

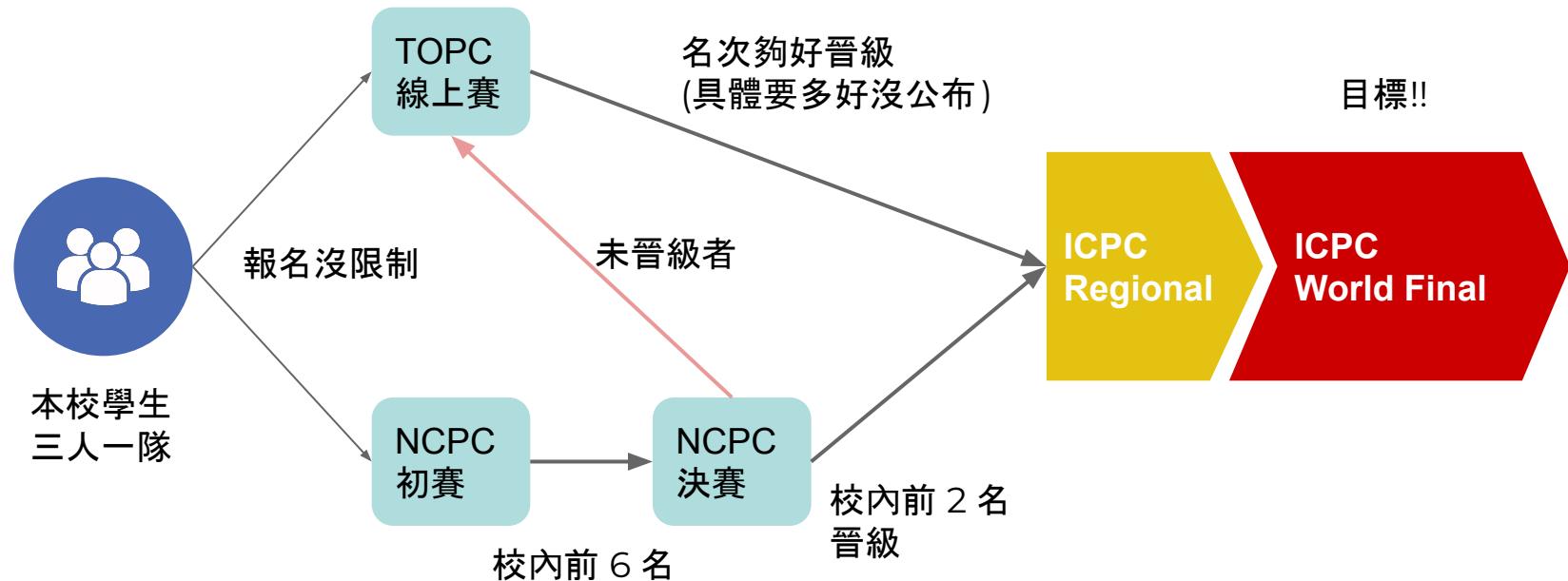
# 國立清華大學 競技程式設計—

展現任性  
貫徹意志

[shorturl.at/gnPX6](http://shorturl.at/gnPX6)



# 課程目的: 訓練 ICPC 競賽選手



# International Collegiate Programming Contest

- 最具影響力的大學生資訊競賽
- 同校三人組成隊伍，比賽時共用一台電腦
- 五小時內寫程式解決 9~14 道題目



# Problem Topic

- Algorithm
- Data Structure
- Implementation
- Dynamic Programming
- Tree and Graph
- Mathematic
- String algorithm
- Geometry
- Flow
- ...

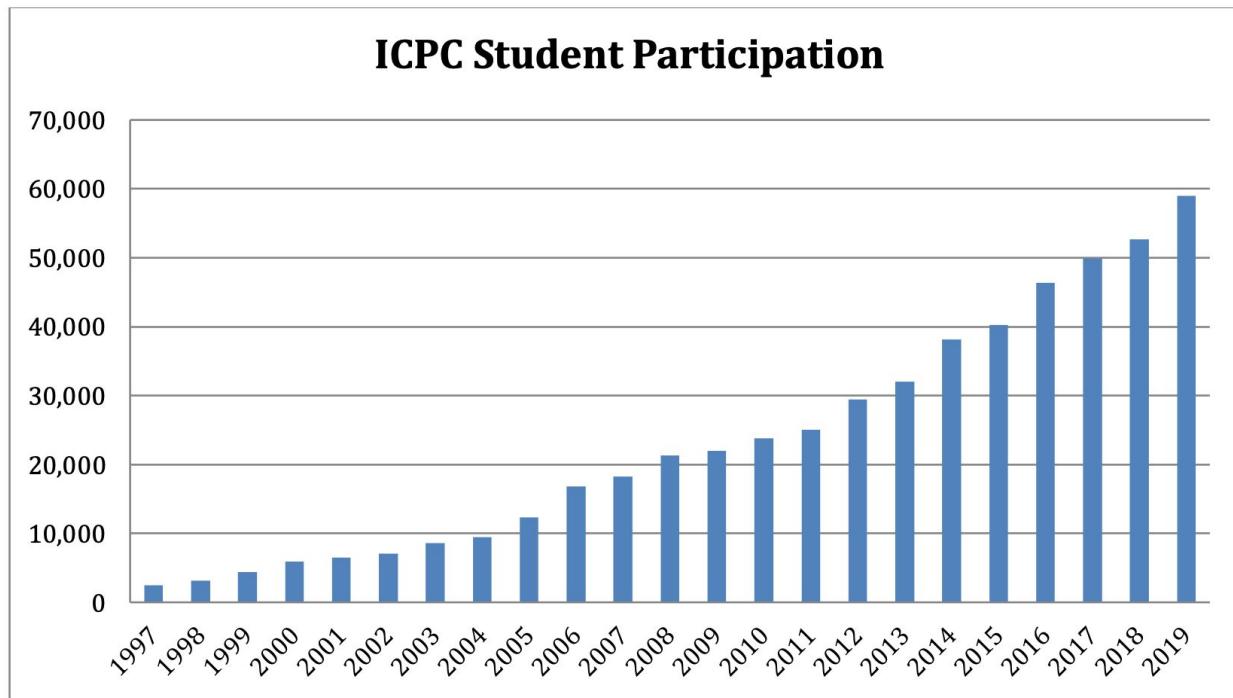
# Judge System

13:46	E	CPP	WRONG-ANSWER
13:17	E	CPP	WRONG-ANSWER
13:15	E	CPP	COMPILER-ERROR
13:14	E	CPP	COMPILER-ERROR
13:12	H	CPP	CORRECT
13:03	H	CPP	TIMELIMIT
12:56	E	CPP	WRONG-ANSWER
12:51	E	CPP	WRONG-ANSWER
12:45	G	CPP	CORRECT
12:37	B	CPP	CORRECT
12:35	G	CPP	WRONG-ANSWER
11:41	E	CPP	WRONG-ANSWER
11:41	A	CPP	CORRECT
11:38	A	CPP	NO-OUTPUT



## Contest Growth

The ICPC Foundation, UPE, and Baylor University are thrilled that the contest continues to attract the best and brightest students from around the world. This year 58,963 contestants from 3,406 universities in 104 countries competed in regional competitions at over 643 sites worldwide. The ICPC student participation has increased by 20X in 20 years. For more information on previous contests, and last year's final standings and problem sets, please see [icpc.global](http://icpc.global).



