NutriNavigator

Navigating the Complex World of Supplements with Ease

APAN5400 Group Project

Group 8

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Background

Dietary supplement data is very laborious to organize, evaluate and decipher. End users have a difficult time understanding and reviewing the supplement data that is presented due to its massive content spread throughout different tables and figures. Scientists and manufacturers often do not realize that their end users are not able to understand the purpose of the supplement.

The ideal Supplement Data should have active ingredients, dosage, fillers, safety & precautions, as well as its treatment. Most end users would seek health professionals in order to digest this information, but that privilege isn't accessible to everyone.

Business Use

Nutritional information provided by vitamin and supplement manufacturers is usually stored in separate data sources, making it inconvenient for end users to assess and compare products that are suitable for their needs.

Furthermore, end users can typically only find nutrition information on the list of vitamins, ingredients, safety, and risks from the product packaging, which does not provide guidance on which vitamins or supplements to take for certain health deficiencies.

In addition, marketplaces like Amazon, Target, and iHerb do not provide a complete list of available products for certain supplements on their site or worldwide.

Therefore, **we aim to connect these issues by creating a search engine for supplements that can help nutrition-deficient patients find the right products** to bolster their needs. Our search engine will prioritize data accuracy and consistency to ensure reliable information.

Data Source & Procurement

Data Source

NIH National Institutes of Health
Office of Dietary Supplements

We are utilizing 'Dietary Supplement Label Database' from the National Institutes of Health.

Data type: CSV file
Number of documents: 156,957
Size of the total data: 1.52 GB
Number of keys: 29

Procurement

The data from the National Institutes of Health is an open source data which means it is freely available to the public and can be used, reused, and distributed without any restrictions or costs.

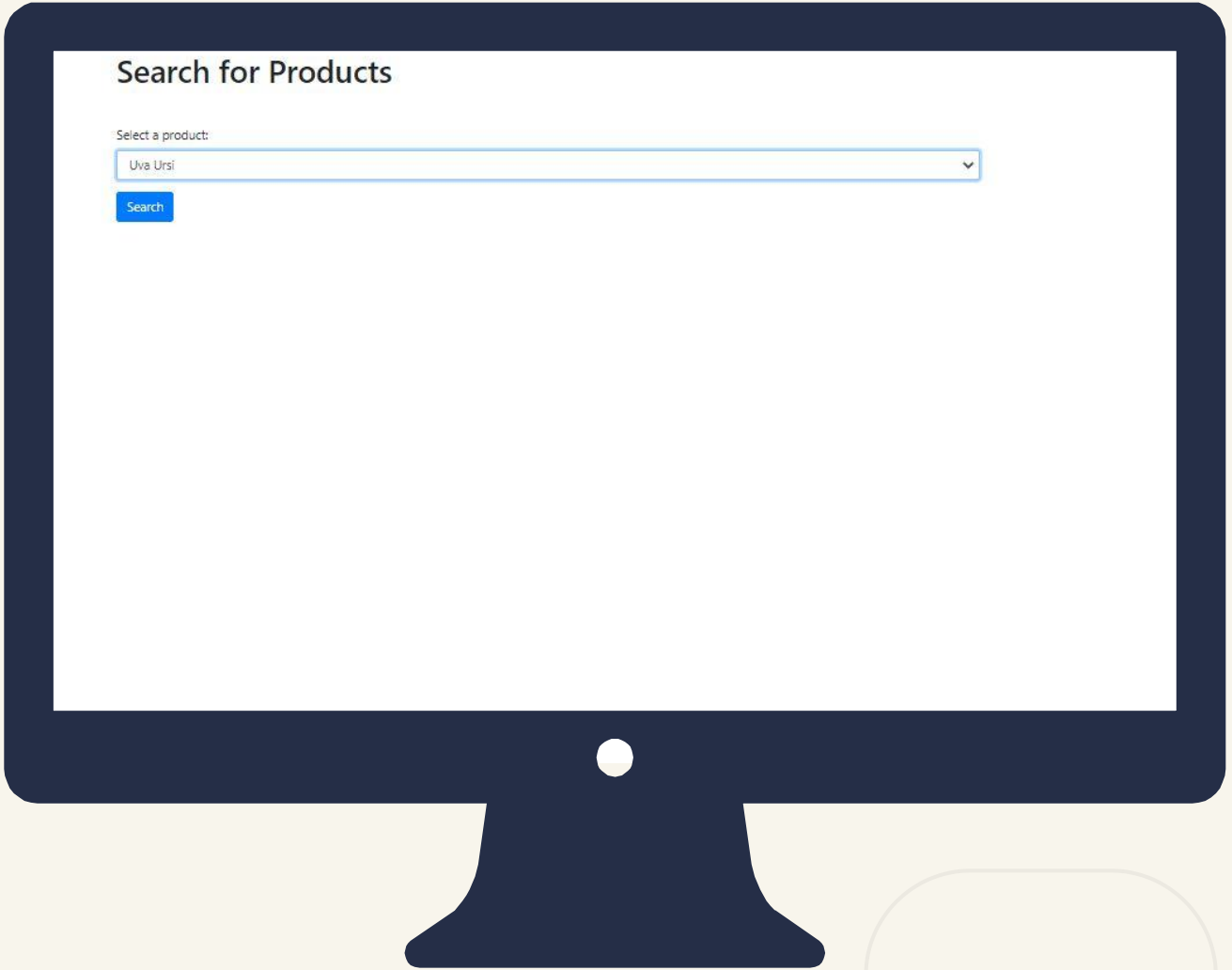
Implemented Design

- **MongoDB**
  - Extracted data from the NIH: 5 different datasets combined
  - Mongo is well suited for variety of data formats
  - Suitable for processing large amounts of data at high speed
  - Integrates well with our other tools for streamline process
  - Cleaning and transformation occurs before loaded into Mongo

