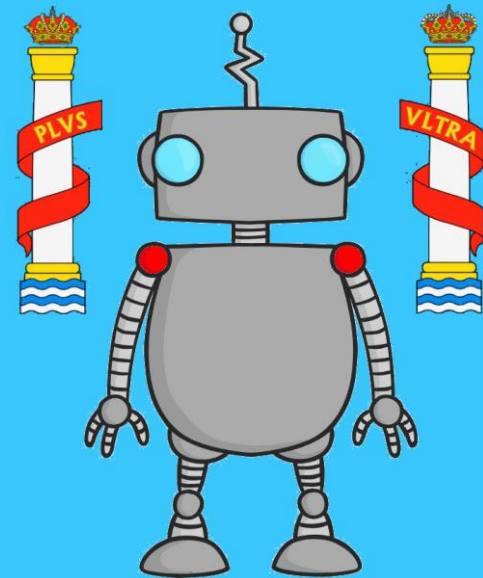
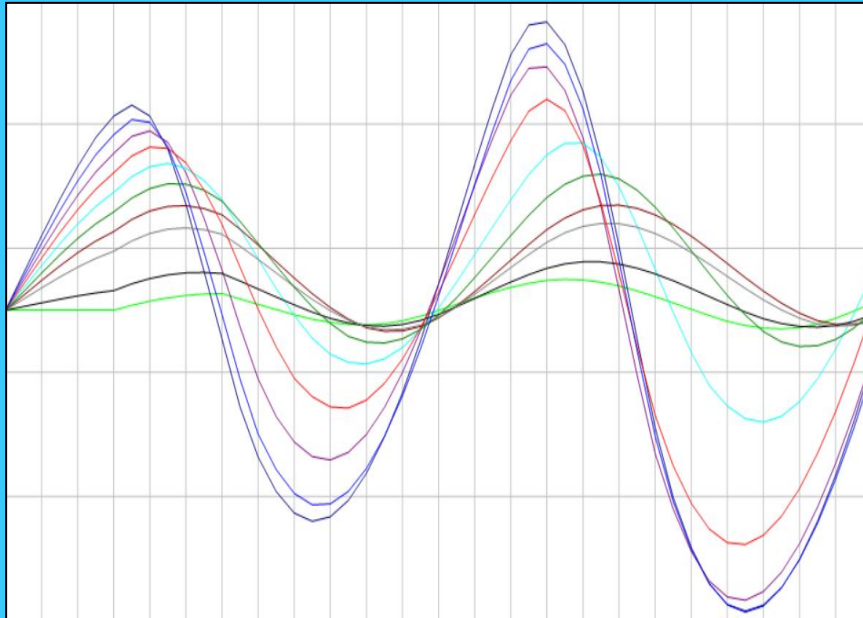


# ChatGPT for Vensim



***Artificial Intelligence in System Dynamics***



Do you need to create a model with Vensim?

There is a very quick way!

Use ChatGPT



# ChatGPT can create a Vensim model from a text that explains the topic being analyzed.

## Data input

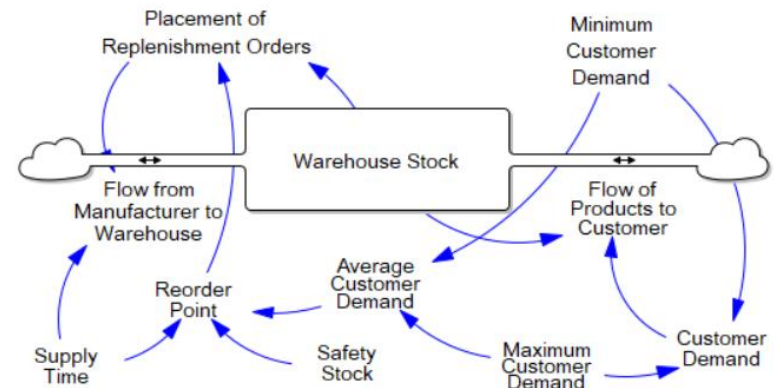
"Draw the flow chart representing the input and output of products from the warehouse of a company that must satisfy the demand of a customer. Do not include back orders since any order not served on time due to stock unavailability (stock out) is lost.

