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You could describe the topic of the section here

## Analysis

You could describe the topic of the section here



$$a^2 + b^2 = c^2$$

## Presentation

You could describe the topic of the section here

## Conclusion

You could describe the topic of the section here

# Soal

1. Lakukan eksplorasi sederhana pada data dan ceritakan insight yang Anda dapatkan dari data tersebut! (dapat ditambah analisis lain yang menurut kelompok Anda akan bermanfaat)
  - a. Visualisasikan karakteristik karyawan yang resign dari perusahaan tersebut!
  - b. Apakah karyawan memilih untuk resign setelah mendapatkan promosi?
  - c. Departemen manakah yang memiliki karyawan loyal paling banyak?
  - d. Lakukan analisis korelasi antar atribut, visualisasikan atribut-atribut yang memiliki korelasi. Jika ada, sampaikan pendapat anda mengenai keterkaitan atribut tersebut

Mahasiswa perlu menambahkan **dua poin eksplorasi sendiri**.

2. Buatlah beberapa model yang mungkin akan diperlukan, diantaranya: (dapat ditambah analisis lain yang menurut kelompok Anda akan bermanfaat)
  - a. Lakukan prediksi untuk mengetahui apakah karyawan akan resign atau tidak di perusahaan tersebut. Bagaimana hasil prediksi anda dapat membantu perusahaan dalam mengambil keputusan?
  - b. Lakukan prediksi untuk mengetahui berapa lama seorang karyawan akan bertahan di perusahaan tersebut. Bagaimana hasil prediksi anda dapat membantu perusahaan dalam mengambil keputusan?
  - c. Lakukan analisis cluster yang dapat terbentuk pada data karyawan. Deskripsikan karakteristik masing-masing cluster yang didapatkan!

Progres Proyek Akhir KASDD

Resignment Intention (RES)

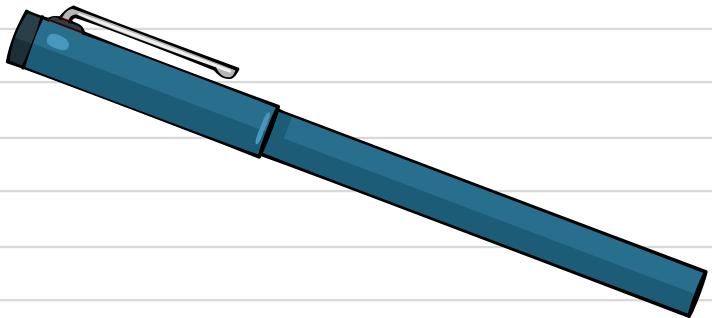
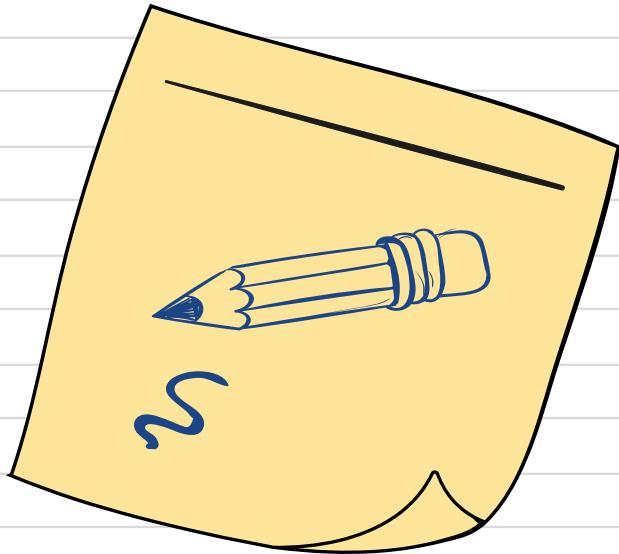
# Anggota DiCARRY