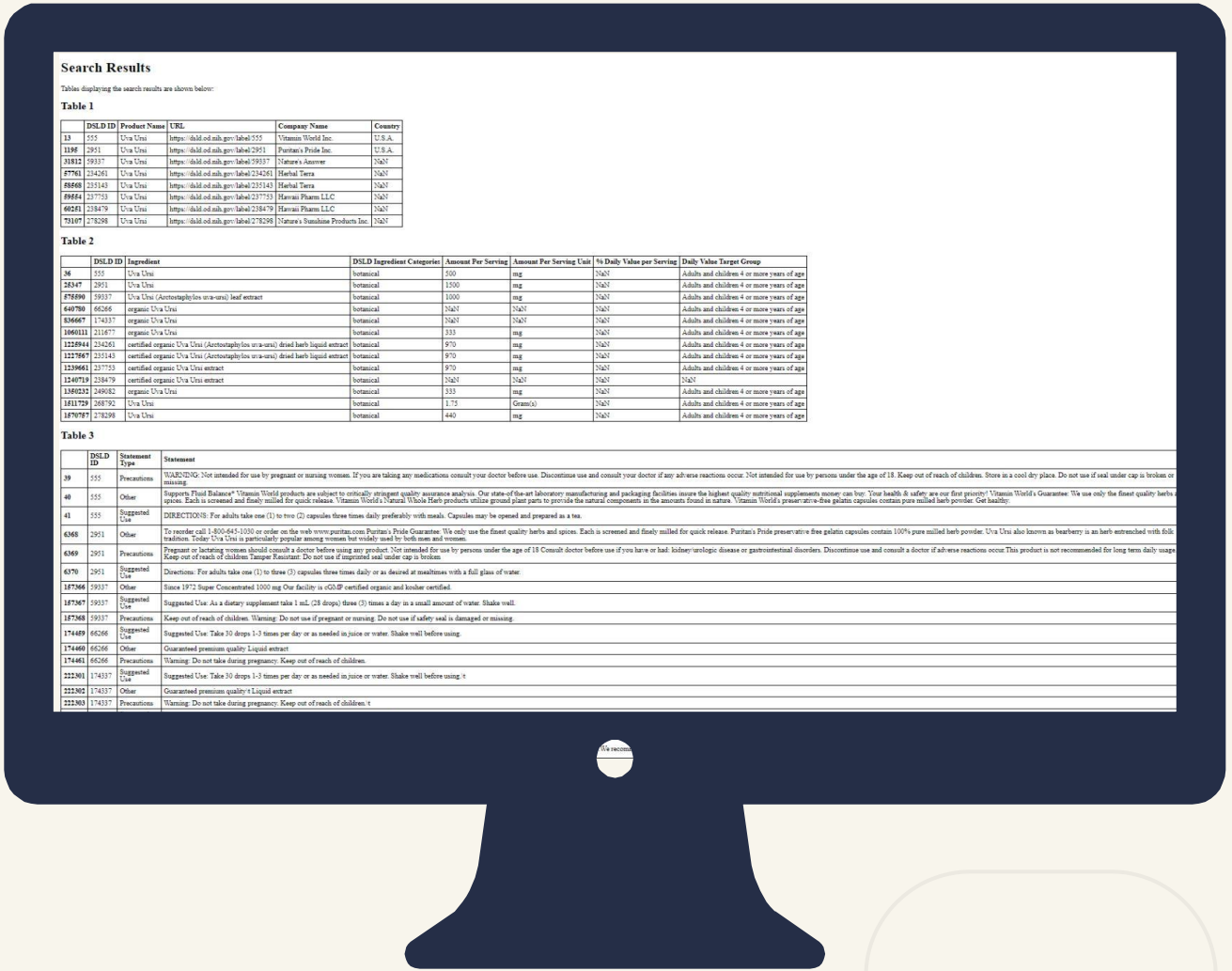
- **Elastic Search**
  - Provides complex indexing and querying to find supplements
  - Real-time analytics that updates with the database
  - Provides advanced search features such as: aggregations and faceting
  - Highly available and fault tolerant, can handle large data

- **Flask**
  - Web framework that can be used to build web applications
  - Handle user requests, pass the requests to the search engine backend, and return the search results to the user
  - High flexibility in terms of project structure, library and tools, so it also integrates well with pipeline of elasticsearch.

Search Input



Output



Search Results

Tables displaying the search results are shown below:

Table 1

	DSLD ID	Product Name	URL	Company Name	Country
13	555	Uva Ursi	https://dsld.od.nih.gov/label/555	Vitamin World Inc.	U.S.A.
1195	2951	Uva Ursi	https://dsld.od.nih.gov/label/2951	Puritan's Pride Inc.	U.S.A.
31812	59337	Uva Ursi	https://dsld.od.nih.gov/label/59337	Nature's Answer	NaN
57761	234261	Uva Ursi	https://dsld.od.nih.gov/label/234261	Herbal Terra	NaN
58568	235143	Uva Ursi	https://dsld.od.nih.gov/label/235143	Herbal Terra	NaN
59554	237753	Uva Ursi	https://dsld.od.nih.gov/label/237753	Hawaii Pharm LLC	NaN
60251	238479	Uva Ursi	https://dsld.od.nih.gov/label/238479	Hawaii Pharm LLC	NaN
73107	278298	Uva Ursi	https://dsld.od.nih.gov/label/278298	Nature's Sunshine Products Inc.	NaN

Table 2

	DSLD ID	Ingredient	DSLD Ingredient Categories	Amount Per Serving	Amount Per Serving Unit	% Daily Value per Serving	Daily Value Target Group
36	555	Uva Ursi	botanical	500	mg	NaN	Adults and children 4 or more years of age
58347	2951	Uva Ursi	botanical	1500	mg	NaN	Adults and children 4 or more years of age
576890	59337	Uva Ursi (Arctostaphylos uva-ursi) leaf extract	botanical	1000	mg	NaN	Adults and children 4 or more years of age
640780	66266	organic Uva Ursi	botanical	NaN	NaN	NaN	Adults and children 4 or more years of age
836667	174337	organic Uva Ursi	botanical	NaN	NaN	NaN	Adults and children 4 or more years of age
1060111	211677	organic Uva Ursi	botanical	333	mg	NaN	Adults and children 4 or more years of age
1228944	234261	certified organic Uva Ursi (Arctostaphylos uva-ursi) dried herb liquid extract	botanical	970	mg	NaN	Adults and children 4 or more years of age
1227567	235143	certified organic Uva Ursi (Arctostaphylos uva-ursi) dried herb liquid extract	botanical	970	mg	NaN	Adults and children 4 or more years of age
1239661	237753	certified organic Uva Ursi extract	botanical	970	mg	NaN	Adults and children 4 or more years of age
1240719	238479	certified organic Uva Ursi extract	botanical	NaN	NaN	NaN	NaN
1360233	249082	organic Uva Ursi	botanical	333	mg	NaN	Adults and children 4 or more years of age
1611729	268792	Uva Ursi	botanical	1.75	Gram(s)	NaN	Adults and children 4 or more years of age
1870787	278298	Uva Ursi	botanical	440	mg	NaN	Adults and children 4 or more years of age

Table 3

	DSLD ID	Statement Type	Statement
39	555	Precautions	WARNING: Not intended for use by pregnant or nursing women. If you are taking any medications consult your doctor before use. Discontinue use and consult your doctor if any adverse reactions occur. Not intended for use by persons under the age of 18. Keep out of reach of children. Store in a cool dry place. Do not use if seal under cap is broken or missing.
40	555	Other	Supports Fluid Balance* Vitamin World products are subject to critically stringent quality assurance analysis. Our state-of-the-art laboratory manufacturing and packaging facilities insure the highest quality nutritional supplements money can buy. Your health & safety are our first priority! Vitamin World's Guarantee: We use only the finest quality herbs a spices. Each is screened and finely milled for quick release. Vitamin World's Natural Whole Herb products utilize ground plant parts to provide the natural components in the amounts found in nature. Vitamin World's preservative-free gelatin capsules contain pure milled herb powder. Get healthy.
41	555	Suggested Use	DIRECTIONS: For adults take one (1) to two (2) capsules three times daily preferably with meals. Capsules may be opened and prepared as a tea.
6368	2951	Other	To reorder call 1-800-645-1030 or order on the web www.puritan.com Puritan's Pride Guarantee: We only use the finest quality herbs and spices. Each is screened and finely milled for quick release. Puritan's Pride preservative free gelatin capsules contain 100% pure milled herb powder. Uva Ursi also known as bearberry is an herb entrenched with folk tradition. Today Uva Ursi is particularly popular among women but widely used by both men and women.
6369	2951	Precautions	Pregnant or lactating women should consult a doctor before using any product. Not intended for use by persons under the age of 18 Consult doctor before use if you have or had: kidney/urologic disease or gastrointestinal disorders. Discontinue use and consult a doctor if adverse reactions occur.This product is not recommended for long term daily usage Keep out of reach of children Tamper Resistant: Do not use if imprinted seal under cap is broken
6370	2951	Suggested Use	Directions: For adults take one (1) to three (3) capsules three times daily or as desired at mealtimes with a full glass of water.
157366	59337	Other	Since 1972 Super Concentrated 1000 mg Our facility is cGMP certified organic and kosher certified.
157367	59337	Suggested Use	Suggested Use: As a dietary supplement take 1 mL (28 drops) three (3) times a day in a small amount of water. Shake well.
157368	59337	Precautions	Keep out of reach of children. Warning: Do not use if pregnant or nursing. Do not use if safety seal is damaged or missing.
174459	66266	Suggested Use	Suggested Use: Take 30 drops 1-3 times per day or as needed in juice or water. Shake well before using.
174460	66266	Other	Guaranteed premium quality Liquid extract
174461	66266	Precautions	Warning: Do not take during pregnancy. Keep out of reach of children.
222301	174337	Suggested Use	Suggested Use: Take 30 drops 1-3 times per day or as needed in juice or water. Shake well before using.\t
222302	174337	Other	Guaranteed premium quality\t Liquid extract
222303	174337	Precautions	Warning: Do not take during pregnancy. Keep out of reach of children.\t