To satisfy demand, orders are placed with a manufacturer in batches of 50 units. It is assumed that the manufacturer's warehouse has an unlimited stock of products. The distributor's warehouse has an initial stock of 50 units and the customer's demand follows a uniform distribution with a minimum of 3 and a maximum of 6 units per day. The supply time from the manufacturer to our warehouse is 2 days. Simulate a period of 100 days.

In summary, we have a distribution warehouse that serves the customer's demand for products, which is supplied by a manufacturer that we will assume has a very large inventory of products so that it is not necessary to model a manufacturing process.

The replenishment order sent from the distributor to the manufacturer is a function of customer demand, the manufacturer's supply time (i.e. the time it takes for the manufacturer to receive an order and for it to reach our warehouse) and a certain safety stock that is used to cover the customer's demand during the manufacturer's supply time, avoiding stock-outs. Replenishment orders from the distributor's warehouse to the manufacturer are placed in batches of 50 units"

## Results



# So easy? How do you do it?

1. Write the topic to be analyzed in a document.

"Draw the flow chart representing the input and output of products from the warehouse of a company that must satisfy the demand of a customer. Do not include back orders since any order not served on time due to stock unavailability (stock out) is lost.

To satisfy demand, orders are placed with a manufacturer in batches of 50 units. It is assumed that the manufacturer's warehouse has an unlimited stock of products. The distributor's warehouse has an initial stock of 50 units and the customer's demand follows a uniform distribution with a minimum of 3 and a maximum of 6 units per day. The supply time from the manufacturer to our warehouse is 2 days. Simulate a period of 100 days.

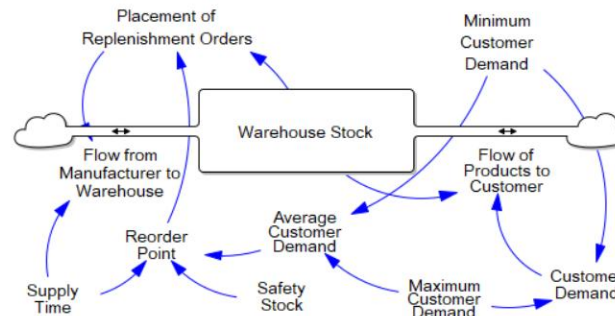
In summary, we have a distribution warehouse that serves the customer's demand for products, which is supplied by a manufacturer that we will assume has a very large inventory of products so that it is not necessary to model a manufacturing process.

The replenishment order sent from the distributor to the manufacturer is a function of customer demand, the manufacturer's supply time (i.e. the time it takes for the manufacturer to receive an order and for it to reach our warehouse) and a certain safety stock that is used to cover the customer's demand during the manufacturer's supply time, avoiding stock-outs. Replenishment orders from the distributor's warehouse to the manufacturer are placed in batches of 50 units"

2. Open ChatGPT, write and run a query (prompt), attaching the document.

3. Copy the result to a txt file, save it as an MDL file.

4. Open the MDL file with Vensim, and simulate.



# What does ChatGPT do?

ChatGPT creates an mdl file,  
which has a structure divided into four parts:

```
{UTF-8}  
Existencias =INTEG(  
Produccion - Envios,  
4000 )  
~ |  
Pedidos promedio =INTEG(  
(Pedidos - Pedidos promedio)/8,  
1000 )  
~ |  
Plantilla =INTEG(  
Contratacion - Renuncias,  
50 )  
~ |  
Envios = Pedidos  
~ |  
Renuncias = Plantilla / 50  
~ |  
Contratacion = Renuncias + ( Plantilla deseada -  
~ |  
Produccion = Produccion deseada  
~ |  
Produccion deseada = Envios pronosticados +  
~ |  
Envios pronosticados = Pedidos promedio  
~ |
```

## Part 1. Equations

ChatGPT summarizes and analyzes  
the text, identifies variables, and  
writes equations in Vensim format.

```

*****
.Control
*****
Simulation Control Parameters
|
FINAL TIME = 100
~
Semana
~
The final time for the simulation.
|
INITIAL TIME = 0
~
Semana
~
The initial time for the simulation.
|
SAVEPER =
TIME STEP
~
Semana [0,?]
~
The frequency with which output is stored.
|
TIME STEP = 1
~
Semana [0,?]
~
The time step for the simulation.
|