2006462960 Arya Bintang Pratama K Kelas D

2006597714 Anindya Sasriya Ibrahim Kelas E

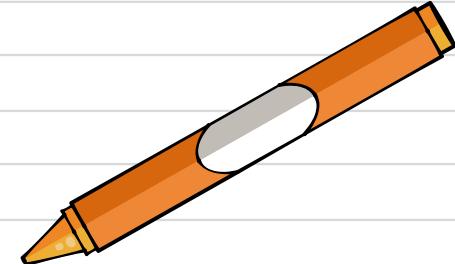
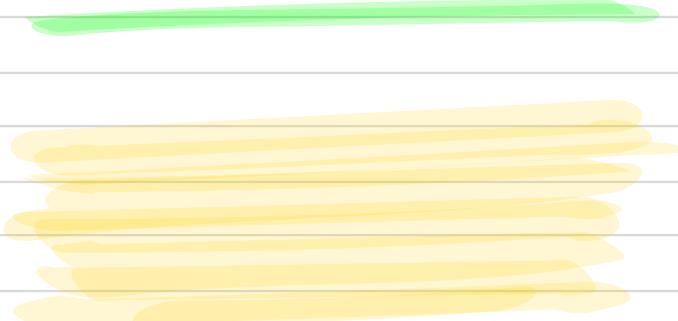
2006521093 Mahdi Imani Wafi Kelas F

2006596081 Mohamad Fariz Kurniawan Kelas F



01

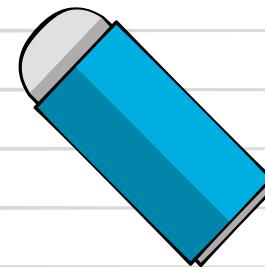
# EKSPLORASI



# Maybe You Need to Divide the Content

## Mercury

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

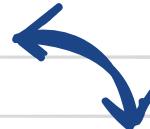


$$x = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

## Venus

Venus has a beautiful name, is the second planet from the Sun and its atmosphere is extremely poisonous

# You Could Use Three Columns, Why Not?



## Mars

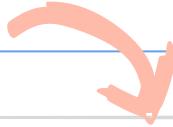
Mars is a cold place. It's full of iron oxide dust, which gives the planet its reddish cast

## Jupiter

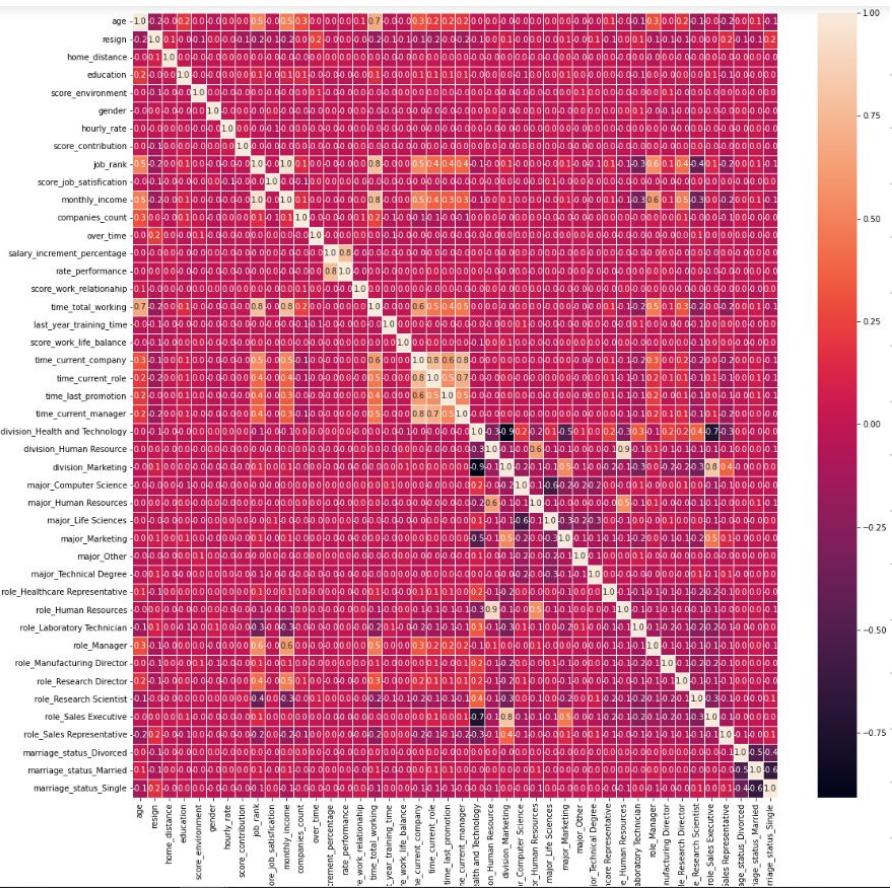
It's the biggest planet in the Solar System and the fourth-brightest object in the sky

## Saturn

Yes, this is the ringed one. It's a gas giant, composed mostly of hydrogen and helium