Scalability

- **MongoDB**
  - Horizontal scaling - sharding and replication will occur as the data becomes larger
  - Replication - supports replicas of multiple copies of the data to ensure high availability of potential server failures

- **Elastic Search**
  - Increasing nodes - to add nodes to the clusters when the requests and traffic grows
  - Shard allocation - primary and replica shards distributed across different nodes in the cluster to ensure availability

- **Flask**
  - The scalability of a Flask depends on how the application is designed and optimized.
  - If it become more high traffic WSGI(Web Server Gateway Interface) server, such as Gunicorn or uWSGI is needed.- The server is optimized for high traffic and can handle multiple requests.

Cost Implications

MongoDB

- **From $57 / month** (varies depending on storage size)
- 10GB to 4TB of storage
- **$0.08/hr for 10GB of storage**
- 2GB to 768 RAM
- Network isolation and fine-grained access control

https://www.mongodb.com/pricing

Elasticsearch

- **$95 / month**
- Clustering & high availability
- Powerful search and analysis
- Data visualization and dashboarding
- Stack security

https://www.elastic.co/pricing/

Flask

- **Flask (Free)**
- Open-source software
- Hosting costs using cloud service
- **AWS (1 year)**
- EC2 shared instance
- Elastic load balancer
- **Upfront cost - $306**
- **Monthly - $122**

https://calculator.aws/#/addService

Total cost

$274~

/ month

Conclusion & Recommendations

- Autofill for intuitive search terms to make it easier for the end
  - Faster

- Expand our database to other types of products:
  - OTC Medicine

- Connect with theoretical pharmacy locator API
  - Extend pipeline to help end users find products at nearest store

- Adding relevant and helpful outcomes in the search results
  - Providing data of drugs that can't be used together with certain supplement

Thank you!

Reference

"Computer Access to Research on Dietary Supplements: A Database of Federally Funded Dietary Supplement Research." *Journal of Nutrition*, vol. 135, no. 7, Oxford UP, July 2005, pp. 1796–99. https://doi.org/10.1093/jn/135.7.1796.

"Dietary Supplement Label Database." *National Institutes of Health*, U.S. Department of Health and Human Services, https://dsld.od.nih.gov/.

Hoppa, Jocelyn. "Knowledge Graph Search With Elasticsearch and Neo4j." *Neo4j Graph Data Platform*, 26 Oct. 2021, neo4j.com/blog/knowledge-graph-search-elasticsearch-neo4j.

Introduction

Here you can give a brief description of the topic you want to talk about. For example, if you want to talk about *Mercury*, you can say that *it's the smallest planet in the entire Solar System*

Our center

Venus has a beautiful name and is the second planet from the Sun. It’s hot and has an extremely poisonous atmosphere. It’s the second-brightest natural object in the night sky after the Moon

Values of the company

Mission

Mercury is the closest planet to the Sun and the smallest one in the Solar System—it's only a bit larger than the Moon

Vision

Venus has a beautiful name and is the second planet from the Sun. It's hot and has a poisonous atmosphere

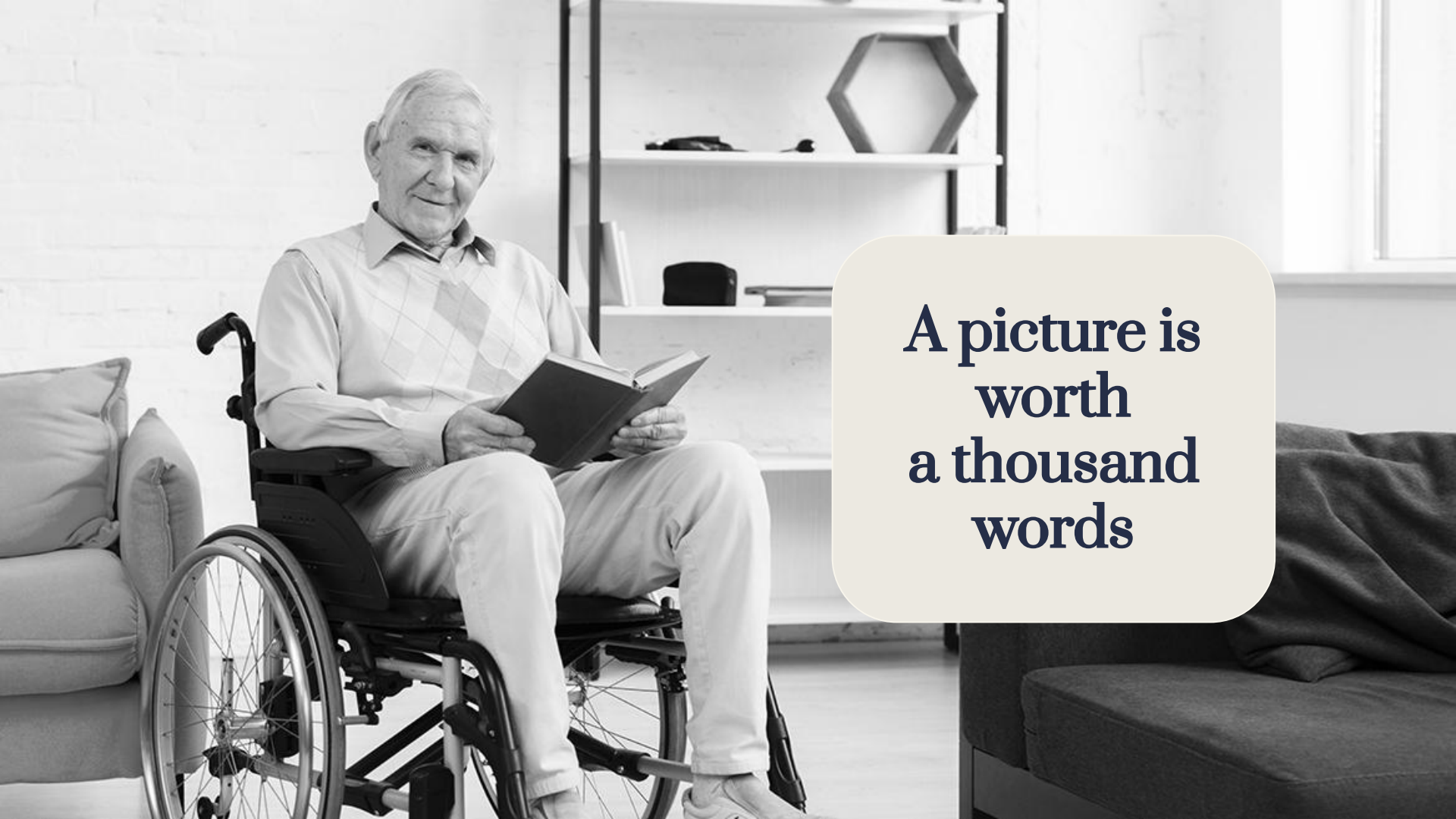
A picture always reinforces the concept

Images reveal large amounts of data, so remember: use an image instead of a long text

Awesome words!