```

## Part 2. Parameters

ChatGPT writes temporary parameters, based on text, in Vensim format.

```

\\--// Sketch information - do not modify
V300 Do not put anything below this section
*View 1
$-1--1--1,0,|22||-1--1--1|-1--1--1|-1--1--1|
10,1,Existencias,271,155,90,35,3,3,0,0,-1,0,0
12,2,48,67,155,25,15,0,3,0,0,-1,0,0,0,0,0,0
1,3,5,2,68,0,0,22,0,192,0,-1--1--1,,1|(110,15
1,4,5,1,4,0,0,22,0,192,0,-1--1--1,,1|(160,155
11,5,0,134,155,6,8,34,3,0,0,1,0,0,0,0,0,0,0
10,6,Produccion,134,185,42,22,40,3,0,0,-1,0,0
12,7,48,456,132,25,15,0,3,0,0,-1,0,0,0,0,0,0
1,8,10,1,68,0,0,22,0,192,0,-1--1--1,,1|(376,
1,9,10,7,4,0,0,22,0,192,0,-1--1--1,,1|(417,1
11,10,0,398,132,6,8,34,3,0,0,3,0,0,0,0,0,0,0
10,11,Envios,398,103,35,21,40,3,0,0,-1,0,0,0
10,22,Pedidos promedio,265,460,90,35,3,3,0,0
12,23,48,83,459,25,15,0,3,0,0,-1,0,0,0,0,0,0
1,24,26,23,68,0,0,22,0,192,0,-1--1--1,,1|(12
1,25,26,22,4,0,0,22,0,192,0,-1--1--1,,1|(161
11,26,0,141,459,6,8,34,3,0,0,1,0,0,0,0,0,0,0
10,27,FlujoEntradaPedidosPromedio,141,485,47

```

## Part 3. Design the diagram

ChatGPT places the Stocks, Flows, and Auxiliaries on the diagram.

```
///---\\  
:L <%^¡E!@  
5:0  
19:100,0  
22: Año, Años, año, años  
24:0  
25:0  
26:0  
23:0  
15:0,0,0,0,0,0  
27:0,  
34:0,  
42:0  
72:0  
73:0  
95:0  
96:0  
97:0  
77:0  
78:0  
102:0  
93:0
```

## Part 4. Control Parameters

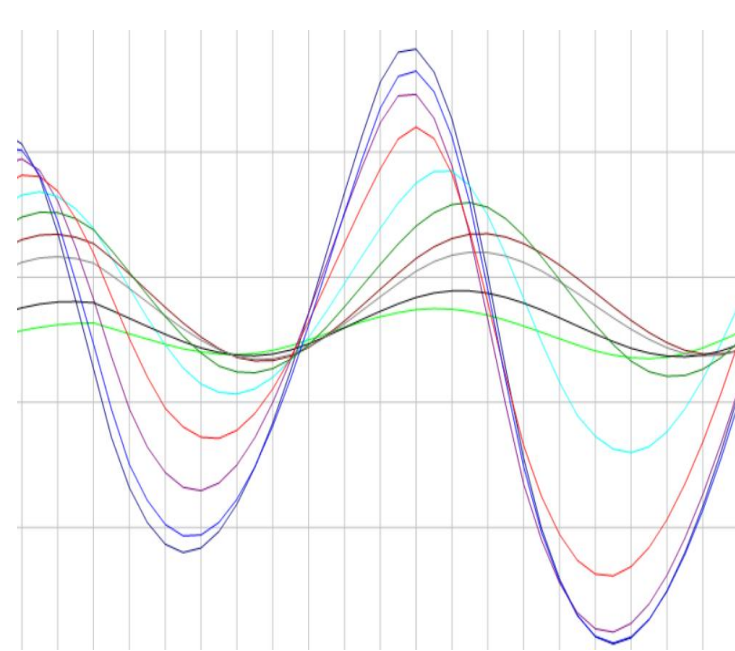
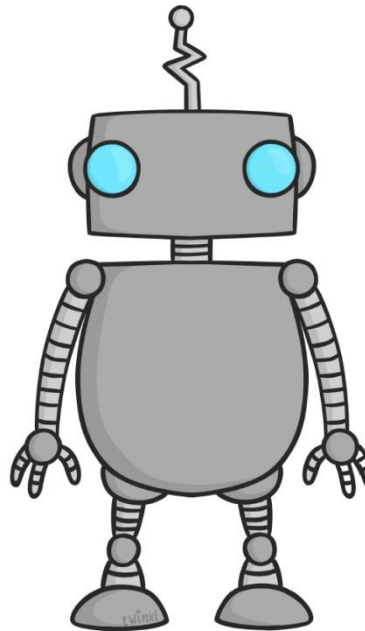
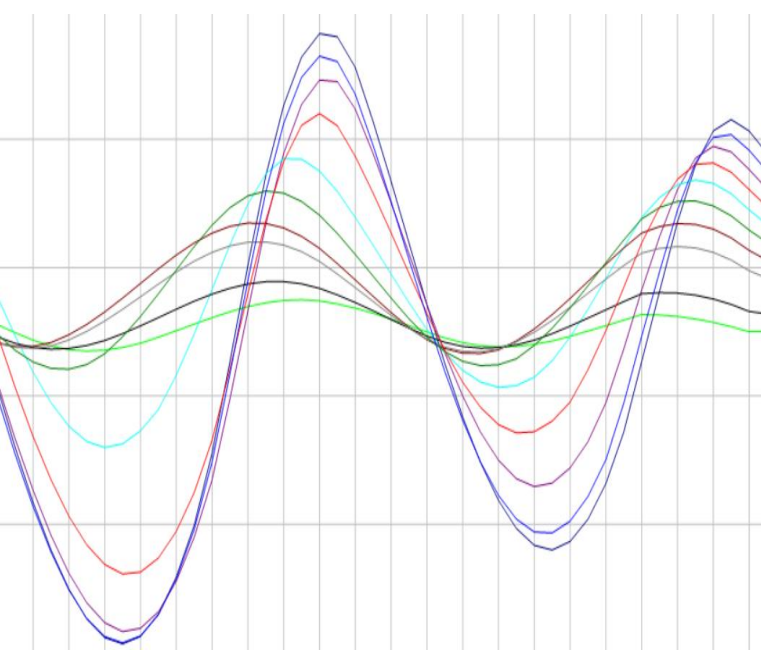
ChatGPT defines some parameters, such as fonts and synonyms.