# ICPC Regional

- 各區域舉辦區域賽選拔隊伍進入 World Final (9月 ~ 12月)
- 亞洲尊絕不凡有三區 (臺灣在 Asia pacific)
- ICPC 總部會發 WF 門票給各個區域
- 各區域中每一站的前  $\times$  名能獲得 WF 資格



# The 2019 ICPC Asia Pacific Contests

🏆 The 2019 ICPC Asia Danang Regional Contest

🏆 The 2019 ICPC Asia Jakarta Regional Contest

🏆 The 2019 ICPC South Pacific Independent Regional Contest

🏆 The 2019 ICPC Asia Taipei-Hsinchu Site Programming Contest

🏆 The 2019 ICPC Asia Yokohama Regional Contest

🏆 The 2019 ICPC Asia Pacific and Southeast Provincials, National and Invitational Contests

🏆 The 2019 ICPC Asia Bangkok Programming Contest

🏆 The 2019 ICPC Asia Seoul Regional Contest

🏆 The 2019 ICPC Asia Manila Regional Contest

🏆 The 2019 ICPC Asia Kuala Lumpur Regional Contest



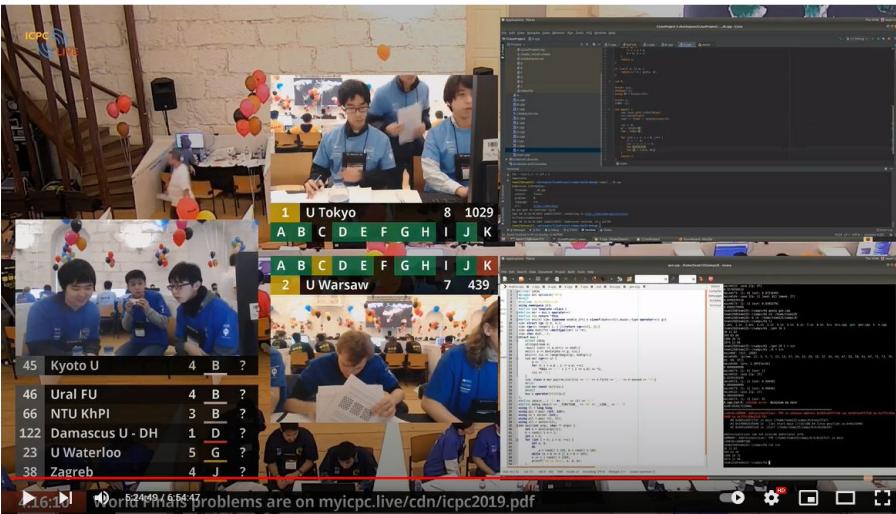
# ICPC Taipei regional contest

- 以前通常都是台清交獨佔前面的名次
- 近幾年越來越多學校投入資源在ICPC



# ICPC World Final

- 辦在世界的某個角落 (3月 ~ 4月)
- 2019 年有快 90 所大學參加
- 非常盛大，會有全程好幾小時的直播 (電競比賽)



CURRENT STANDINGS													
	<b>Σ</b>	<b>PEN</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>	<b>I</b>	<b>J</b>	<b>K</b>
1	U Warsaw	7	439	+	+1	-	+	+	+	+	+	+	-1
2	Moscow SU	7	598	+	+	+	+	+1	-2	+	+1	+	-4
3	MIT	7	670	+	+	+	+	+	+	+	+	+	
4	U Tokyo	7	739	+	+1	-	+	+	-2	+2	+	+	
5	Seoul National U	7	783	+	+	-	+1	+2	+2	+	+	+3	
6	KUT	7	803	+	+1	-	+1	+	+	+	+	+	
7	National Taiwan U	7	901	+	+	-	+	+	+	+	+	+	
8	Sharif UT	6	635	+	+1	-	+	+	+	+	+	+	
9	UP Catalunya	6	636	+	+	-	+	+	+	+	+	+	
10	MIPT	6	698	+	+	-1	+	+1	+	+	+	+	
11	HSE	6	717	+	+2	-	+1	+1	+1	+	+	+	
12	Fudan U	6	795	+1	-	-	+	*6	+	+	+	+	
13	NJU	6	862	+	*3	-	+1	+	-2	+4	+1	+	
14	U Wroclaw	5	348	+	-	-	+	+	-1	+1	+	+1	
15	KAIST	5	459	+1	-4	-	+	+1	+3	+	+	+	
16	UI	5	492	+3	-4	-	+	+	+	+	+	+	
17	Belarusian SU	5	514	+	-2	-	+	+	+	+2	+	+	
85	FCIS Ain Shams	3	H	AC									
16	UI	5	B	WA									
19	Zhejiang U	5	B	AC									
20	Princeton	5	E	AC									
21	Waterloo	5	G	?									
38	Zagreb	4	J	?									
84	CUHK	1	D	?									
116	LAU	5	613	+	-	-	+1	+1	+	+	+	+	



• 2019 Gold	Moscow State University Massachusetts Institute of Technology The University of Tokyo University of Warsaw
Silver	National Taiwan University University of Wroclaw Seoul National University KimChack University of Technology
Bronze	Sharif University of Technology Moscow Institute of Physics & Technology National Research University Higher School of Economics The Chinese University of Hong Kong
• 2018 Gold	Moscow State University Moscow Institute of Physics & Technology Peking University The University of Tokyo
Silver	Seoul National University University of New South Wales Tsinghua University Shanghai Jiao Tong University
Bronze	St. Petersburg ITMO University University of Central Florida Massachusetts Institute of Technology Vilnius University Ural Federal University

• 2017 Gold	St. Petersburg ITMO University University of Warsaw Seoul National University St. Petersburg State University
Silver	Moscow Institute of Physics & Technology Tsinghua University Peking University Fudan University
Bronze	KAIST Ural Federal University KTH - Royal Institute of Technology The University of Tokyo









# Pros



## CS Fundamental

程設、DS、Algo



## 經歷

履歷、推甄、求職  
外商白板題



## 人脈

認識大神、內推  
認識教授們



## 比賽、出國

競技所帶來的刺激感  
團隊合作的歸屬感  
大家一起朝著同一個  
目標努力

Cons



Time Consuming



# Pros

刷了一個月  
LxxtCode



嗚嗚 Medium 題目  
怎麼這麼難

ICPC 選手



Hard 跟 Easy 差在哪  
字數嗎

# 教學進度(Syllabus)

1. ICPC 介紹、環境介紹、C++語法複習考
2. 遞迴函數與枚舉
3. 暴力搜索與剪枝
4. 時間複雜度 and C++ STL 1
5. 二分搜尋 and C++ STL 2
6. 基本資料結構應用
7. BFS
8. 期中考
9. 基礎數論
10. 基礎動態規劃
11. Tree & Disjoint Set
12. Graph
13. 其他解題技巧
14. 線段樹
15. 期末考