“This is a quote. Words full of wisdom that someone important said and can make the reader get inspired”

—Someone famous


A picture is
worth
a thousand
words

Key numbers

20,000

This is the number of patients we had last month

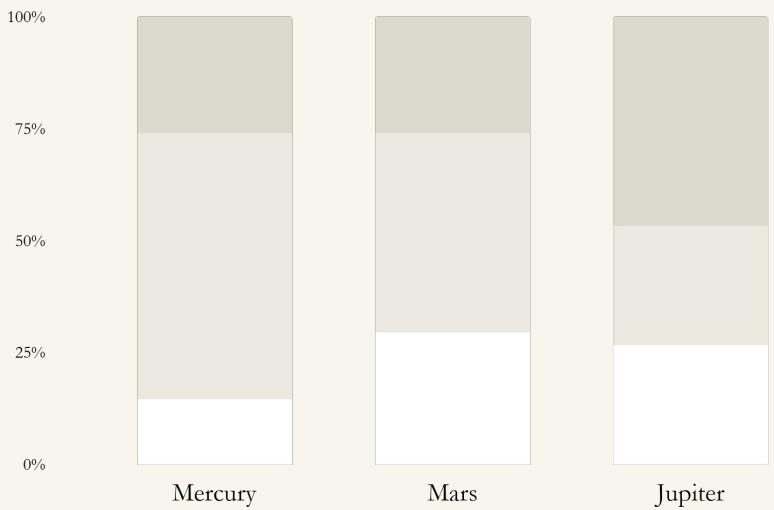
50,000

This is the number of total visitors we had last month

5,000

This is the number of transplants performed

Our statistics



Mercury

Neptune is the farthest planet

Mars

Jupiter is a gas giant planet

Jupiter

Saturn is the ringed planet

Follow the link in the graph to modify its data and then paste the new one here. For more info, **click here**

A brief story

Mercury is the closest planet to the Sun and the smallest one in the Solar System—it's only a bit larger than the Moon.

- Venus is the second planet from the Sun
- Earth is the planet where we live on
- Neptune is very far away from Earth

Milestones reached

2020-2021

Venus has a beautiful name

Year 2022

2018-2019

It's a gas giant and the biggest

2017-2018

Jupiter is the biggest planet

2019-2020

It's a gas giant and the biggest

Our process

01 Venus

Venus has a beautiful name

02 Saturn

It's a gas giant and has rings

Mars 03

Despite being red, Mars is cold

Jupiter 04

Jupiter is the biggest planet

02

Key Numbers

You can enter a subtitle here if you need it

Patient care

Mercury is the closest planet to the Sun and the smallest one in the Solar System—it's a bit larger than the Moon. The planet's name has nothing to do with the liquid metal

Areas we cover

Mercury

Mercury is the closest planet to the Sun

Venus

Venus is the second planet from the Sun

Jupiter

It's a gas giant and the biggest planet

Saturn

It is the ringed one. It's a huge gas giant

Services

Mercury

Mercury is the closest planet to the Sun

Jupiter

It’s a gas giant and the biggest planet

Venus

Venus is the second planet from the Sun

Saturn

It is the ringed one. It’s a huge gas giant

Key accomplishments

Mars

Despite being red, Mars is a very cold place

Jupiter

It’s a gas giant and the biggest planet

Saturn

Yes, this is the ringed one. It’s a huge gas giant

This is a map

Venus

Venus is the second planet from the Sun

Jupiter

It's a gas giant and the biggest planet

Mercury

Mercury is the closest planet to the Sun

4,498,300

Big numbers catch your audience's attention

333,000,000

earths is the Sun's mass

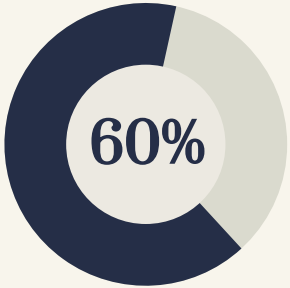
9h 55m 23s

is Jupiter's rotation period

386,000 km

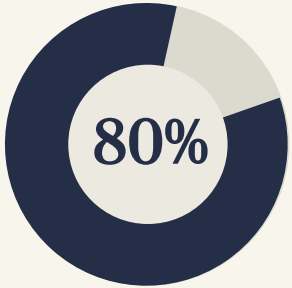
is the distance between Earth and the Moon

Patient satisfaction



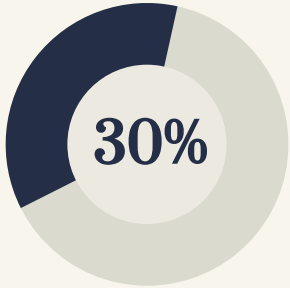
Mercury

Mercury is the smallest planet



Venus

Venus has a beautiful name



Mars

Despite being red, Mars is a cold place

This is a table

	Qty.	Booked	Sold	Refund	Percent
Mars	2	12000	9800	500	80%
Venus	3	6000	5000	450	50%
Jupiter	4	2000	1500	300	70%
Saturn	9	6000	5000	450	50%

Mercury is closest planet to the Sun and the smallest one in the Solar System

Innovations

Mercury

Mercury is the smallest planet

Venus

Venus has a beautiful name

Mars

Despite being red, Mars is cold place

Quality improvement measures

Mercury

Mercury is the closest planet to the Sun

Venus

Venus has a beautiful name

Mars

Despite being red, Mars is cold place

Jupiter

It's the biggest planet in Solar System

Saturn

Saturn is a gas giant and has rings

Neptune

It is the farthest planet from the Sun

Testimonials

Levi Doe, 35

“Mercury is the closest planet to the Sun”

Arnold Kito, 59

“It’s a gas giant and the biggest planet”

Elen Heula, 26

“Venus is the second planet from the Sun”

Mika Kuroki, 21

“It is the ringed one. It’s a huge gas giant”

