</ # Proyecto Final: Algoritmos Genéticos />

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</ Objetivo del Proyecto

- Solución ideal para el diseño de un circuito formado por un resistor de resistencia R y un transistor MOSFET de canal N.
- Minimizar error cuadrático medio.
- Máximo 3%.
- Nodos de 1 micra.
- Población: 32
- Generaciones: 100-300
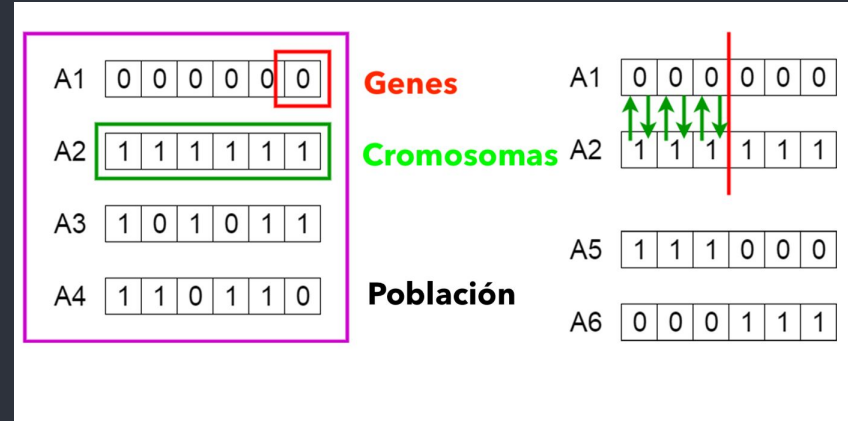
Optimización Circuitos>
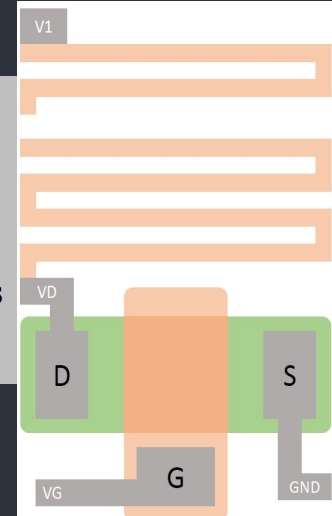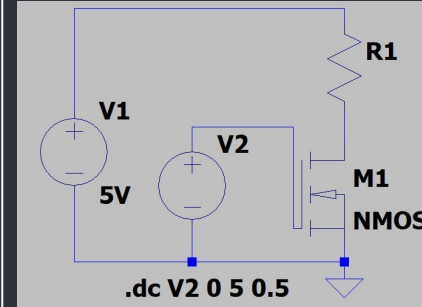
Longitud del gen y del cromosoma
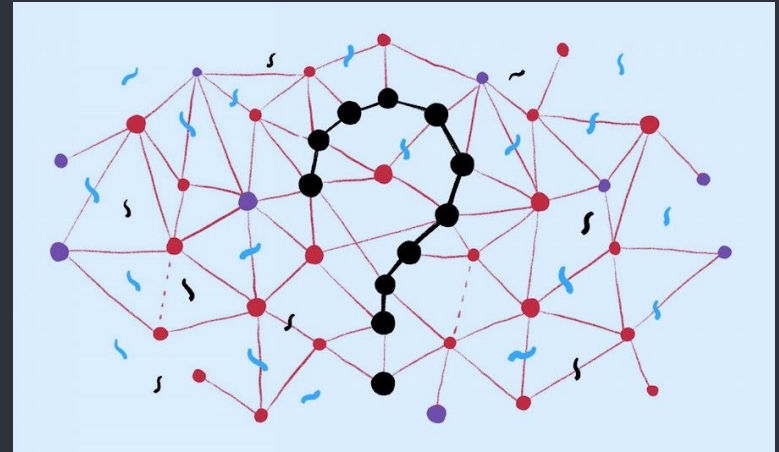
- 16 bits por gen

- 64 bits el cromosoma

Ventajas

- Mayor precisión en los cálculos

- Evita la pérdida de información

Primeros pasos

1) Crear a la primera población con individuos aleatorios.

2) Preguntar al usuario la cantidad de generaciones a iterar.

3) Obtener el MSE de cada poblador.

Gray to Real

- Para el gen de W se asignó 17 bits.

- Para el gen L se asignó 15 bits.