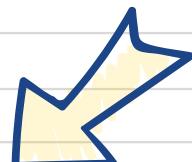
# Heatmap Korelasi



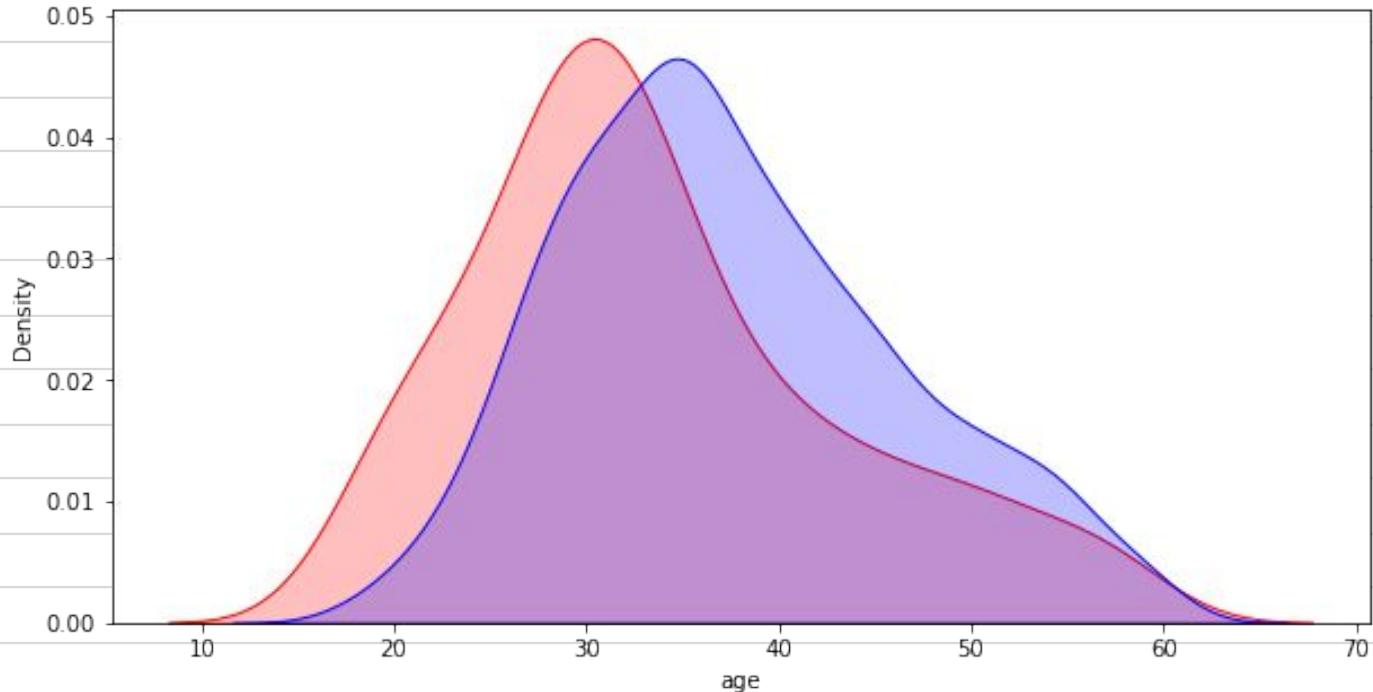
Visualisasikan karakteristik karyawan yang resign dari perusahaan tersebut!

Menurut kami, berdasarkan nilai korelasinya terhadap target(resign) karakteristik karyawan yang resign dapat kita lihat dari atribut-atribut berikut:

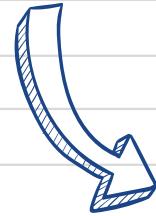
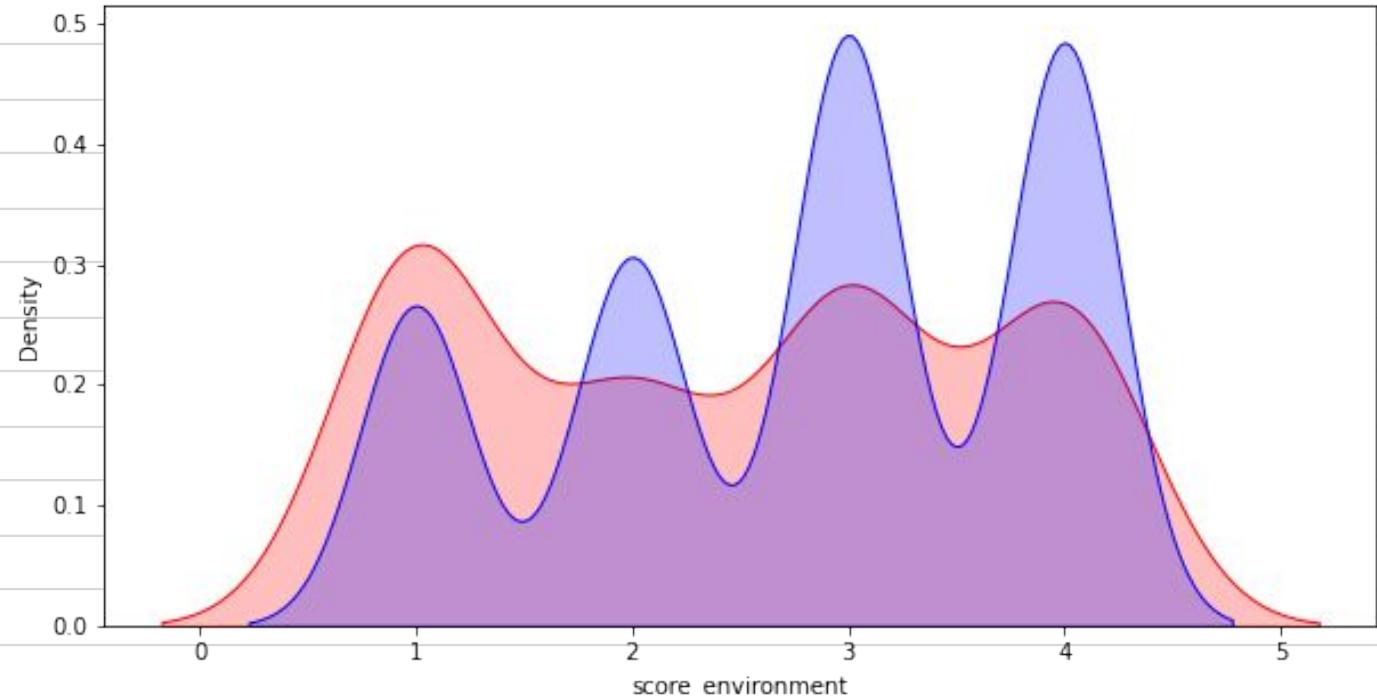
**age, score\_environment, score\_contribution, job\_rank,  
score\_job\_satisfaction, monthly\_income, over\_time, time\_total\_working,  
time\_current\_company, time\_current\_role, time\_current\_manager,  
role\_Sales Representative, marriage\_status\_Single(single/tidak).**



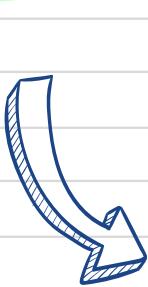
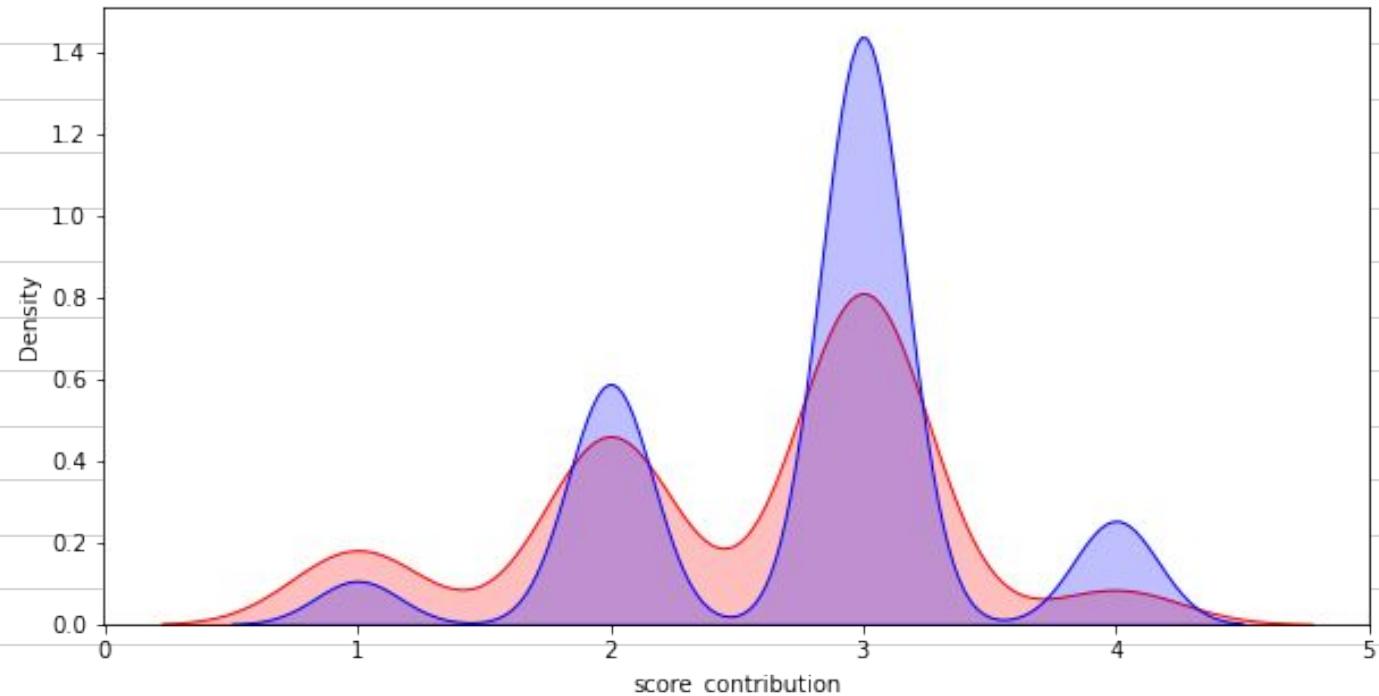
age