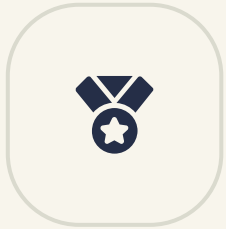
Awards

Mercury

2017-2018

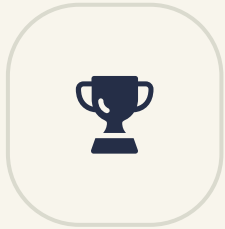
Venus

2018-2019



Mars

2019-2020



Neptune

2020-2021

Our team

Ms. Gina

Mercury is the closest planet to the Sun and the smallest one

Mr. Rena

Venus has a beautiful name and is the second planet from the Sun

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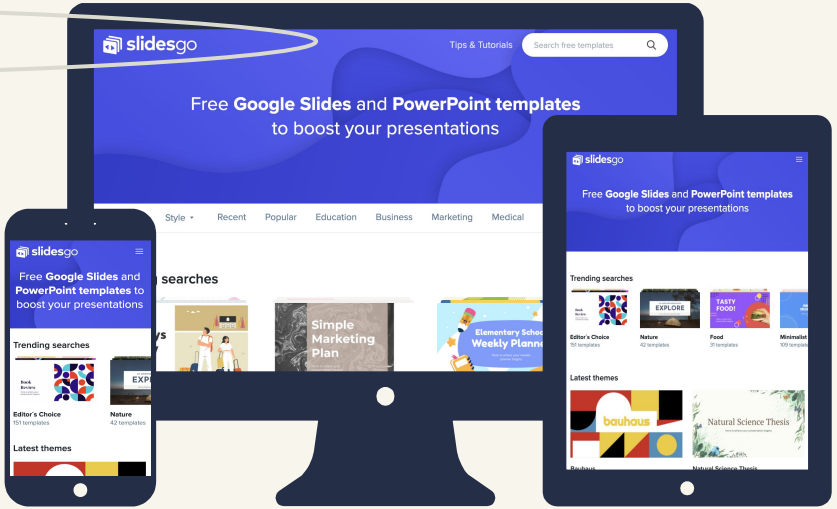

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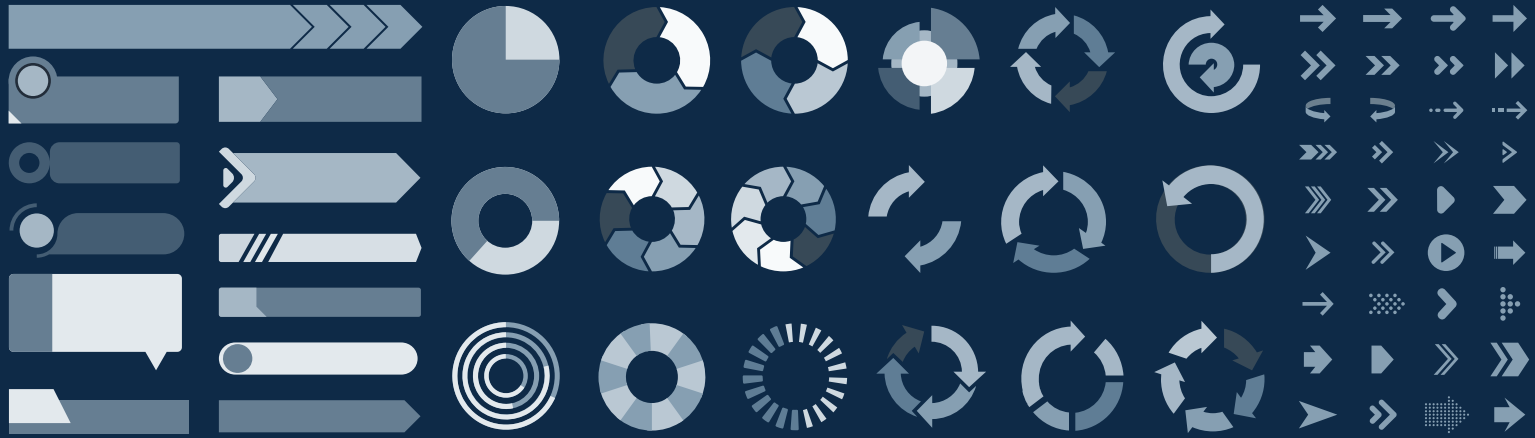