- Esto asegura que en dado caso que ambos ambos números tienen solamente 1's W sea mayor.

- Es importante hacer adecuaciones en todo el código.

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

= 32767

1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

= 131071

Dimensiones
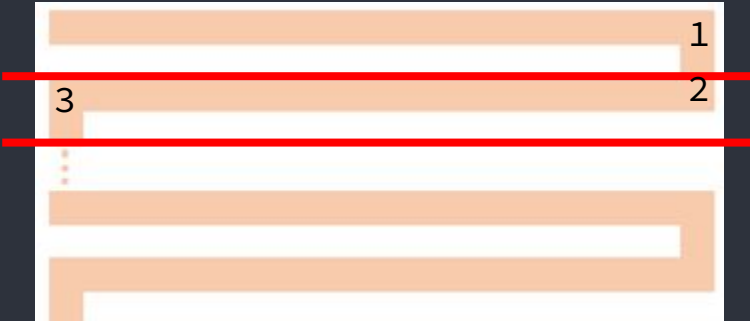
- Rango de la dimensión de W y L: De 2µm a 50µm

- Rango de la dimensión de m y n: De 2 a 50
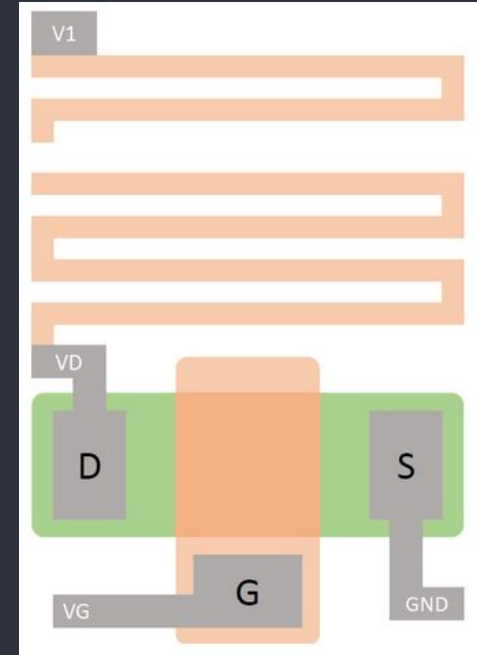
Siripruchyanun, M., & Jaikla, W. (2009). Realization of CMOS Current Controlled Current Conveyor Transconductance Amplifier (CCCCTA) and Its Applications.

Fitness

- Cálculo de corriente

- Cálculo de resistencia

- Cálculo de MSE


```python
#Calculo de la resistencia
n_round = round(n)
m_round = round(m)
if n_round % 2 == 0:
    n_round = n_round
else:
    if n_round > m_round:
        n_round = n_round-1
    else:
        n_round = n_round+1
equinas = n_round-1
cuadros = ((n_round*m_round)-(m_round-1))-equinas
cuadros_con_esquinas = cuadros + (equinas*(2/3))
Resistencia_total = Res_sheet*cuadros_con_esquinas
```

Selection

- El pick que debe de ser más probable es el que menor MSE tiene de la población.

- Calcular la proporción inversa.

- Normalizados de 0 a 1 la ruleta.

Q4
16,7%

Q1
33,3%

Q3
22,2%

Q2
27,8%
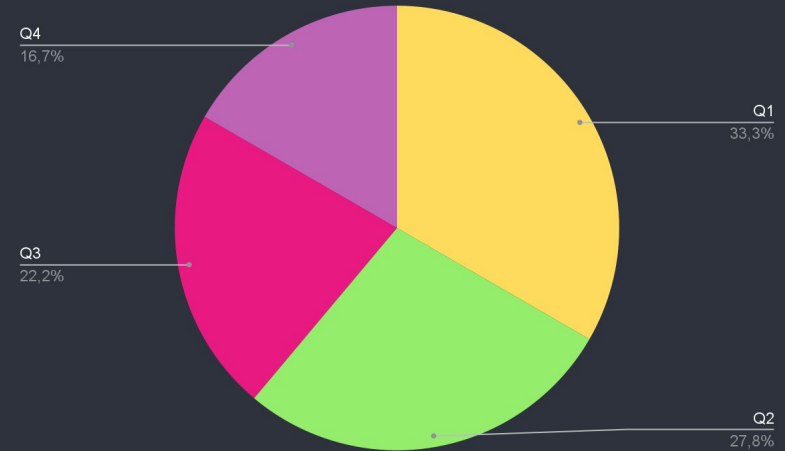
# Condición para seleccionar padres y _fillers_

- Que W sea mayor a 2 veces L

- Que m no sea mayor a 2 veces n

- Que n no sea mayor a 2 veces m

- Que padre 0 no sea igual a padre 1 (solo en selección de padre 1)

1 0 1 1 0 1 1 0 1 1 0 1 1 0 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 1 0 1 1 0 1 1 0 1 1 1 1 1 0 1

Última generación obtener el mejor

- Puede ser que el mejor MSE no sea ninguno de los padres o hijos.