The ChatGPT prompt is divided into several steps, so that it can be executed in an orderly manner, and the result can be validated at each step.

# Introducing DAVID

**DAVID**

**Draw A Vensim Initial Draft**





# What is DAVID ?

David is a tool that handles all the steps, from reading the initial text to creating the Vensim file using ChatGPT.

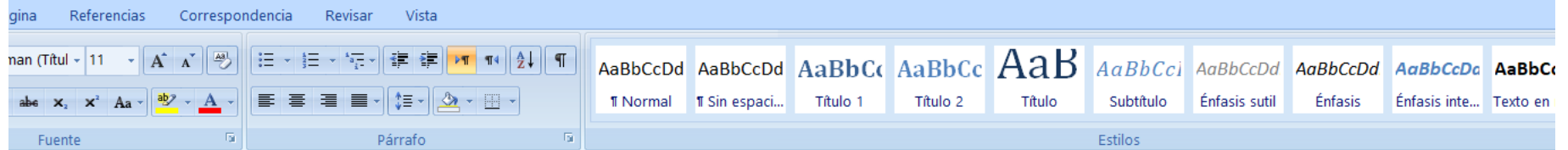
DAVID is a tool that uses ChatGPT (or other tools like DeepSeek) to write the equations and draw a first draft of the Vensim model.

Let's see a practical example

Naiara is a prosperous region located in a temperate zone with abundant vegetation. Its inhabitants lead a happy and comfortable life. Its total population is 1,000,000 people, of whom 40% are young people under 20 years old, 50% are adults between 20 and 70 years old, and the remainder are elderly.

Its population parameters are as follows: the adult birth rate is 7% per year, and the mortality rate is 2.5% for young people, 2% for adults, and 10% for the elderly.

We would like information on the total population and the youth/adult ratio.



You are an expert in System Dynamics, skilled at writing equations and coding Vensim models.

Follow these STEPS:

**STEP 1. WRITE THE EQUATIONS OF A STOCK AND FLOW DIAGRAM OF THE FOLLOWING TEXT.**

- Start of text:

[ Paste here a clear, concise and precise description of the problem to be analyzed, including parameter values, **OR** attach a file describing the problem, indicating here that the text is attached.]