子曰：“知者乐水，仁者乐山。”

知晓武艺的人喜欢凭力断水流，仁德的武者  
喜欢徒手开山锻炼身体。

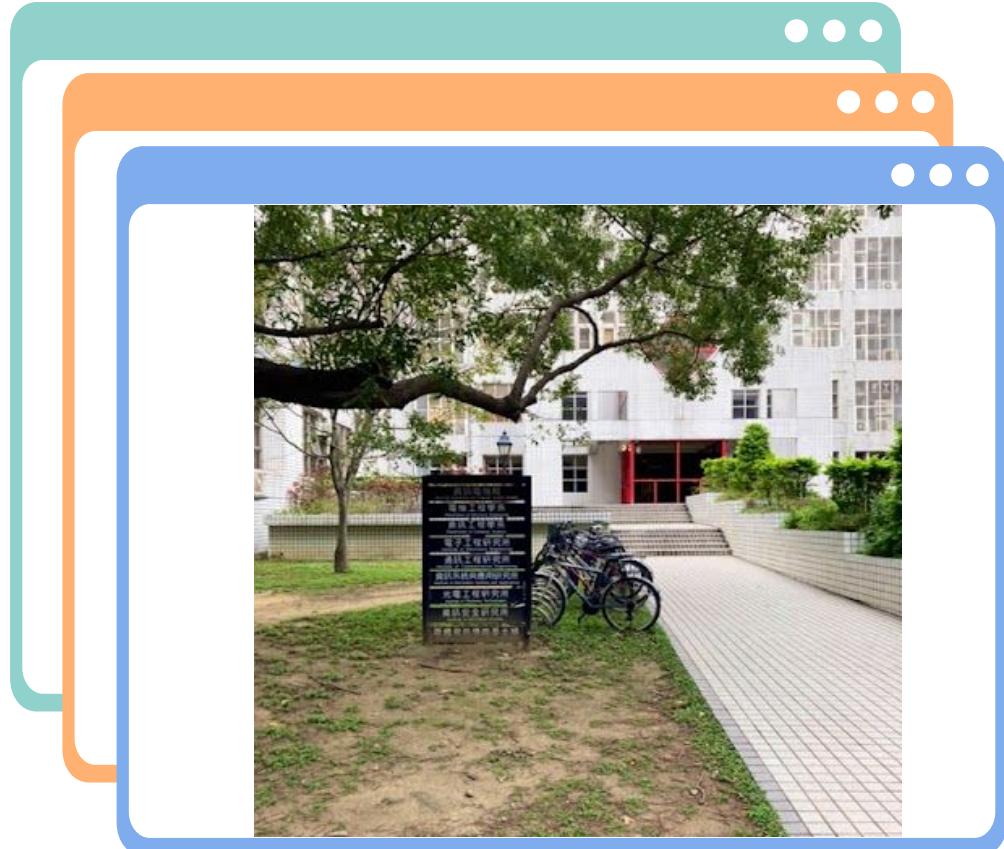
——《论语》





# 老師、助教辦公室

資電館 124



# 評分方式

期末考

20%

10%

20%

50%

課外競賽參與

參與 TOPC: 5 分

參與 NCPC 初選: 5 分

其他競賽參與:

每個 1 分

期中考

作業成績

每周都會有多道題目



# 其他競賽列表

- Codeforces
- Atcoder
- Google codejam
- Google kickstart
- Facebook Hackercup

有任何題目問題沒事就多問問助教

學而不思則罔，思而不學則殆

你學我的武功不學我的思想就會迷惘，  
你學我的思想不學我的武功就會被人打死。

子曰：不耻下问

译：看到我不自愧者，你就去  
下面问问



# 和學校其他課程的差異

## 競賽導向



大量學校課程不會教的內容

## 解題



透過大量題目思考如何應用資料結構與演算法

## 實做



以精簡又有效率的方法實做各個資料結構與演算法

# 歡迎參與 清大競技程式設計

eeclass:

<https://eeclass.nthu.edu.tw/course/9206>

粉絲專頁：

<https://www.facebook.com/NTHUCP/>

Join us in Discord:

<https://discord.gg/ghGVvSHuga>

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# 考試時間

## 關於第一堂課測驗與加簽標準

x

Views: 0, Publish date 09-12, 競技程式設計—Competitive Programming Training (I), by 李泓輝

各位同學好，

第一次上課 (9/12) 老師和助教們準備了一個簡單的小測驗。

該測驗不算成績，但是沒通過門檻的同學我們會建議退選；對於加簽的同學，必須要參加測驗並通過門檻後才有加簽資格。

測驗將在 20:30 開始，使用 codeforces.com 上的 virtual participation 功能

測驗連結將在 20:30 分公告，屆時請依照下列步驟開始 virtual participation

- 1) 登入 codeforces.com (如果你還沒有帳號，請盡早註冊)
- 2) 助教會在 20:30 公告 contest link
- 3) contest page 右側會有一個 "start virtual participation" 按鈕，點下去 (圖一)
- 4) 開始時間選 20:30，並按下 "register for virtual participation" (圖二)
- 5) 20:30 後即可看到題目
- 6) contest 結束後，請在此表單填寫成績：<https://forms.gle/25Azc5wyxKmMYo7Z6>

測驗門檻暫定為 AC 2 題，我們會根據大家解題情況更改門檻

大家加油歐~

登記成績 → <https://forms.gle/25Azc5wyxKmMYo7Z6>



## → Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

[Start virtual contest](#)

### Registration for virtual participation

Notice:

#### virtual participation

Terms of  
agreement:

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests.

If you've seen these problems, a virtual contest is not for you - solve these problems in the archive.

If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive.

Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Take part:

- as individual participant  
 as a team member

Virtual start time:

Sep/12/2022 20:30 (in timezone UTC +08:00)

Use datetime format like 03/07/2010 11:00PM

[Register for virtual participation](#)

• • •

UPDATE 加簽測驗 codeforces 連結：  
<https://codeforces.com/contest/825>



# CONTENTS OF THIS TEMPLATE

Here's what you'll find in this **Slidesgo** template:

1. A slide structure based on a medical presentation, which you can easily adapt to your needs.  
For more info on how to edit the template, please visit **Slidesgo School** or read our **FAQs**.
2. An assortment of graphic resources that are suitable for use in the presentation can be found in the **alternative resources slide**.
3. A **thanks slide**, which you must keep so that proper credits for our design are given.
4. A **resources slide**, where you'll find links to all the elements used in the template.
5. **Instructions for use**.
6. Final slides with:
  1. The **fonts and colors** used in the template.
  2. A **selection of illustrations**. You can also customize and animate them as you wish with the online editor. Visit **Storyset** to find more.
  3. More **infographic resources**, whose size and color can be edited.
  4. Sets of **customizable icons** of the following themes: general, business, avatar, creative process, education, help & support, medical, nature, performing arts, SEO & marketing, and teamwork.

You can delete this slide when you're done editing the presentation.