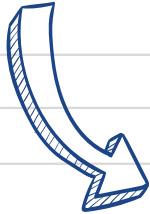
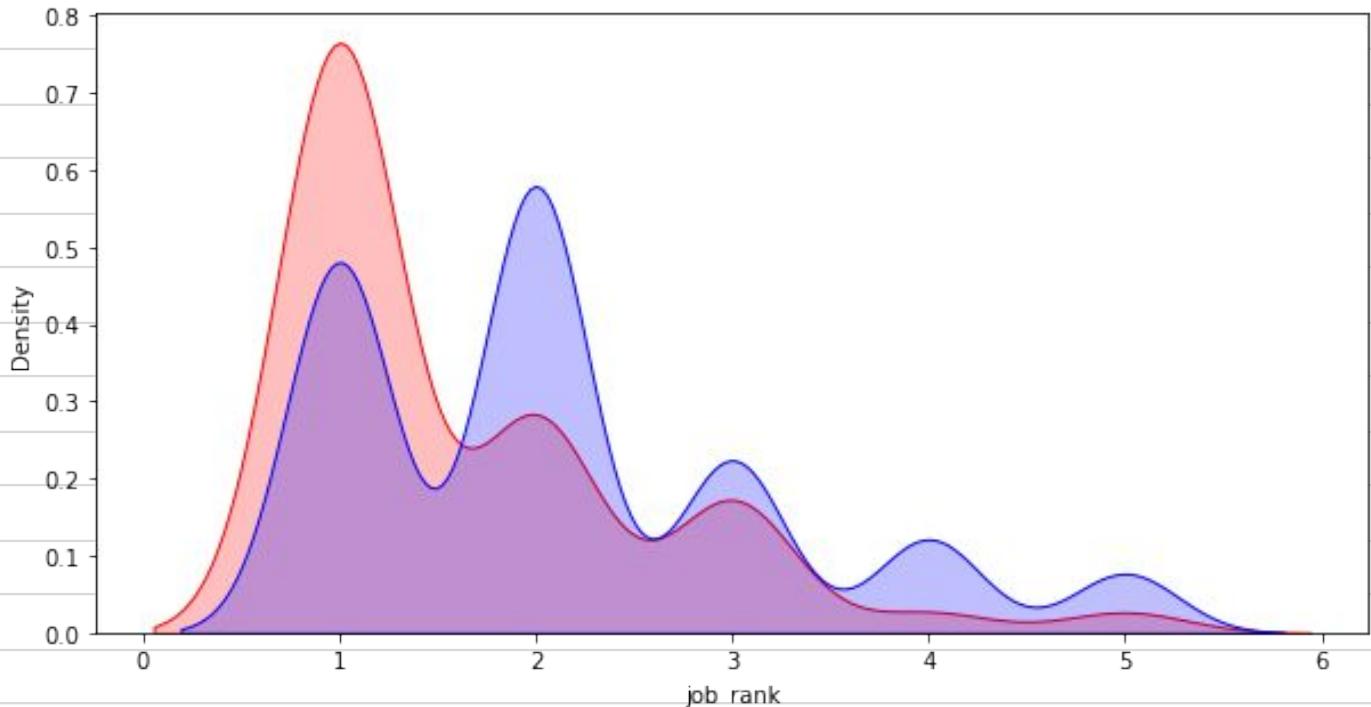
## score\_environment