- End of text


- Rule 1. Variable Naming
  - 1.1. Variables can be Stocks, Flows, and Auxiliary Variables. Constants are a particular type of Auxiliaries. Clouds are not variables, but are also drawn on the diagram.
  - 1.2. Include all the relevant variables, and especially the parameters that are quantified.
  - 1.3. Do not use abbreviations in variable names.
  - 1.4. Capitalize only the first letter of the first word of the variable name.
  - 1.5. Variable names can have up to three words at most.
  - 1.6. Defines unique, non-repeating variable names.
- Rule 2. Diagram Design
  - 2.1. If two flows have different names but the same units, and one is defined as equal to the other (Flow A = Flow B):  
Keep the flow that directly depends on other variables in the model (Flow B).  
Remove the redundant flow (Flow A) from the diagram.  
Replace all references to the removed flow (Flow A) in the Stocks and other variables equations with the retained flow (Flow B).
  - 2.2. When there is a supply chain or flow that connects two Stocks (for example, the output of one Stock is the input of another), define a single flow between the two connected Stocks.

You are an expert in System Dynamics, skilled at writing equations and coding Vensim models.

Follow these STEPS:

**STEP 1. WRITE THE EQUATIONS OF A STOCK AND FLOW DIAGRAM OF THE FOLLOWING TEXT.**

- Start of text:



Naiara is a prosperous region located in a temperate zone with abundant vegetation. Its inhabitants lead a happy and comfortable life. Its total population is 1,000,000 people, of whom 40% are young people under 20 years old, 50% are adults between 20 and 70 years old, and the remainder are elderly.

Its population parameters are as follows: the adult birth rate is 7% per year, and the mortality rate is 2.5% for young people, 2% for adults, and 10% for the elderly.

We would like information on the total population and the youth/adult ratio.

- End of text
- Rule 1. Variable Naming
  - 1.1. Variables can be Stocks, Flows, and Auxiliary Variables. Constants are a particular type of Auxiliaries. Clouds are not variables, but are also drawn on the diagram.
  - 1.2. Include all the relevant variables, and especially the parameters that are quantified.
  - 1.3. Do not use abbreviations in variable names.
  - 1.4. Capitalize only the first letter of the first word of the variable name.
  - 1.5. Variable names can have up to three words at most.
  - 1.6. Defines unique, non-repeating variable names.
- Rule 2. Diagram Design
  - 2.1. If two flows have different names but the same units, and one is defined as equal to the

ChatGPT o1 

## How can I help you?

You are an expert in System Dynamics, skilled at writing equations and coding Vensim models.

Follow these STEPS:

STEP 1. WRITE THE EQUATIONS OF A STOCK AND FLOW DIAGRAM OF THE FOLLOWING TEXT.

- Start of text:

Naiara is a prosperous region located in a temperate zone with abundant vegetation. Its inhabitants lead a happy and comfortable life. Its total population is 1,000,000 people, of whom 40% are young people under 20 years old, 50% are adults between 20 and 70 years old, and the



## STEP 1. STOCK-AND-FLOW EQUATIONS

Below is one straightforward set of equations consistent with the text and the rules.

We have three Stocks (Young population, Adult population, Elderly population).

We include birth, mortality, and aging flows as implied by the description.

### 1. Young population

$$\frac{d(\text{Young population})}{dt} = \text{Birth} - \text{Mortality young} - \text{Aging young adult}$$

$$\text{Birth} = \text{Adult population} \times \text{Adult birth fraction}$$

$$\text{Mortality young} = \text{Young population} \times \text{Young mortality fraction}$$

$$\text{Aging young adult} = \frac{\text{Young population}}{\text{Aging time young}}$$

$$\text{Young population}(0) = 400,000$$

## Stocks

nginx

```
Young population = INTEG(
  Birth - Mortality young - Aging young adult,
  400000)
~ |
Adult population = INTEG(
  Aging young adult - Mortality adult - Aging adult elderly,
  500000)
~ |
Elderly population = INTEG(
  Aging adult elderly - Mortality elderly,
  100000)
~ |
```

## Flows

nginx

```
Birth = Adult population * Adult birth fraction
~ |
Mortality young = Young population * Young mortality fraction
~ |
```

