaviour is to ab
ort conversion). This flag is only relevant if '--execute' was specified, to
o.
    Equivalent to: [--ExecutePreprocessor.allow_errors=True]
--stdin
    read a single notebook file from stdin. Write the resulting notebook wit
h default basename 'notebook.*'
    Equivalent to: [--NbConvertApp.from_stdin=True]
--stdout
    Write notebook output to stdout instead of files.
    Equivalent to: [--NbConvertApp.writer_class=StdoutWriter]
--inplace
    Run nbconvert in place, overwriting the existing notebook (only
            relevant when converting to notebook format)
    Equivalent to: [--NbConvertApp.use_output_suffix=False --NbConvertApp.ex
port_format=notebook --FilesWriter.build_directory=]
--clear-output
    Clear output of current file and save in place,
            overwriting the existing notebook.
    Equivalent to: [--NbConvertApp.use_output_suffix=False --NbConvertApp.ex
port_format=notebook --FilesWriter.build_directory= --ClearOutputPreprocesso
r.enabled=True]
--no-prompt
    Exclude input and output prompts from converted document.
    Equivalent to: [--TemplateExporter.exclude_input_prompt=True --TemplateE
xporter.exclude_output_prompt=True]
--no-input
    Exclude input cells and output prompts from converted document.
            This mode is ideal for generating code-free reports.
    Equivalent to: [--TemplateExporter.exclude_output_prompt=True --Template
Exporter.exclude_input=True --TemplateExporter.exclude_input_prompt=True]
--allow-chromium-download
    Whether to allow downloading chromium if no suitable version is found on
the system.
    Equivalent to: [--WebPDFExporter.allow_chromium_download=True]
--disable-chromium-sandbox
    Disable chromium security sandbox when converting to PDF..
    Equivalent to: [--WebPDFExporter.disable_sandbox=True]
--show-input
    Shows code input. This flag is only useful for dejavu users.
    Equivalent to: [--TemplateExporter.exclude_input=False]
--embed-images
    Embed the images as base64 dataurls in the output. This flag is only use
ful for the HTML/WebPDF/Slides exports.
    Equivalent to: [--HTMLExporter.embed_images=True]
--sanitize-html
    Whether the HTML in Markdown cells and cell outputs should be sanitize
d..
    Equivalent to: [--HTMLExporter.sanitize_html=True]
--log-level=<Enum>
    Set the log level by value or name.
    Choices: any of [0, 10, 20, 30, 40, 50, 'DEBUG', 'INFO', 'WARN', 'ERRO
R', 'CRITICAL']
    Default: 30
    Equivalent to: [--Application.log_level]
--config=<Unicode>
    Full path of a config file.
    Default: ''
    Equivalent to: [--JupyterApp.config_file]
--to=<Unicode>
    The export format to be used, either one of the built-in formats
            ['asciidoc', 'custom', 'html', 'latex', 'markdown', 'notebook',
'pdf', 'python', 'rst', 'script', 'slides', 'webpdf']
            or a dotted object name that represents the import path for an
            ``Exporter`` class
    Default: ''
    Equivalent to: [--NbConvertApp.export_format]
--template=<Unicode>
    Name of the template to use
    Default: ''
    Equivalent to: [--TemplateExporter.template_name]
--template-file=<Unicode>
    Name of the template file to use
    Default: None
    Equivalent to: [--TemplateExporter.template_file]
--theme=<Unicode>
    Template specific theme(e.g. the name of a JupyterLab CSS theme distribu
ted
    as prebuilt extension for the lab template)
    Default: 'light'
    Equivalent to: [--HTMLExporter.theme]
--sanitize_html=<Bool>
    Whether the HTML in Markdown cells and cell outputs should be sanitized.
This
    should be set to True by nbviewer or similar tools.
    Default: False
    Equivalent to: [--HTMLExporter.sanitize_html]
--writer=<DottedObjectName>
    Writer class used to write the
                                    results of the conversion
    Default: 'FilesWriter'
    Equivalent to: [--NbConvertApp.writer_class]
--post=<DottedOrNone>
    PostProcessor class used to write the
                                    results of the conversion
    Default: ''
    Equivalent to: [--NbConvertApp.postprocessor_class]
--output=<Unicode>
    overwrite base name use for output files.
                can only be used when converting one notebook at a time.
    Default: ''
    Equivalent to: [--NbConvertApp.output_base]
--output-dir=<Unicode>
    Directory to write output(s) to. Defaults
                                  to output to the directory of each noteboo
k. To recover
                                  previous default behaviour (outputting to
the current
                                  working directory) use . as the flag valu
e.
    Default: ''
    Equivalent to: [--FilesWriter.build_directory]
--reveal-prefix=<Unicode>
    The URL prefix for reveal.js (version 3.x).
            This defaults to the reveal CDN, but can be any url pointing to
a copy
            of reveal.js.
            For speaker notes to work, this must be a relative path to a loc
al
            copy of reveal.js: e.g., "reveal.js".
            If a relative path is given, it must be a subdirectory of the
            current directory (from which the server is run).
            See the usage documentation
            (https://nbconvert.readthedocs.io/en/latest/usage.html#reveal-js
-html-slideshow)
            for more details.
    Default: ''
    Equivalent to: [--SlidesExporter.reveal_url_prefix]
--nbformat=<Enum>
    The nbformat version to write.
            Use this to downgrade notebooks.
    Choices: any of [1, 2, 3, 4]
    Default: 4
    Equivalent to: [--NotebookExporter.nbformat_version]

Examples
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    The simplest way to use nbconvert is

            > jupyter nbconvert mynotebook.ipynb --to html

            Options include ['asciidoc', 'custom', 'html', 'latex', 'markdow
n', 'notebook', 'pdf', 'python', 'rst', 'script', 'slides', 'webpdf'].

            > jupyter nbconvert --to latex mynotebook.ipynb

            Both HTML and LaTeX support multiple output templates. LaTeX inc
ludes
            'base', 'article' and 'report'.  HTML includes 'basic', 'lab' an
d
```

```
                'classic'. You can specify the flavor of the format used.

                > jupyter nbconvert --to html --template lab mynotebook.ipynb

                You can also pipe the output to stdout, rather than a file

                > jupyter nbconvert mynotebook.ipynb --stdout

                PDF is generated via latex

                > jupyter nbconvert mynotebook.ipynb --to pdf

                You can get (and serve) a Reveal.js-powered slideshow

                > jupyter nbconvert myslides.ipynb --to slides --post serve

                Multiple notebooks can be given at the command line in a couple
of
                different ways:

                > jupyter nbconvert notebook*.ipynb
                > jupyter nbconvert notebook1.ipynb notebook2.ipynb

                or you can specify the notebooks list in a config file, containi
ng::

                    c.NbConvertApp.notebooks = ["my_notebook.ipynb"]

                > jupyter nbconvert --config mycfg.py

To see all available configurables, use `--help-all`.
```