  Puede ser un *filler*.

- El *filler* cumple con las características de W,L,m y n.

Graficas obtenidas
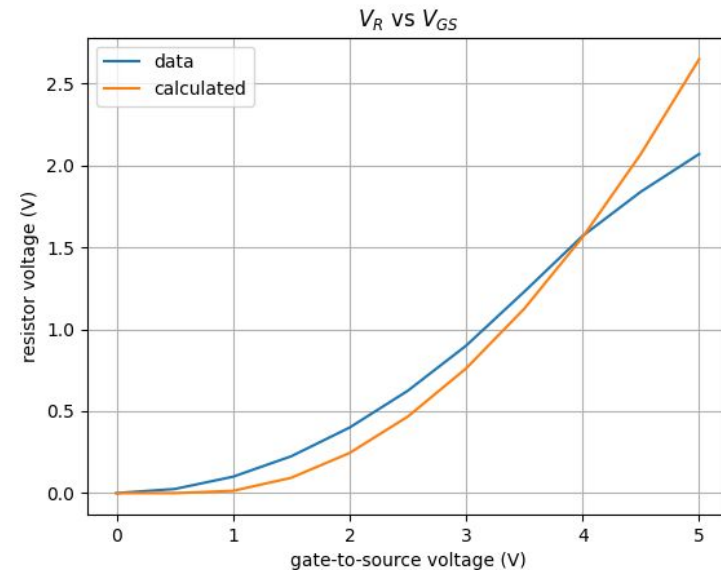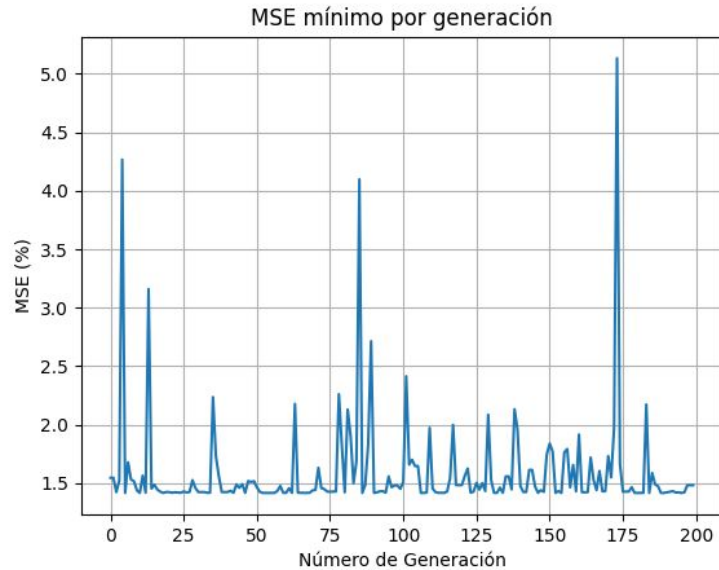
3 consolas de comando

```
Cantidad total de generaciones: 200
Best:  1.4310078572437048
Solution[W,L,m,n] [3.34e-05, 9.2e-06, 21.9280385, 31.0607462]
W: 33.4µm        L: 9.2µm
R: 16258.333333333334 Ω
Mean Sq Error:  1.43101 %
```

```
Cantidad total de generaciones: 200
Best:  1.484089545812755
Solution[W,L,m,n] [4.59e-05, 1.22e-05, 32.9379721, 19.701442]
W: 45.9µm        L: 12.2µm
R: 16341.666666666666 Ω
Mean Sq Error:  1.4840900000000001 %
```

```
Cantidad total de generaciones: 200
Best:  1.5534424641968236
Solution[W,L,m,n] [2.52e-05, 7.7e-06, 32.1418173, 24.3538567]
W: 25.2µm        L: 7.7µm
R: 19008.333333333336 Ω
Mean Sq Error:  1.55344 %
```