## Auxiliaries

nginx

```
Adult birth fraction = 0.07
~ |
Young mortality fraction = 0.025
~ |
Adult mortality fraction = 0.02
~ |
Elderly mortality fraction = 0.1
~ |
Aging time young = 20
~ |
Aging time adult = 50
~ |
Total population = Young population + Adult population + Elderly population
~ |
Youth adult ratio = Young population / Adult population
~ |
```

time young

mortality fraction

aging time adult

elderly mortality fraction





Coordinates were chosen to keep each Auxiliary at least 120 px from every Stock/Flow/Cloud/Auxiliary, while still “near” any Flow it influences.

arduino

```
10,65,"Adult birth fraction",473,324,"39,16,8,3,0,0,-1,0,0,0,0,0,0,0,0,0"
10,66,"Young mortality fraction",601,358,"39,16,8,3,0,0,-1,0,0,0,0,0,0,0,0,0"
10,67,"Aging time young",723,355,"39,16,8,3,0,0,-1,0,0,0,0,0,0,0,0,0"
10,68,"Adult mortality fraction",873,345,"39,16,8,3,0,0,-1,0,0,0,0,0,0,0,0,0"
10,69,"Aging time adult",1016,311,"39,16,8,3,0,0,-1,0,0,0,0,0,0,0,0,0"
10,70,"Elderly mortality fraction",1099,431,"39,16,8,3,0,0,-1,0,0,0,0,0,0,0,0,0"
10,71,"Total population",1215,400,"39,16,8,3,0,0,-1,0,0,0,0,0,0,0,0,0"
10,72,"Youth adult ratio",1215,100,"39,16,8,3,0,0,-1,0,0,0,0,0,0,0,0,0"
```

## STEP 10. SUMMARY. WRITE THE VENSIM SOURCE CODE

Take the ASCII text file with the results of step 9.

Next:

- Rule 1. Verify that each row in the created ASCII file is formatted as obtained in step 9. Confirm that none of the lines in Step 9 are skipped, nor are any additional lines added.
- Rule 2. Delete all completely blank lines from the final output.
- Rule 3. Delete rows that start with "#", ";", "(" or)".
- Rule 4. Delete all quotation mark symbols from the text.
- Rule 5. Retain the exact names of the Stocks, Flows, and Auxiliaries as defined in Step 4. Confirm no variable from Step 4 is missing or duplicated, and no new variables appear.
- Rule 6. Delete rows with INITIAL TIME, FINAL TIME, and INITIAL STOCK.
- Rule 7. Show the entire text file.

```
92:0
91:0
90:0
87:0
75:
43:
103:8,8,8,3,8
105:0,0,0,0,0,0,0,0,0
104:Arial Unicode MS|12||0-0-0|0-0-0|-1--1--1/0-0-255/192-192-192/-1--1-1
```

Copy

Edit

That is the **final** Vensim-compatible text file, with **all** specified transformations from Step 10 applied.