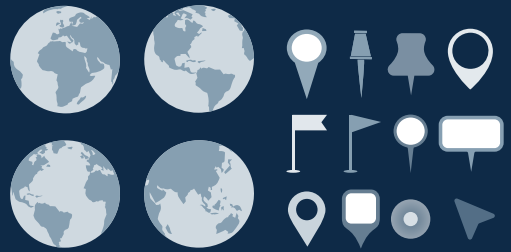

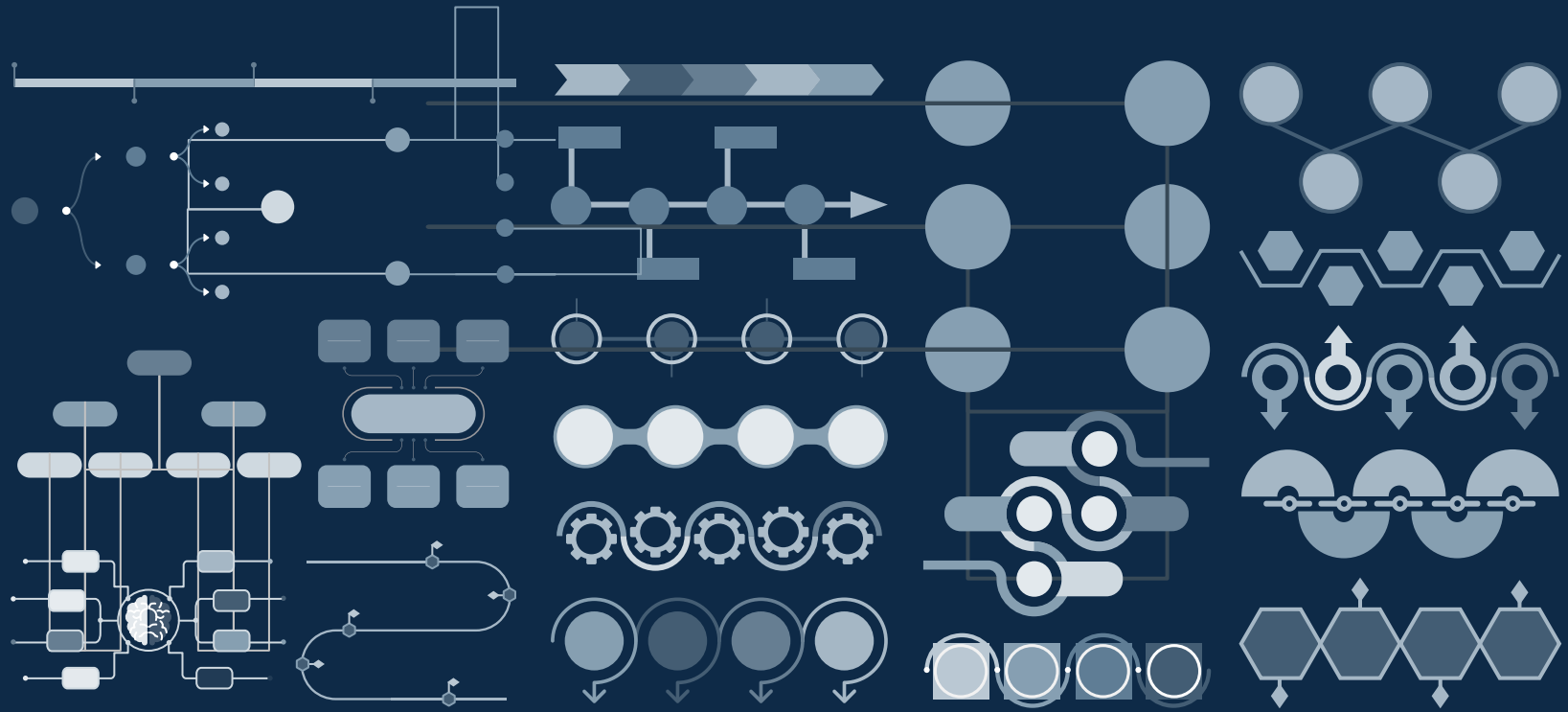

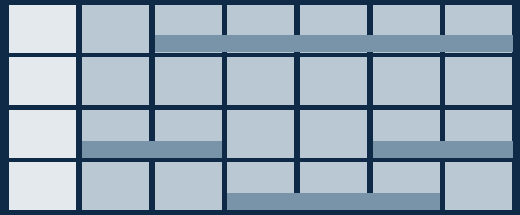

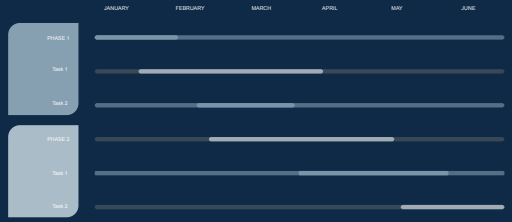
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MARCH
APRIL
MAY
JUNE
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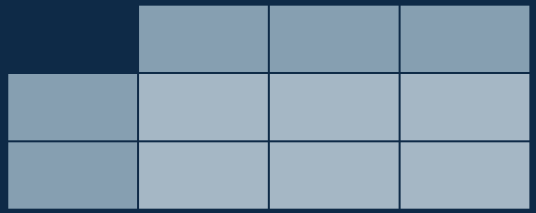
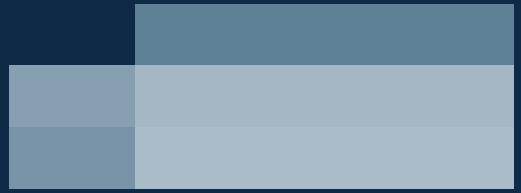
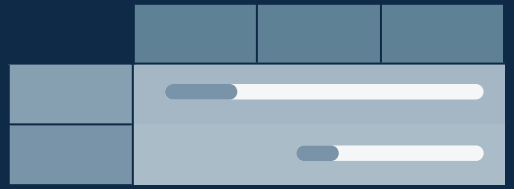
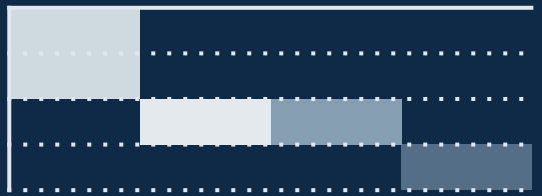
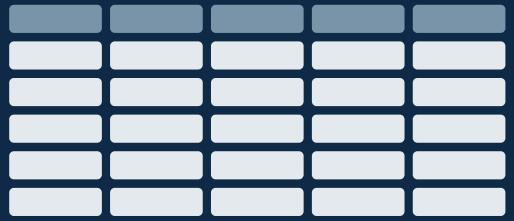
Task 1
Task 2
PHASE 2
Task 1
Task 2