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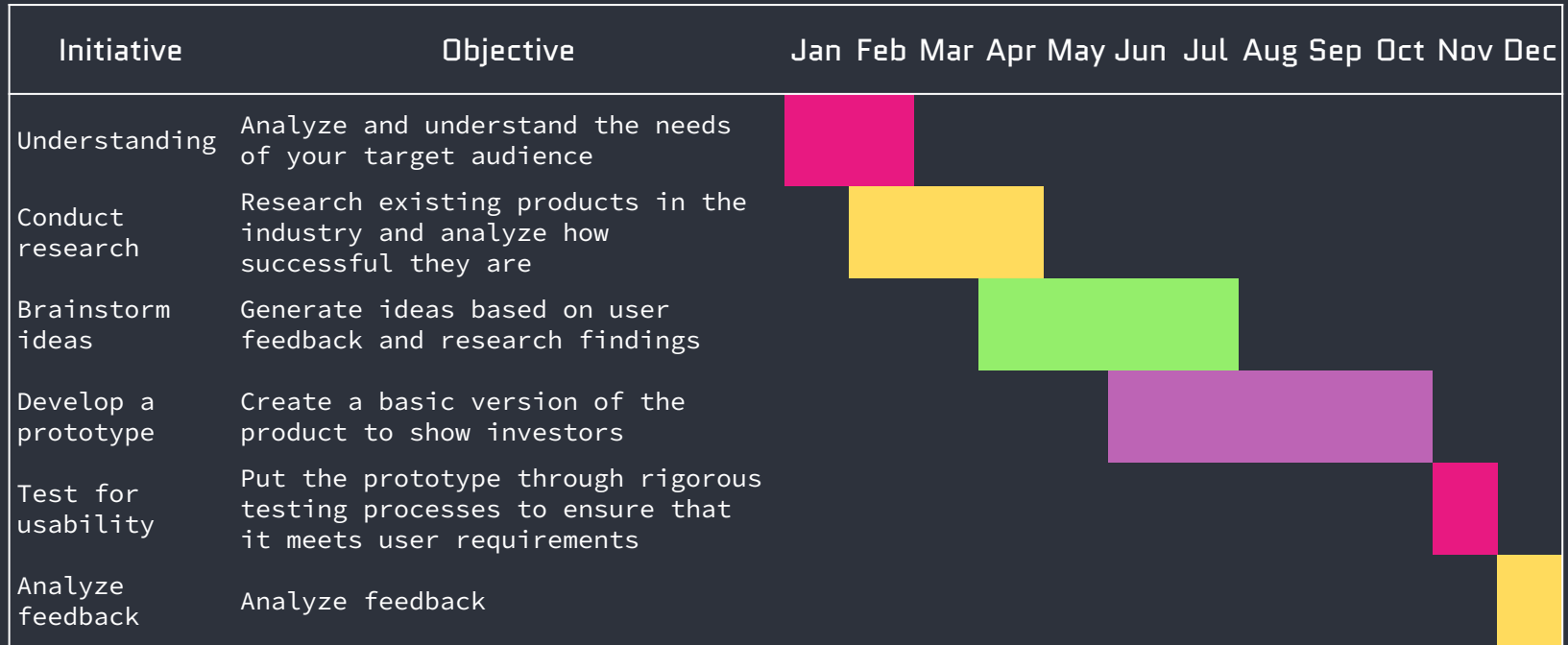
Consideraciones

- El código puede no terminar de correr. Puede no haber individuos con las condiciones que pedimos.

- Se puede cambiar el rango tanto de W,L,m y n en Gray2real.

- El MSE puede empeorar a lo largo de las generaciones debido al crossover y a las mutaciones.