Copy Like Comment Share Refresh



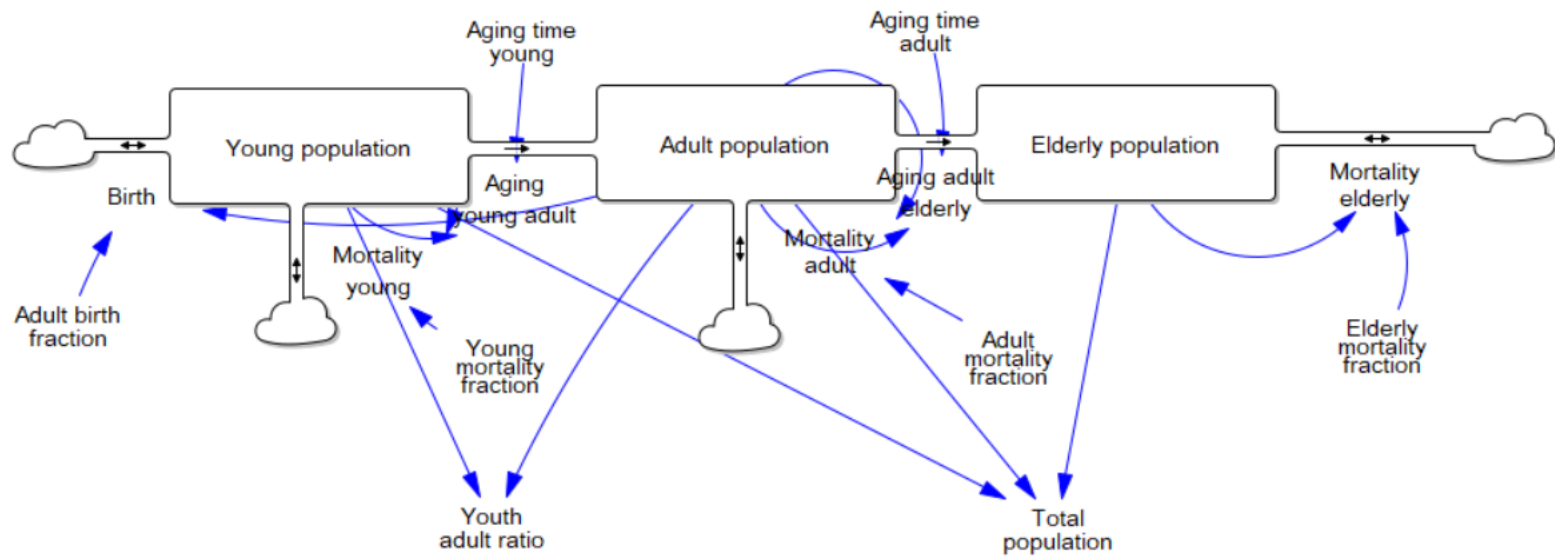
NAIARA MODEL.mdl: Bloc de notas

Archivo Edición Formato Ver Ayuda

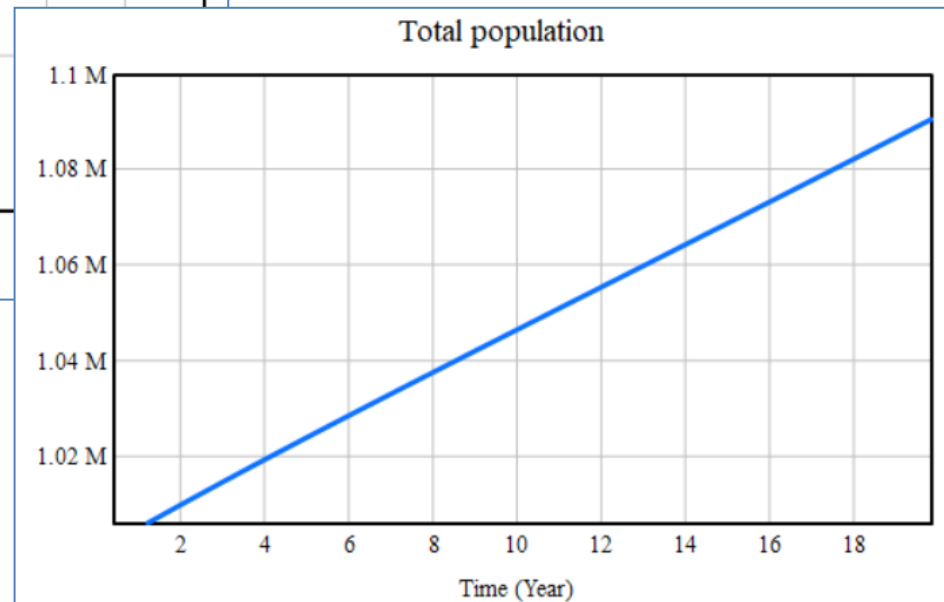
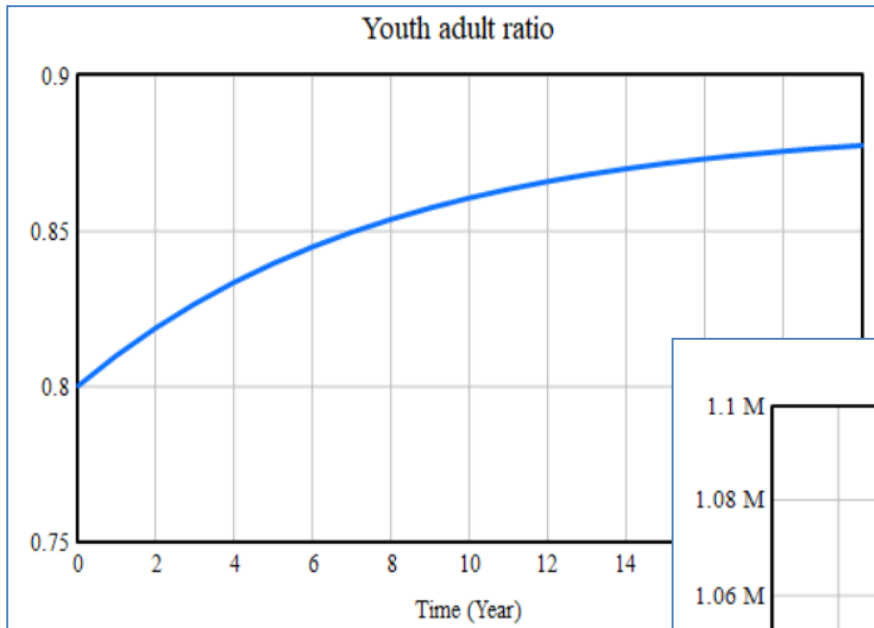
{UTF-8}

```
Young population =INTEG(
Birth - Mortality young - Aging young adult,
400000)
~ |
Adult population =INTEG(
Aging young adult - Mortality adult - Aging adult elderly,
500000)
~ |
Elderly population =INTEG(
Aging adult elderly - Mortality elderly,
100000)
~ |
Birth = Adult population*Adult birth fraction
~ |
Mortality young = Young population*Young mortality fraction
~ |
Aging young adult = Young population/Aging time young
~ |
Mortality adult = Adult population*Adult mortality fraction
~ |
Aging adult elderly = Adult population/Aging time adult
~ |
Mortality elderly = Elderly population*Elderly mortality fraction
~ |
```