# TABLE OF CONTENTS

## 01. OUR CENTER

You can describe the topic of the section here

## 02. KEY NUMBERS

You can describe the topic of the section here

## 03. PATIENT CARE

You can describe the topic of the section here

## 04. KEY ACCOMPLISHMENTS

You can describe the topic of the section here



# 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

# 01.

## OUR CENTER

You can enter a subtitle  
here if you need it



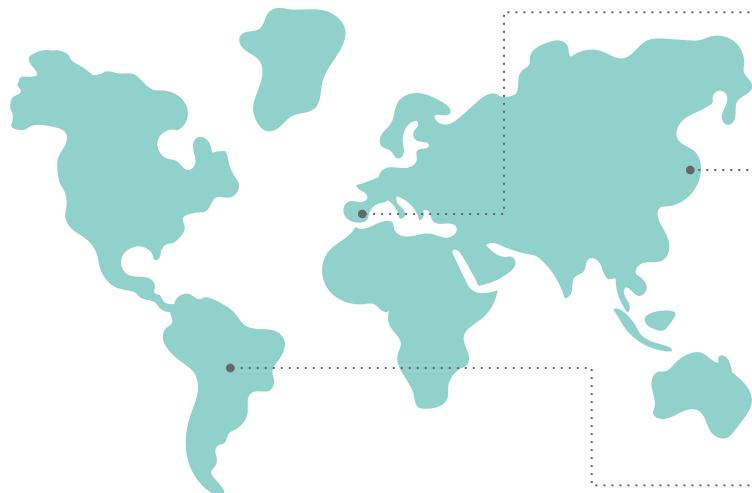


**AWESOME  
WORDS**



A PICTURE IS WORTH  
A THOUSAND WORDS

# THIS IS A MAP



**VENUS**

Venus is the second planet from the Sun



**MARS**

Despite being red, Mars is actually a cold place



**SUN**

It's the star at the center of the Solar System

# OUR CENTER

Do you know what helps you make your point clear?

Lists like this one:

1. They're simple
2. You can organize your ideas clearly
3. You'll never forget to buy milk!

And the most important thing: the audience won't miss the point of your presentation





## MISSION

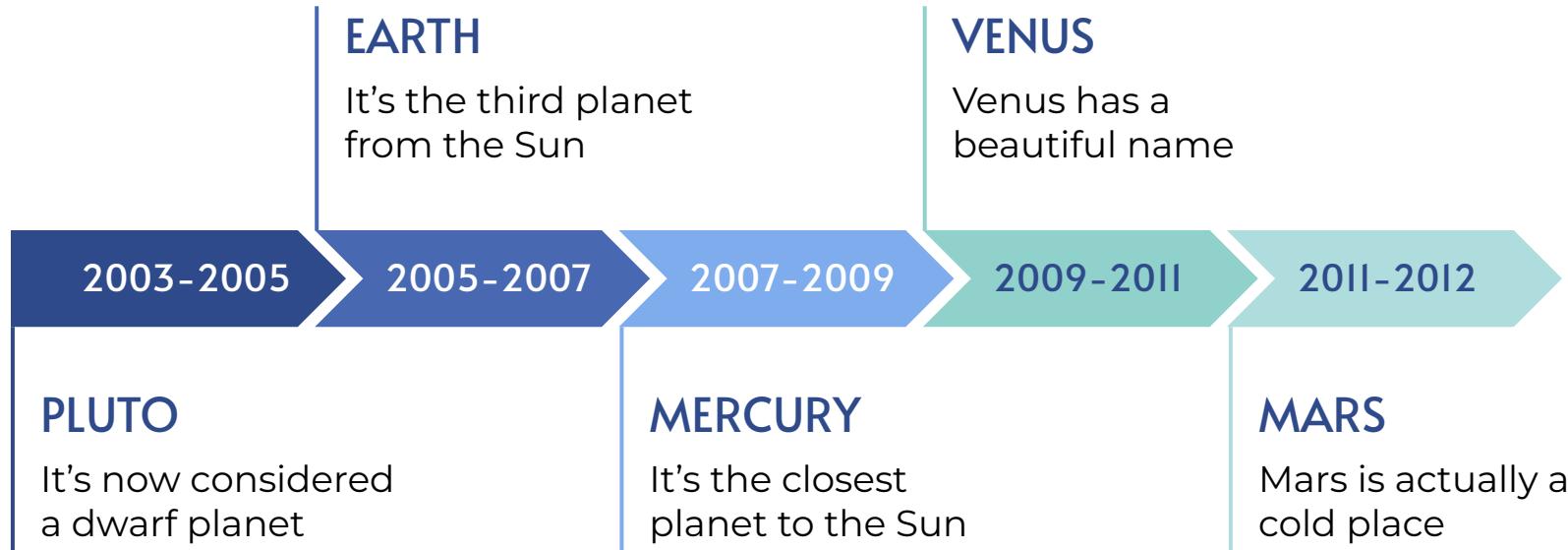
Mercury is the smallest planet and the closest one to the Sun



## VISION

Neptune is the farthest planet from the Sun. It's also the fourth-largest

# MILESTONES REACHED



# KEY ACCOMPLISHMENTS



## MERCURY

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



## VENUS

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



## MARS

Despite being red, Mars is actually a cold place. It's full of iron oxide dust

# KEY NUMBERS



**120,000**

Pluto is now considered a dwarf planet



**30,000**

Mars is actually a cold place

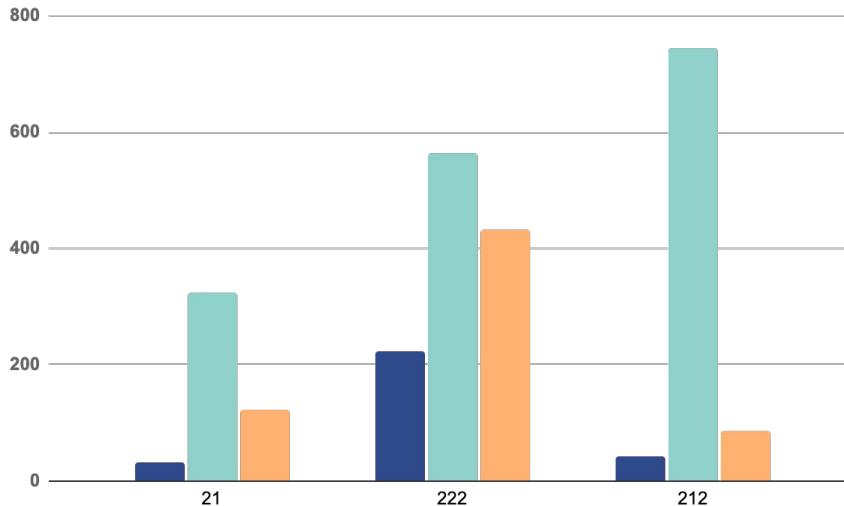


**5,000**

Mercury is the smallest of them all



# OUR GRAPHS



\* To modify this graph, click on it, follow the link, change the data and paste the new graph here, replacing this one.  
[You can see how to modify the graph here](#)