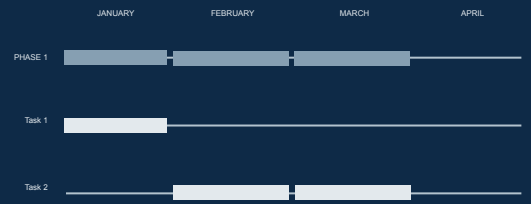


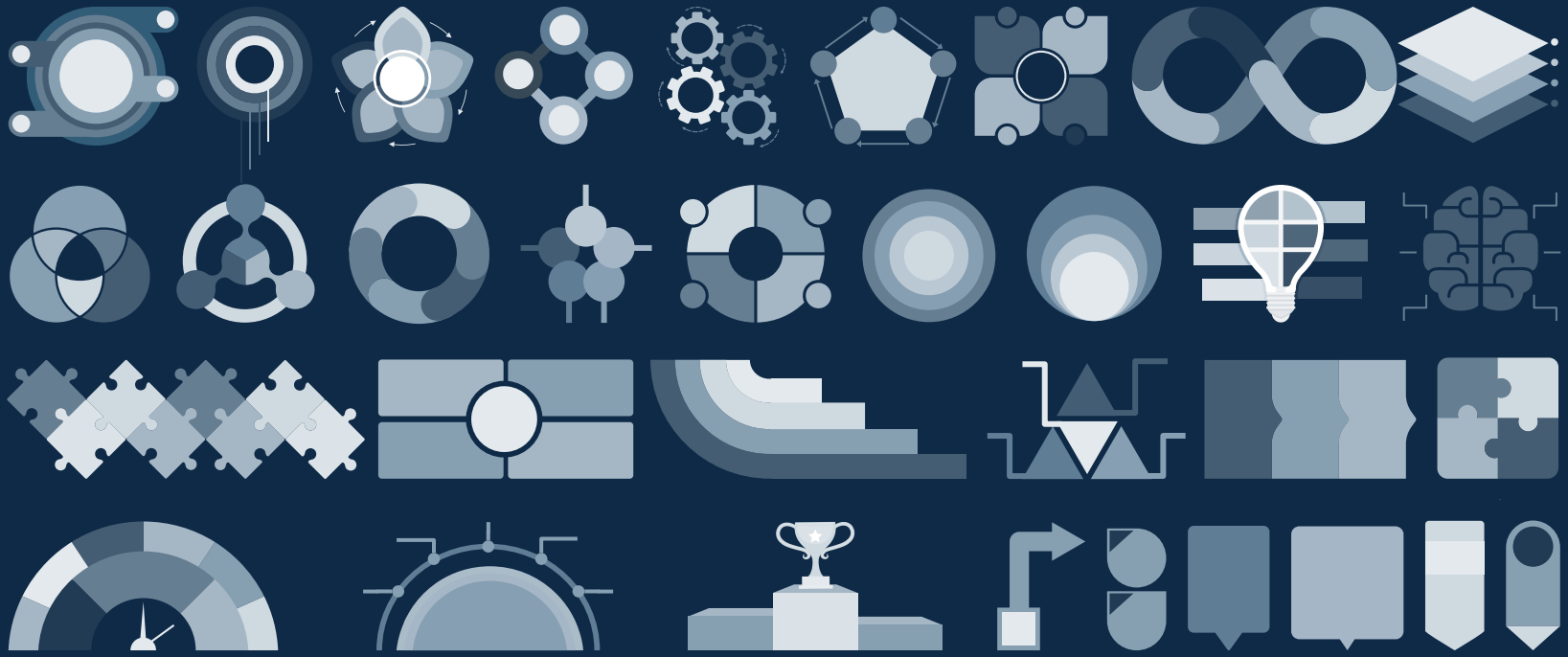


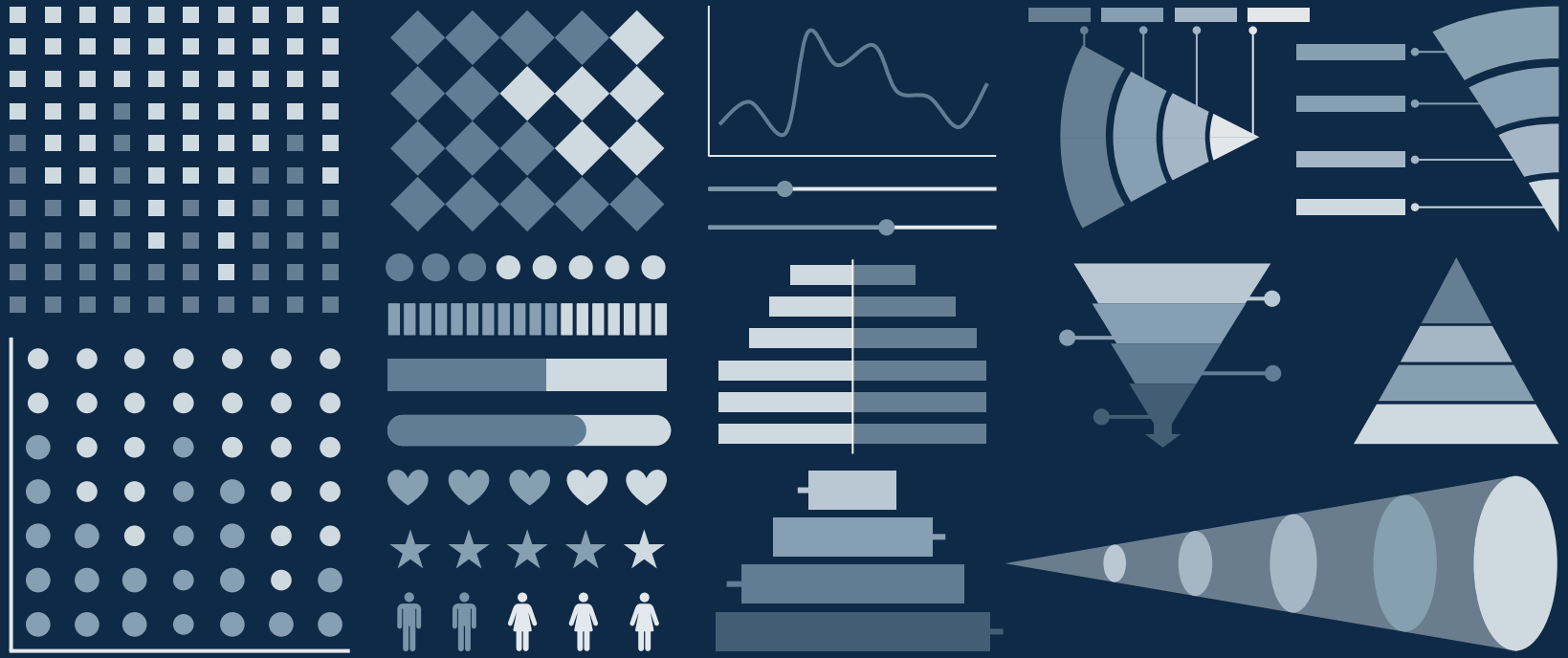




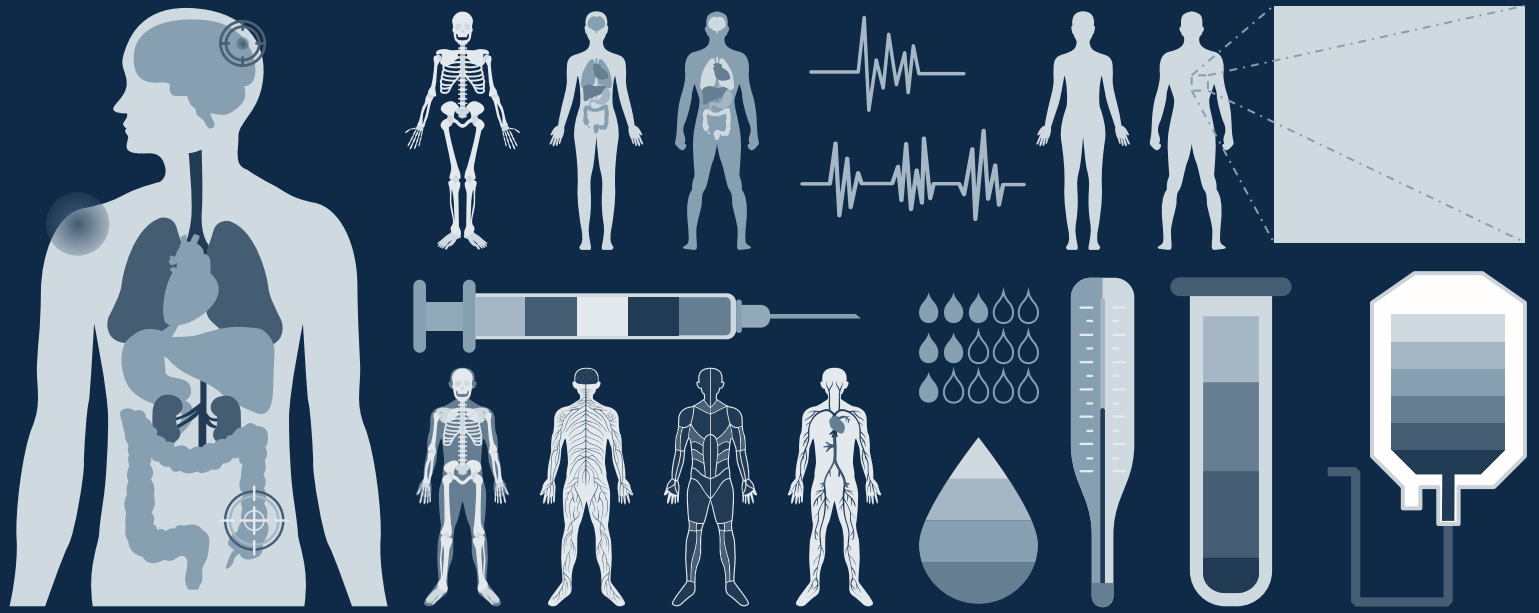


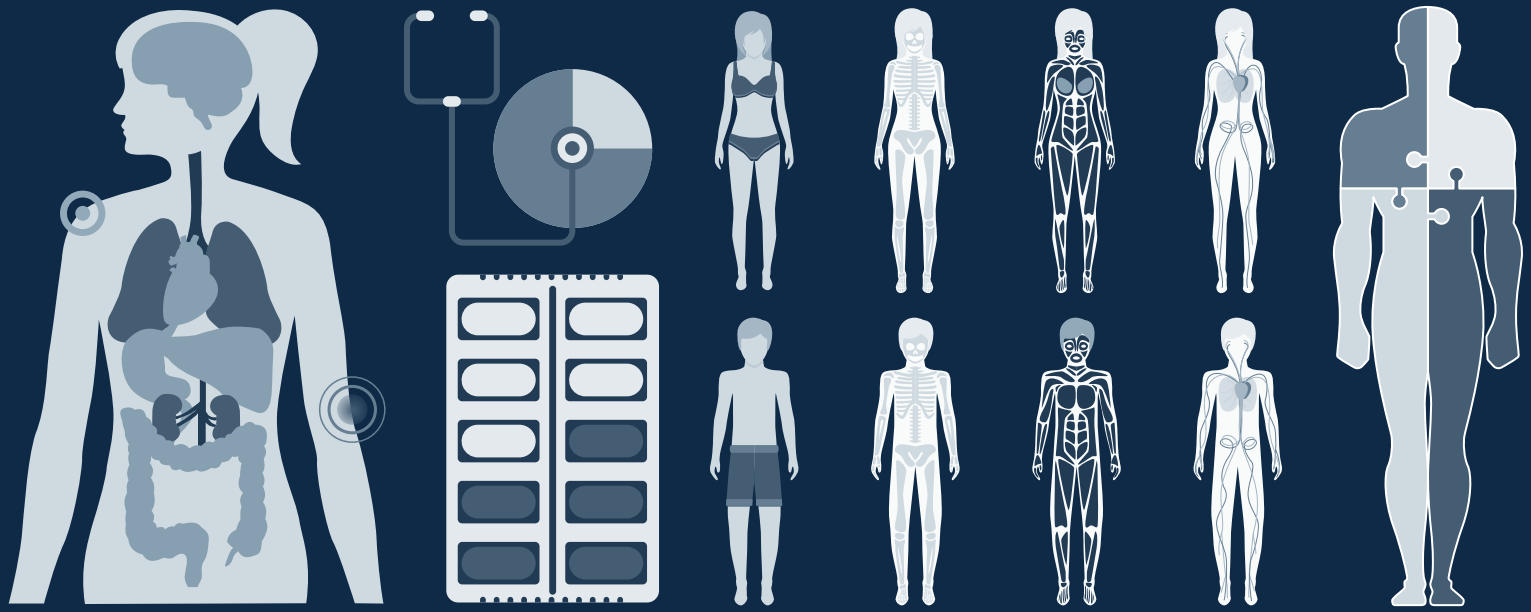

JANUARY
FEBRUARY
MARCH
APRIL
PHASE 1
Task 1
Task 2