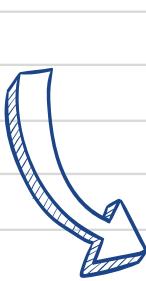
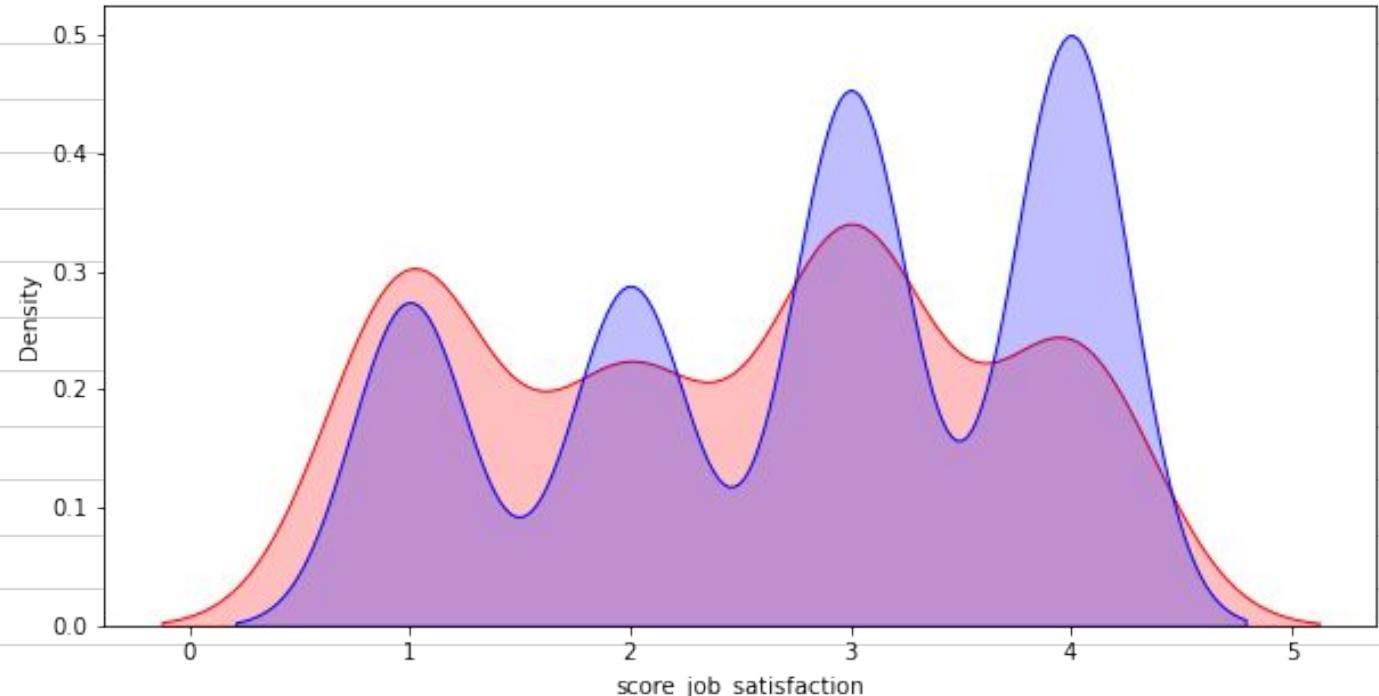
## score\_contribution