## MERCURY ●

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

## VENUS ●

Venus has a beautiful name and is the second planet

## MARS ●

Despite being red, Mars is actually a cold place full of iron oxide



# SERVICES



## MERCURY

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

## MARS

Despite being red, Mars is actually a cold place. It's full of iron oxide dust



## VENUS

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

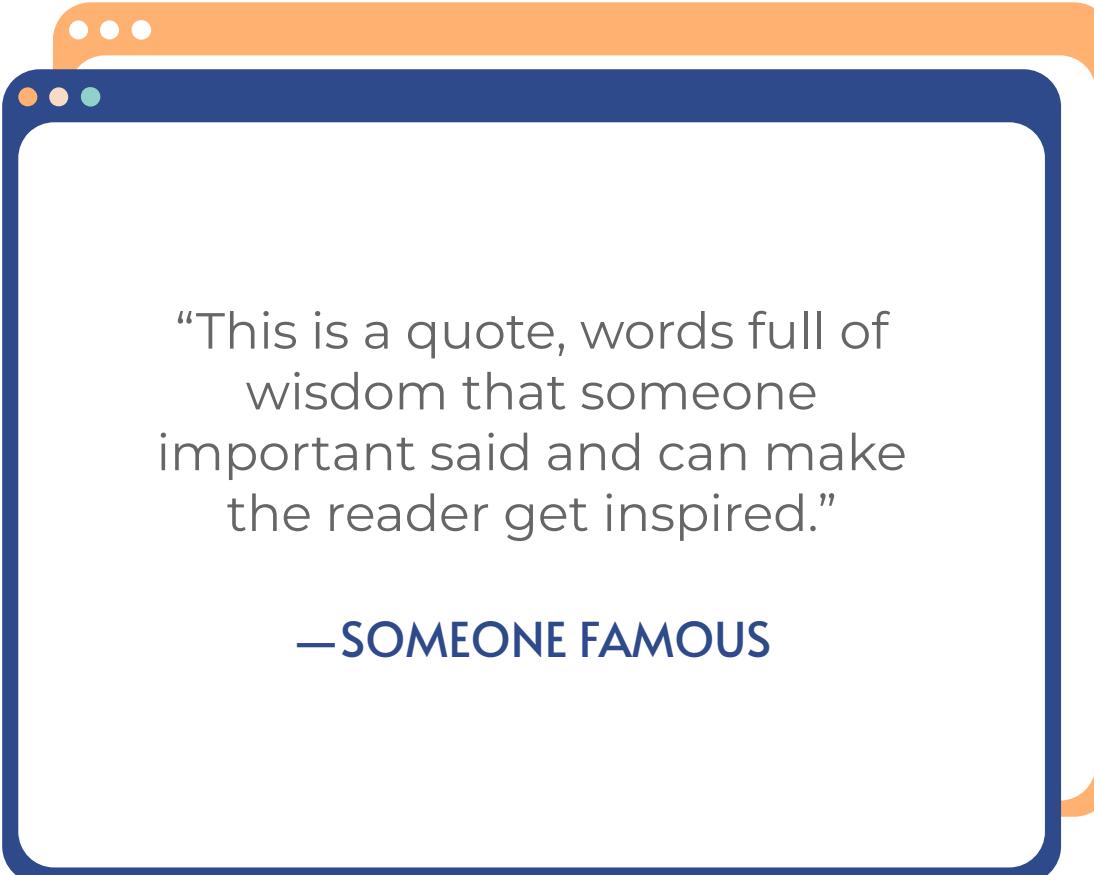


## NEPTUNE

Neptune is the farthest planet from the Sun. It's also the fourth-largest

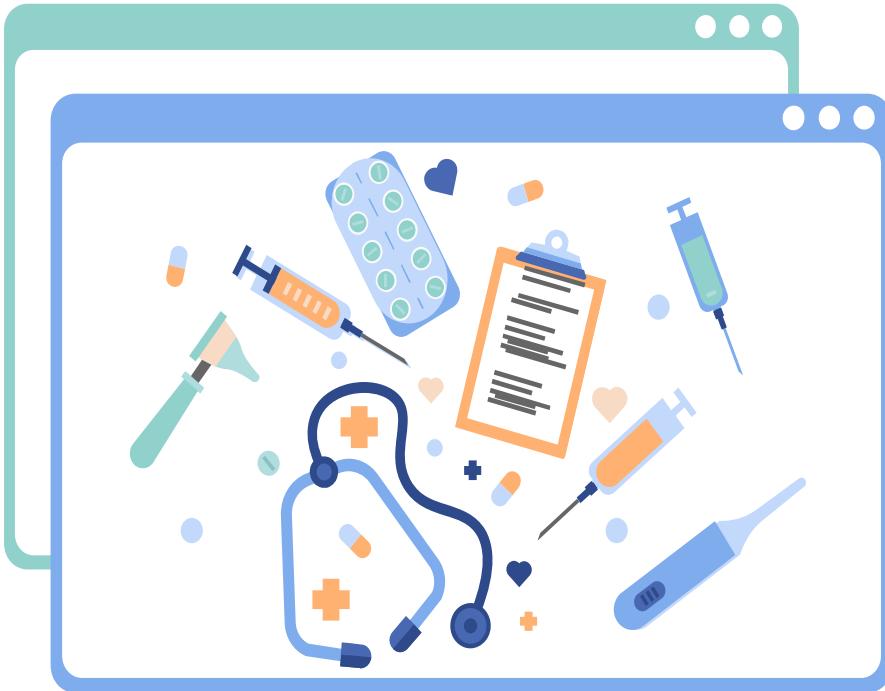
# QUALITY IMPROVEMENT MEASURES

	MERCURY	MARS
JUPITER	Mercury is the smallest planet of them all	Jupiter is made of gas and it's the biggest planet of them all
SATURN	Venus is the second planet from the Sun	Saturn is a gas giant and has several rings
VENUS	Despite being red, Mars is actually a cold place	Neptune is the farthest planet from the Sun



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

—SOMEONE FAMOUS



## A BRIEF STORY

Saturn is a gas giant and has several rings. It's composed mostly of hydrogen and helium. It was named after the Roman god of wealth

# OUR PROCESS

## JUPITER

Jupiter is a gas giant and the biggest planet

## NEPTUNE

Neptune is the farthest planet from the Sun



## MERCURY

Mercury is the closest planet to the Sun

## PLUTO

It's now considered a dwarf planet

# AWARDS

## MERCURY



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

## VENUS



Venus has a beautiful name and is the second planet

## MARS



Despite being red, Mars is actually a cold place. It's full of iron oxide

# PATIENT CARE

Neptune is the farthest planet from the Sun. It's also the fourth-largest object by diameter in the Solar System





# AREAS WE COVER



## MERCURY

It's the closest planet to the Sun of them all



## VENUS

Venus is the second planet from the Sun



## MARS

Mars is actually a very cold place



## JUPITER

Jupiter is the biggest planet of them all



## SATURN

It's composed of hydrogen and helium



## NEPTUNE

It's the farthest planet from the Sun

A graphic featuring three overlapping web browser windows. The top window has a light blue header bar with three white dots. The middle window has a teal header bar with three white dots. The bottom window has a dark blue header bar with orange, yellow, and green dots. All three windows have a white body area. In the center of the bottom window, the text '20,000,000' is displayed in a large, bold, dark blue sans-serif font.