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Gracias

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1 0 1 1 0 1 1 0 1 1 0 1 1 0 0 1 1 0 1 1 0 1 1 0 1 1 0 1 1 1 0 1 1 0 1 1 0 1 1 1 1 1 0 1

</ Road infographics

Initiative	Objective	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Understanding	Analyze and understand the needs of your target audience	██	██										
Conduct research	Research existing products in the industry and analyze how successful they are		██	██									
Brainstorm ideas	Generate ideas based on user feedback and research findings				██	██							
Develop a prototype	Create a basic version of the product to show investors						██	██	██				
Test for usability	Put the prototype through rigorous testing processes to ensure that it meets user requirements										██		
Analyze feedback	Analyze feedback											██	

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</ KPI dashboard

Product	Units	Revenue	Returns
Item 1	500	2,000,000	40
Item 2	1,000	50,750	10
Item 3	250	1,500,000	300
Item 4	500	2,000,000	40
Item 5	1,000	50,750	10
Item 6	250	1,500,000	300
Item 7	500	2,000,000	40
Item 8	1,000	50,750	10

$4M
Revenue

$1M
General costs

$3M
Benefit

A — B — C — D
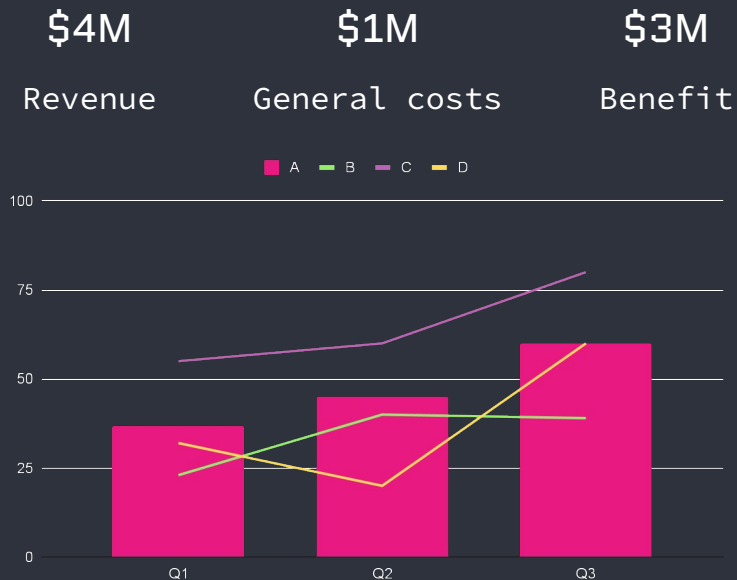