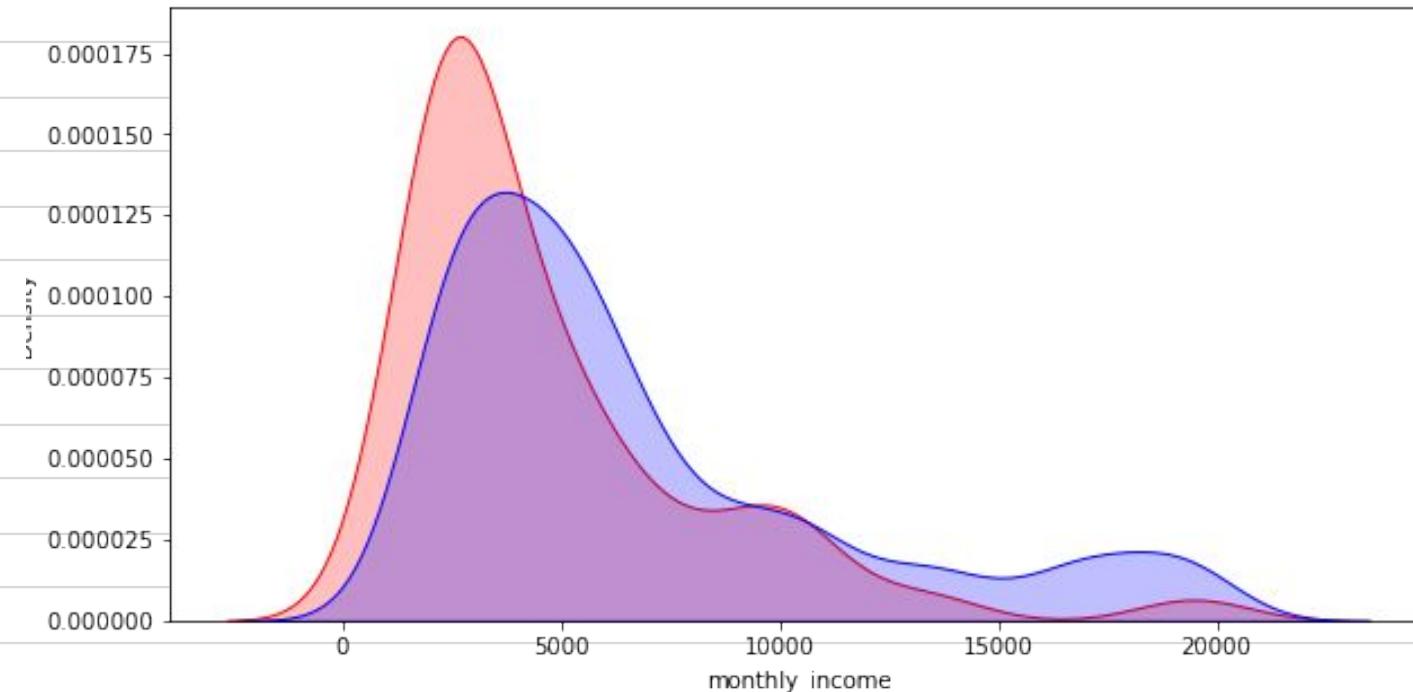
# job\_rank



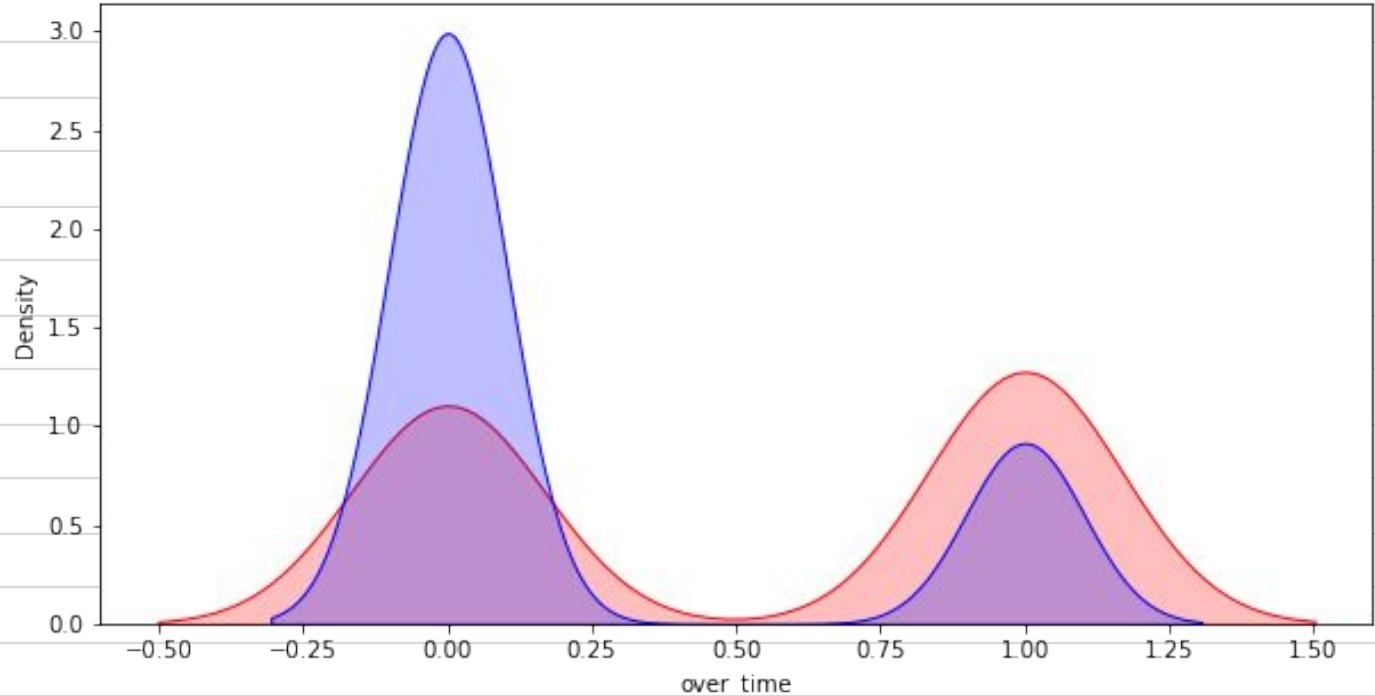