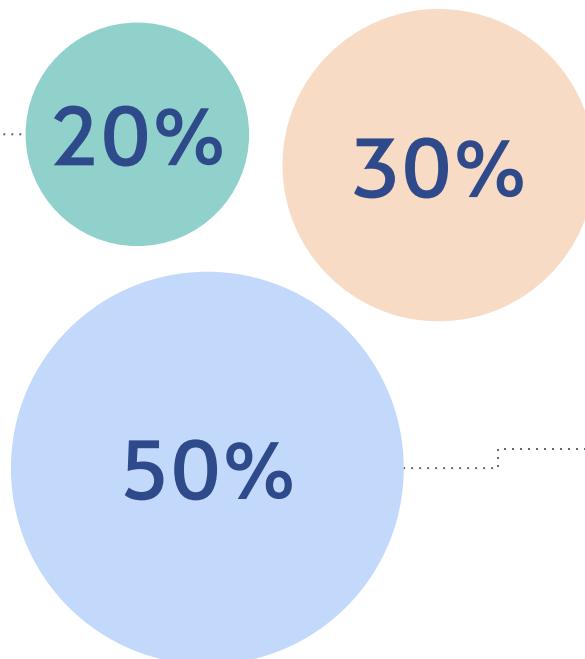
20,000,000

Big numbers catch your audience's attention

# PATIENT SATISFACTION

MERCURY

Mercury is the closest planet to the Sun



JUPITER

Jupiter is a gas giant and the biggest planet

NEPTUNE

Neptune is the farthest planet from the Sun

# INNOVATIONS



## MARS

Despite being red, Mars is actually a cold place. It's full of iron oxide dust

## VENUS

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

## MERCURY

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

# OUR TEAM

JENNA DOE



You can talk a bit about  
this person here

TIMMY JIMMY



You can talk a bit about  
this person here

# TESTIMONIALS

"Mercury is the closest planet to the Sun"

**JENNA DOE, 25**

"Despite being red, Mars is actually a cold place"

**JOHN JAMES, 36**

"Venus is the second planet from the Sun"

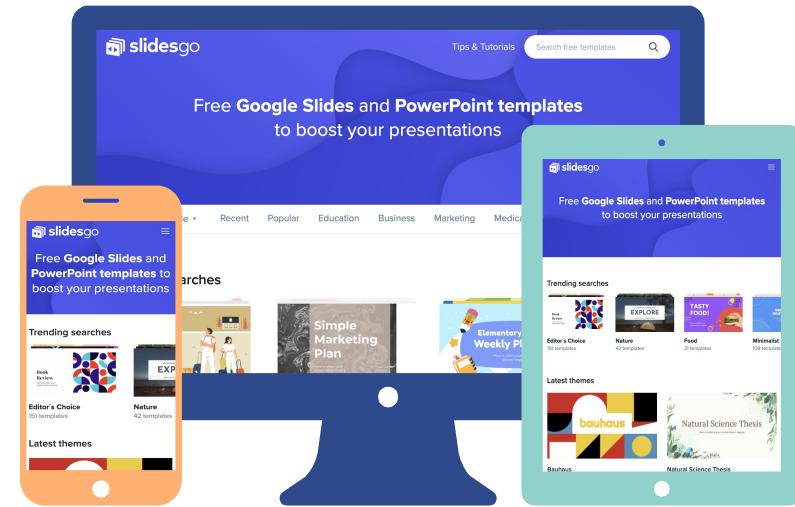
**FRED BLOGGS, 31**

"Neptune is the farthest planet from the Sun"

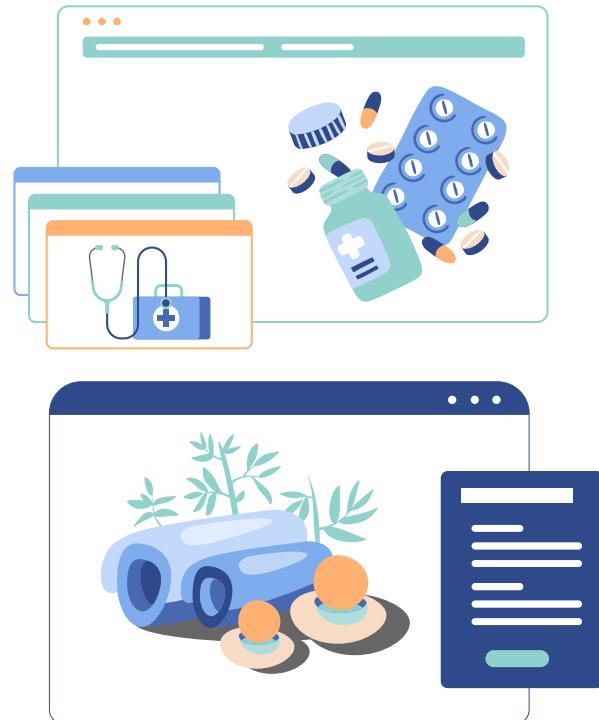
**HELENA SMITH, 58**

# VISIT OUR WEBSITE!

You can replace the image on the screen with your own work. Just right-click on it and select “Replace image”



# ALTERNATIVE RESOURCES





# RESOURCES

Did you like the resources on this template? Get them for free at our other websites:

## VECTORS

- Organic motiongraphics landing page template
- Hand drawn national nurses day illustration
- Nature cosmetics landing page template
- Illustrated medical stickers set
- Medical feast illustration with thermometer and stethoscope
- Health clinic poster template
- Young doctors health professional team
- Self care health concept
- World health day flat design

## PHOTOS

- Close-up patient talking to doctor online
- Medium shot health worker helping patient
- Cheerful medics team in lab
- Female doctor taking notes on a clipboard

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(<https://fonts.google.com/specimen/Alata>)

## Montserrat

(<https://fonts.google.com/specimen/Montserrat>)

#2f4a8a

#ffffff

#666666

#4869b1

#7eacec

#f8dbc4

#ffb172

#c3d9fb

#90d1cb

#afdcdd

# Storyset

Create your Story with our illustrated concepts. Choose the style you like the most, edit its colors, pick the background and layers you want to show and bring them to life with the animator panel! It will boost your presentation. Check out [How it Works](#).