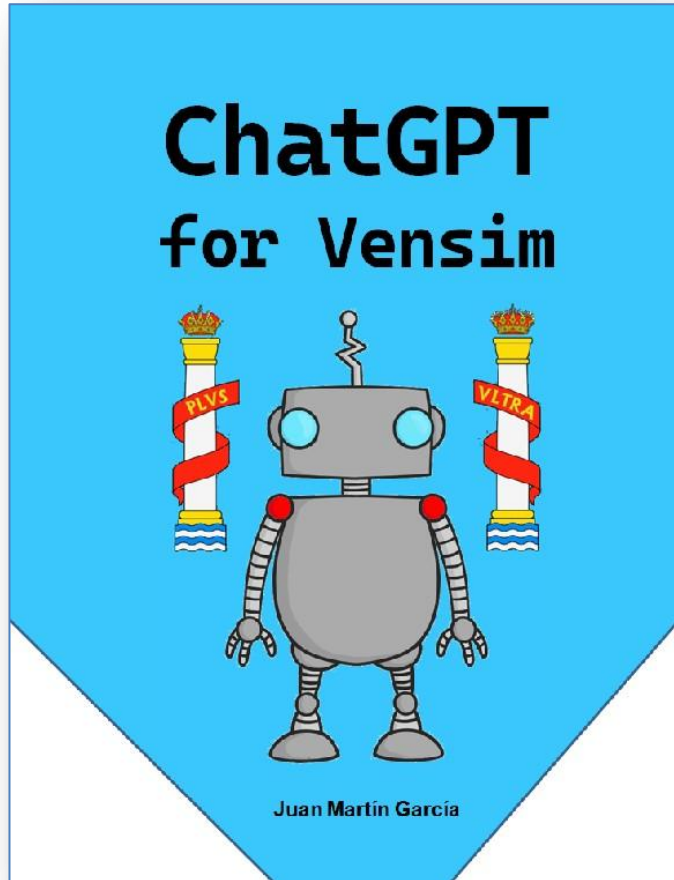
## Diagram



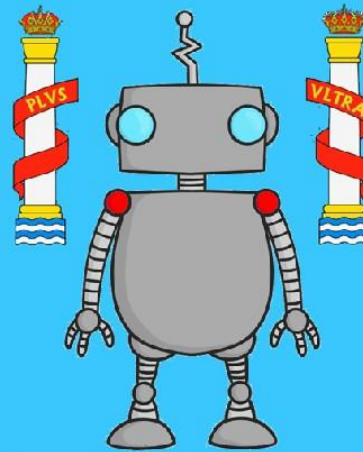
## Results



# How to get DAVID?



# ChatGPT for Vensim



Juan Martín García