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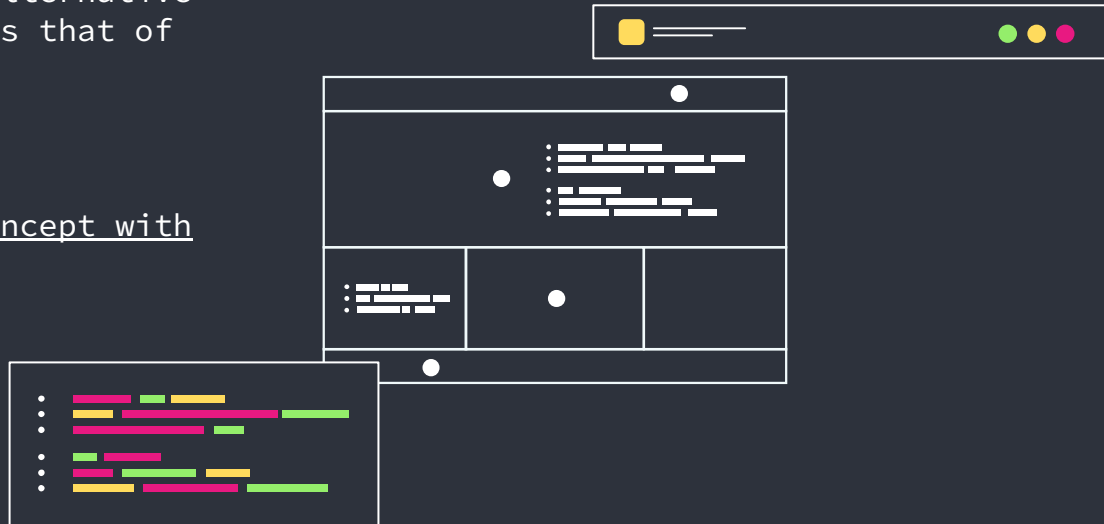
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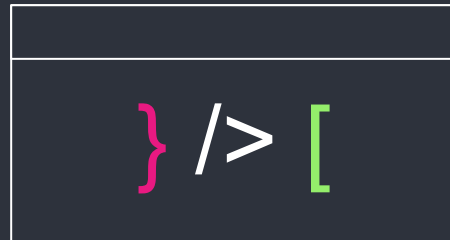
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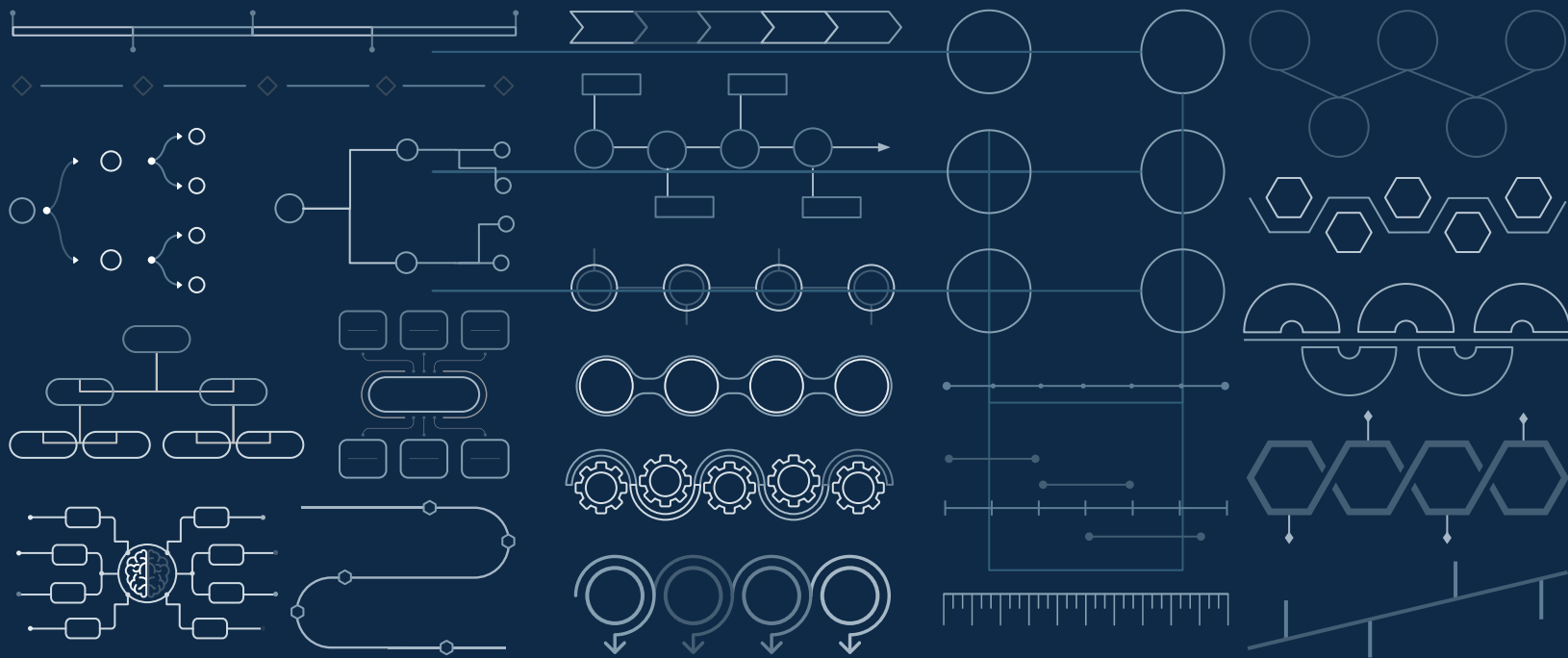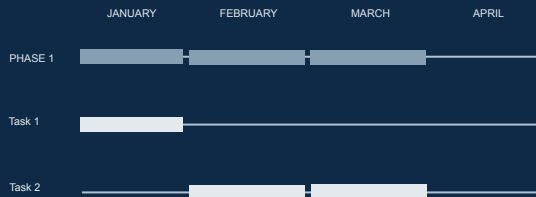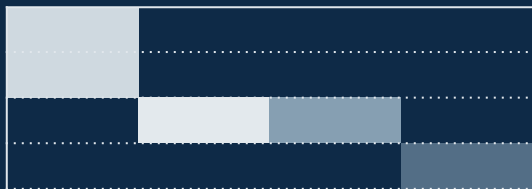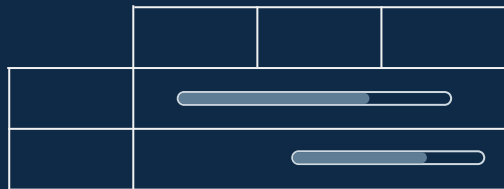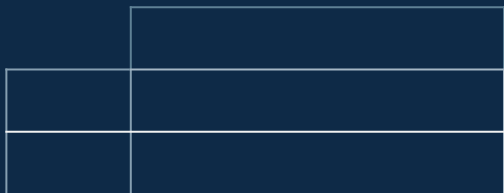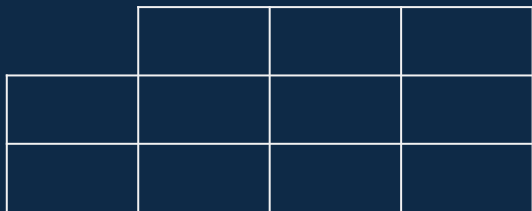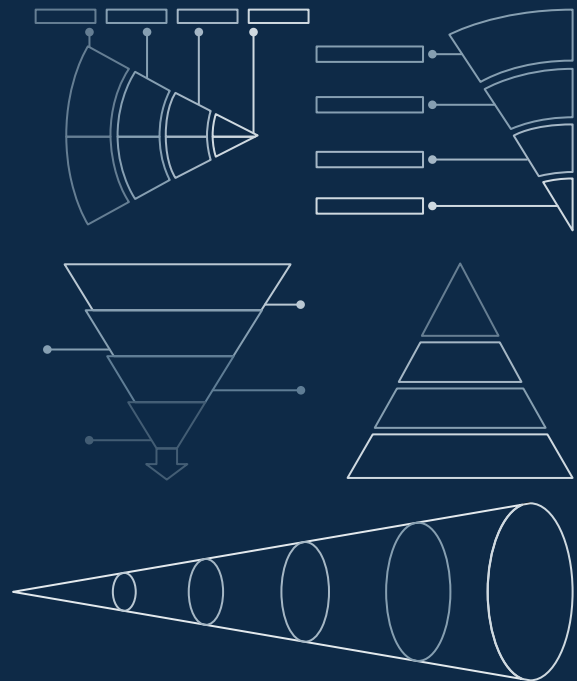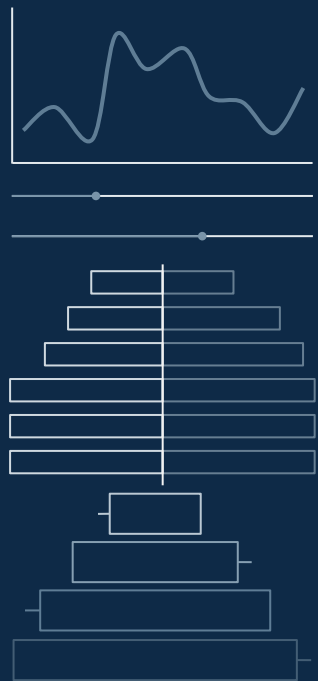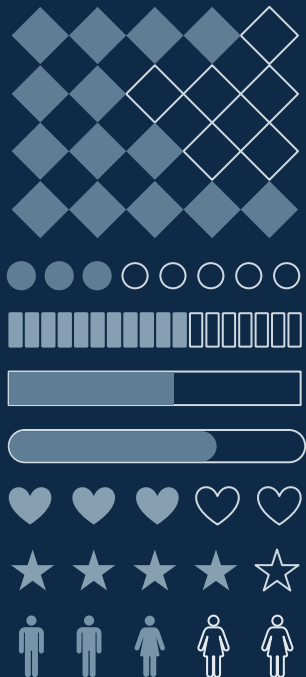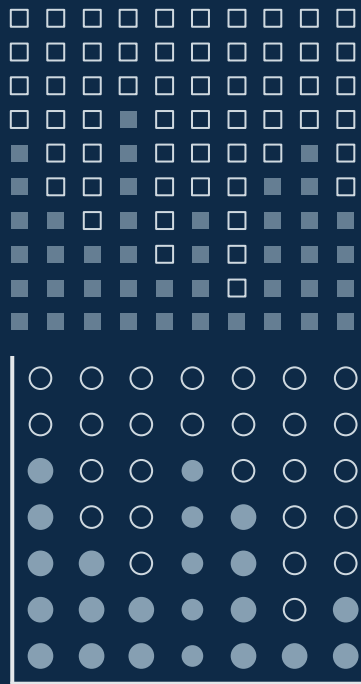
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