Pana



Amico



Bro



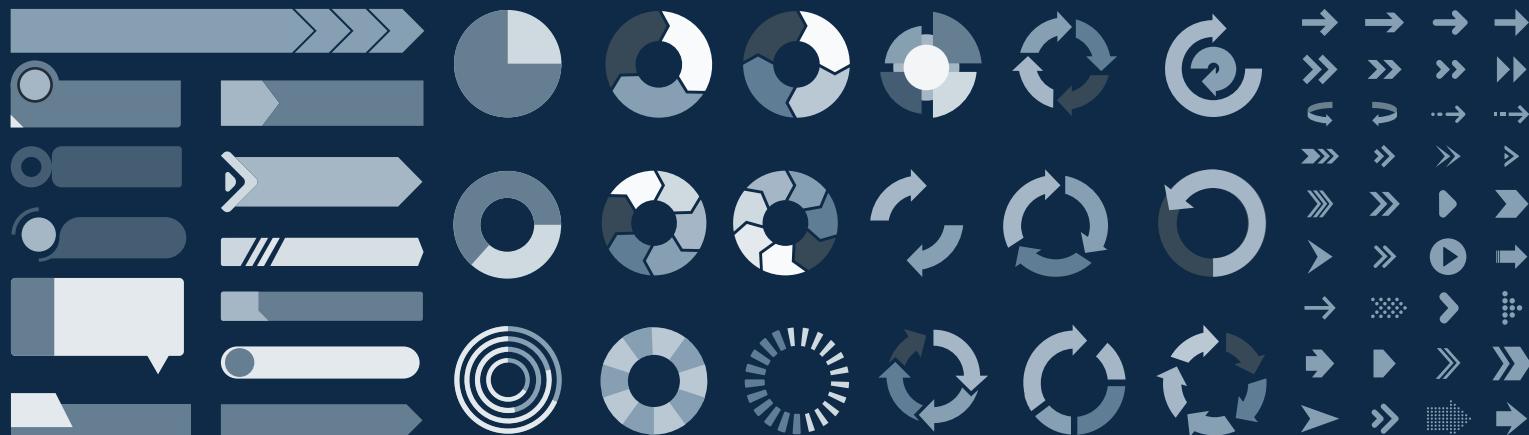
Rafiki

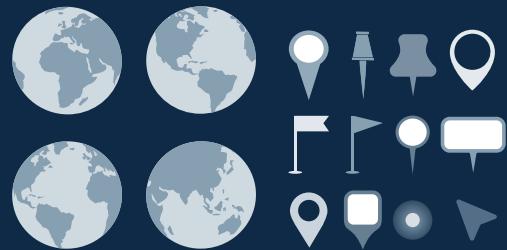


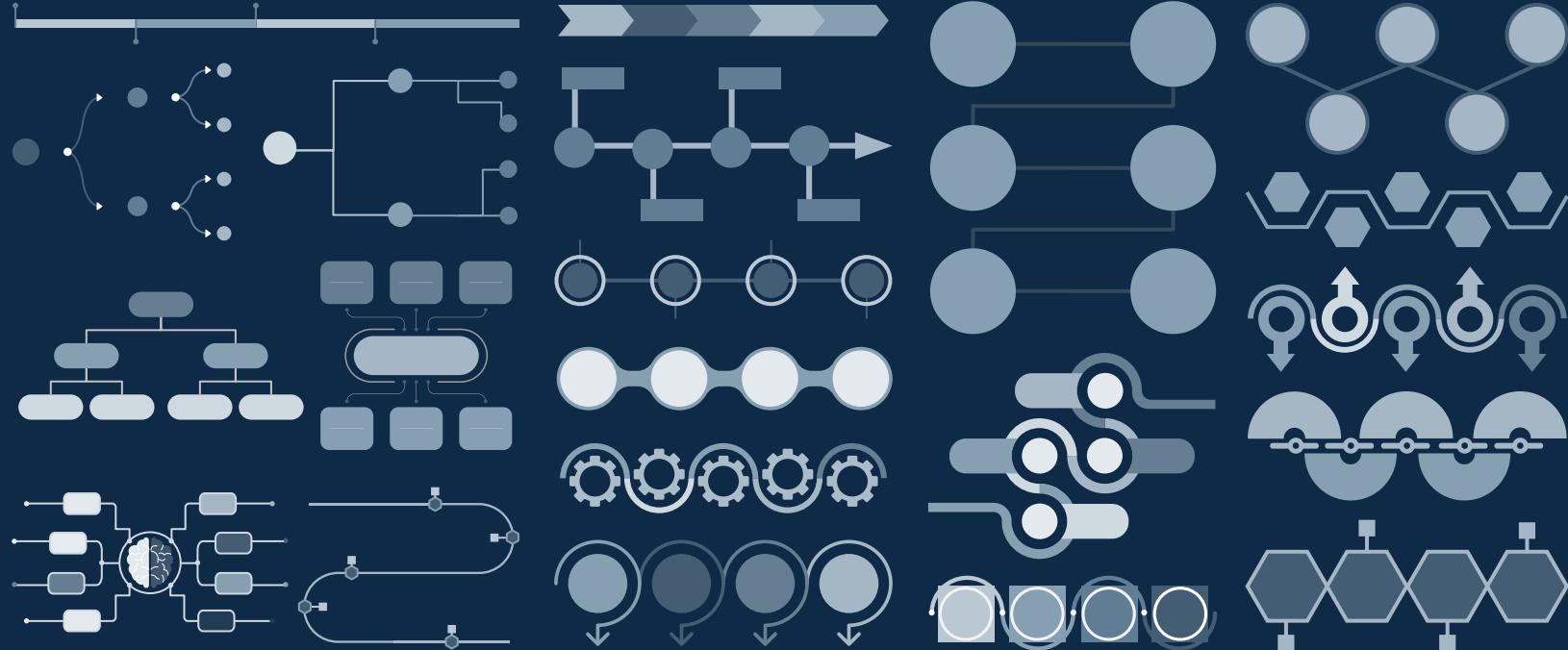
Cuate

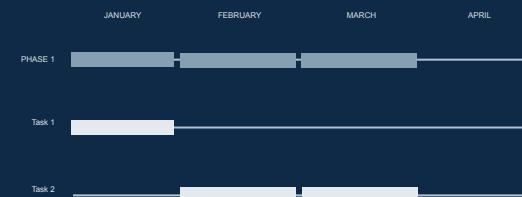
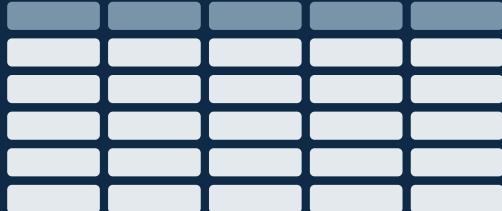
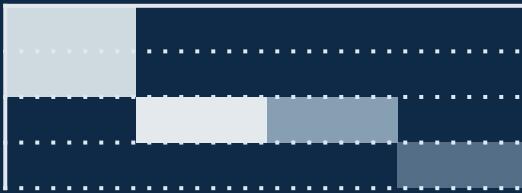
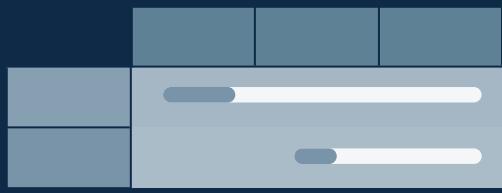
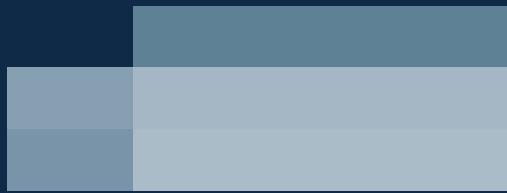
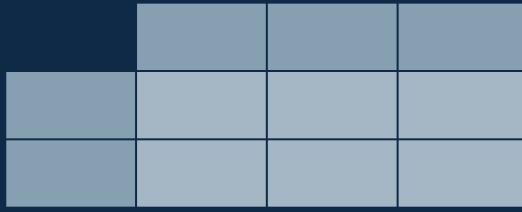
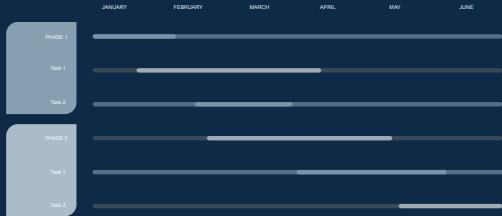
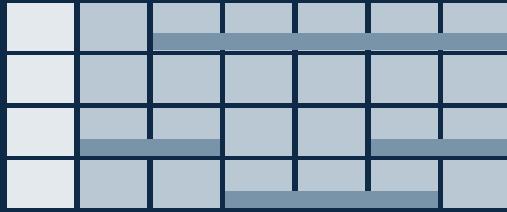
# Use our editable graphic resources...