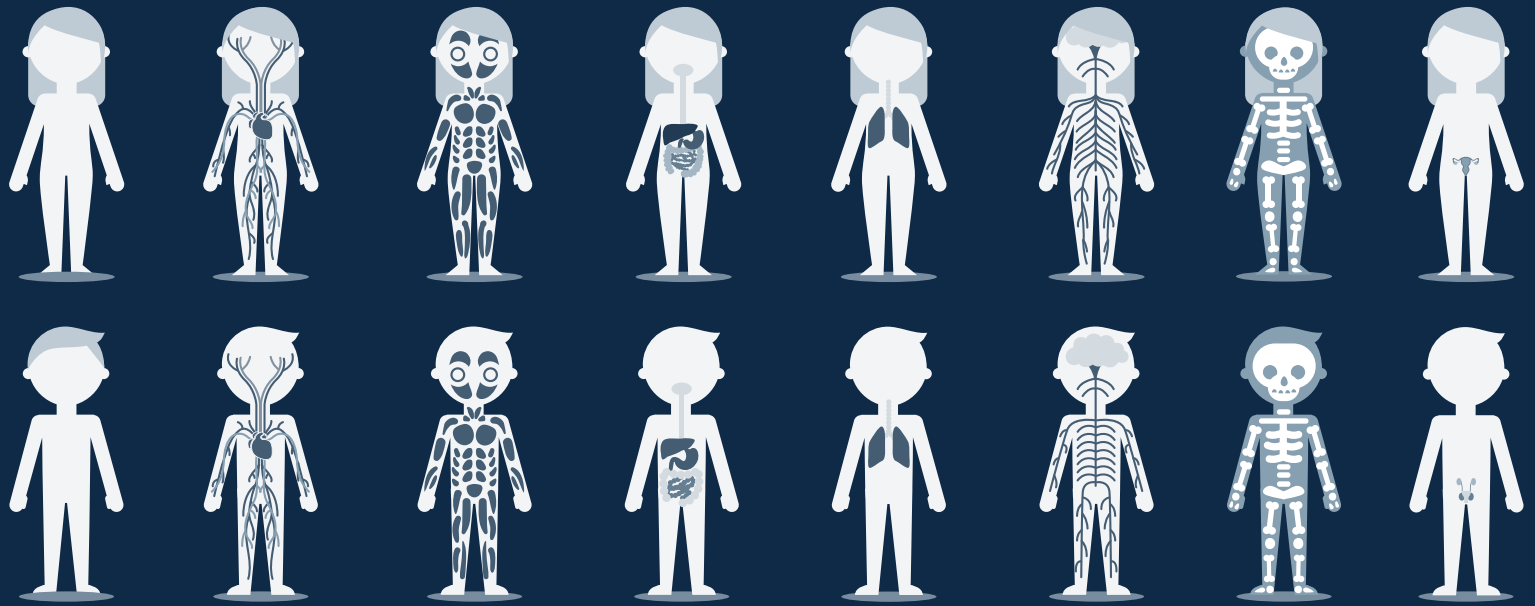




Medical Infographics







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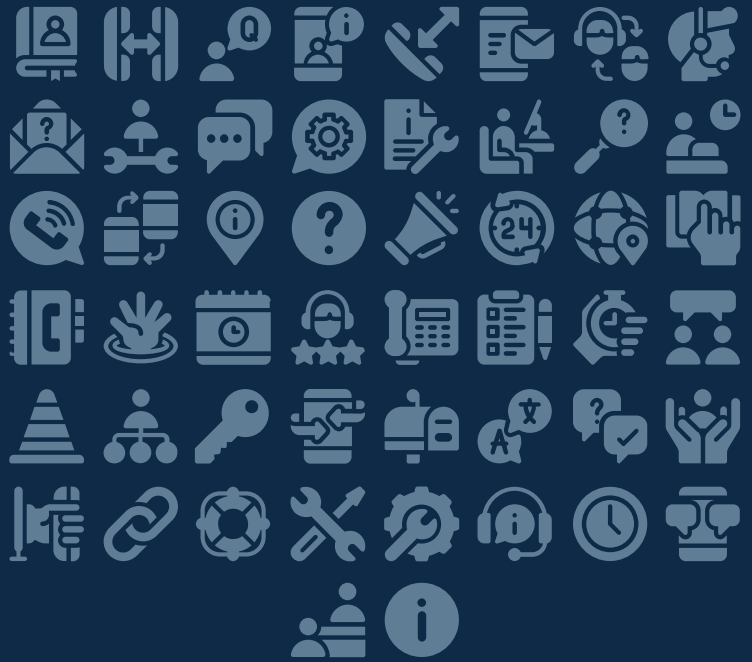
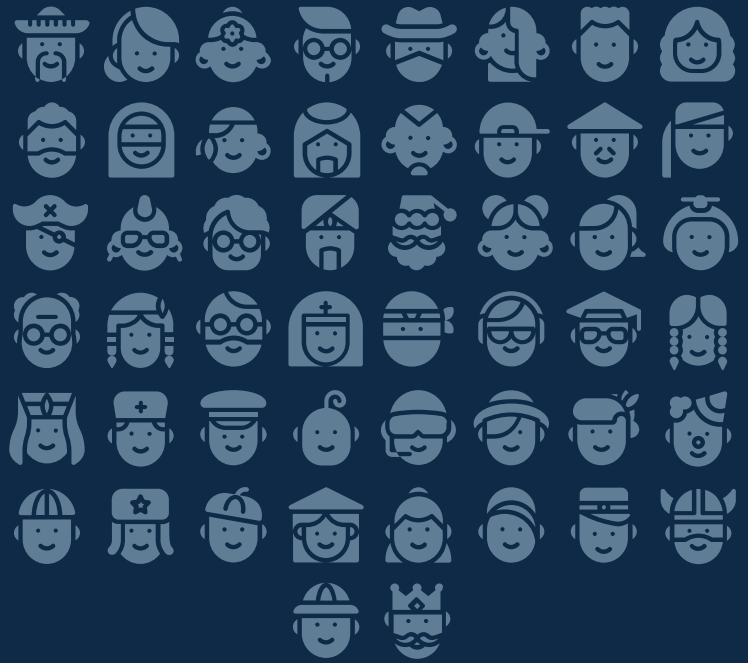


Avatar Icons



Creative Process Icons

Performing Arts Icons

Nature Icons

SEO & Marketing Icons