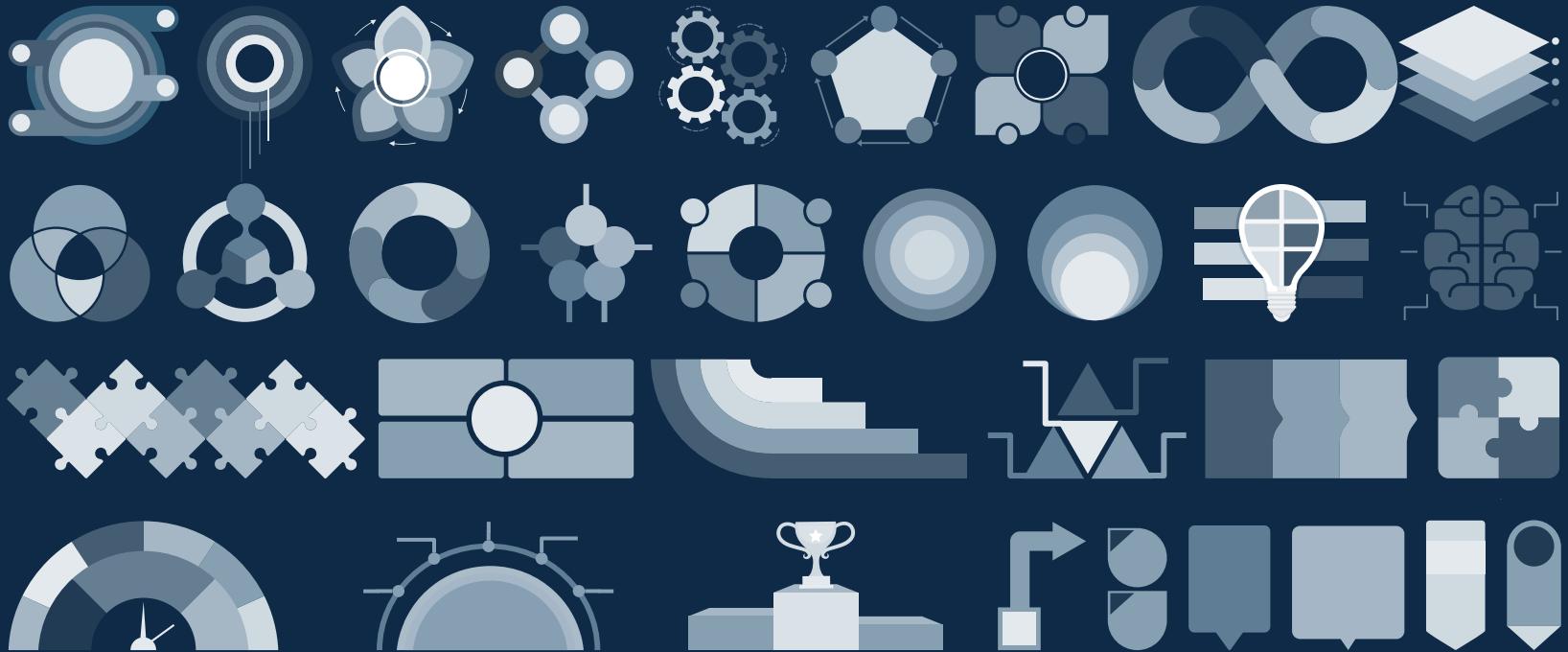
You can easily resize these resources without losing quality. To change the color, just ungroup the resource and click on the object you want to change. Then, click on the paint bucket and select the color you want. Group the resource again when you're done. You can also look for more infographics on Slidesgo.

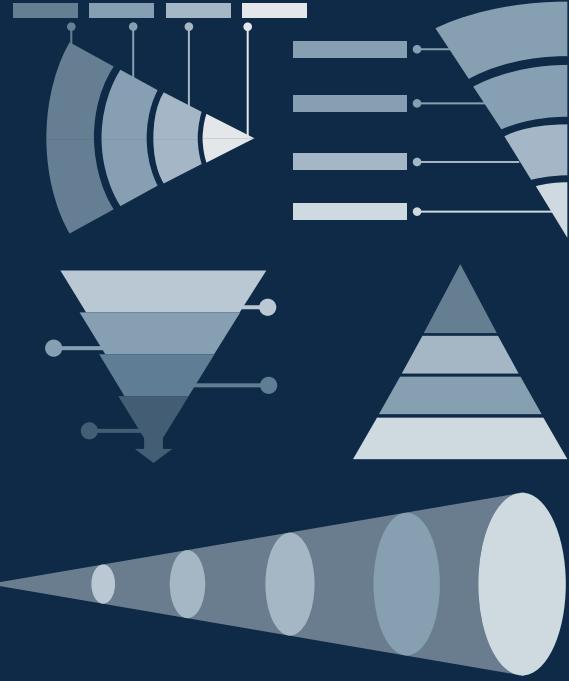
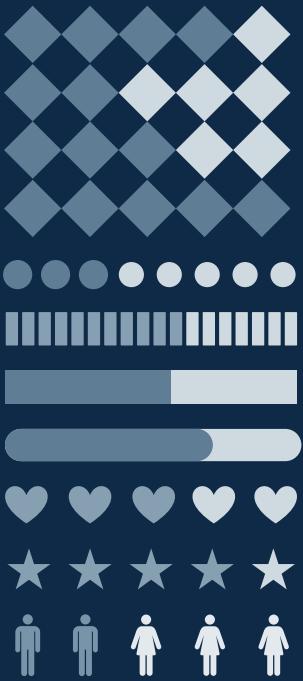
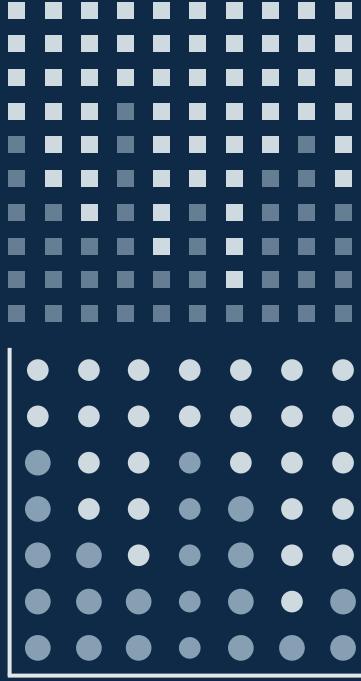












# Medical Infographics