# score\_job\_satisfaction



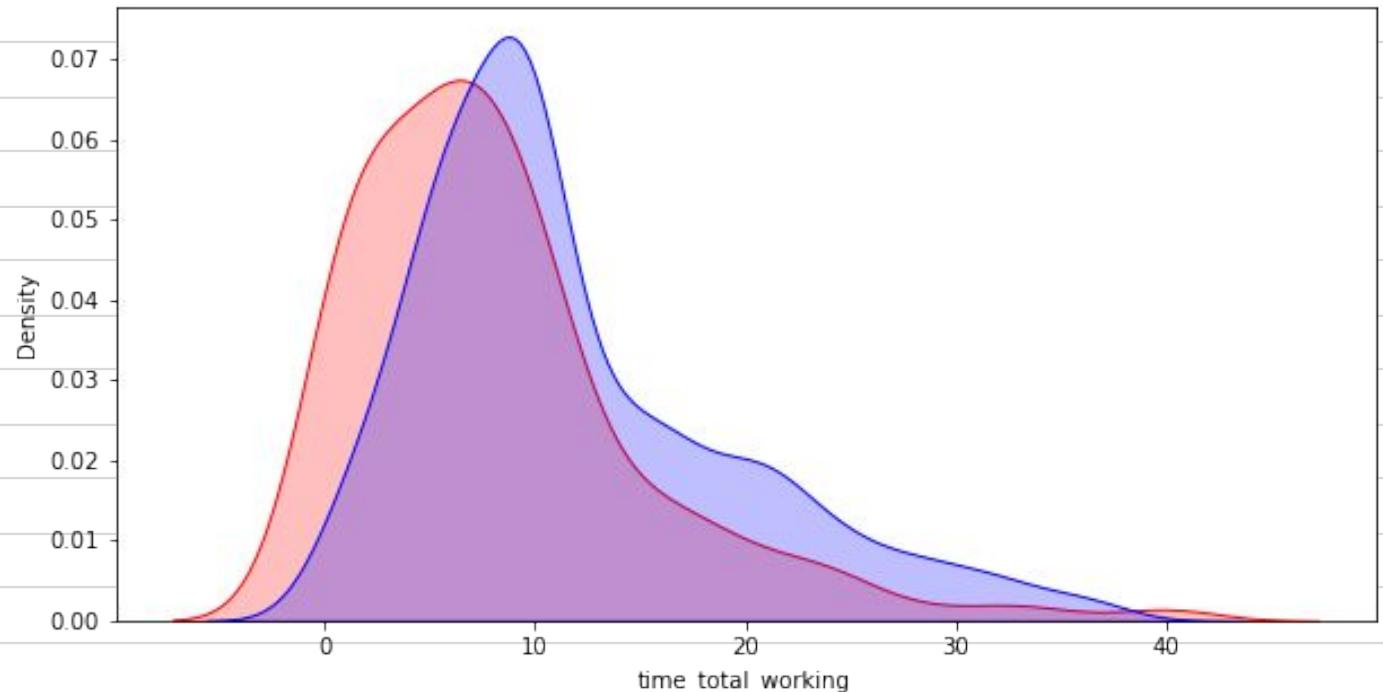
## monthly\_income



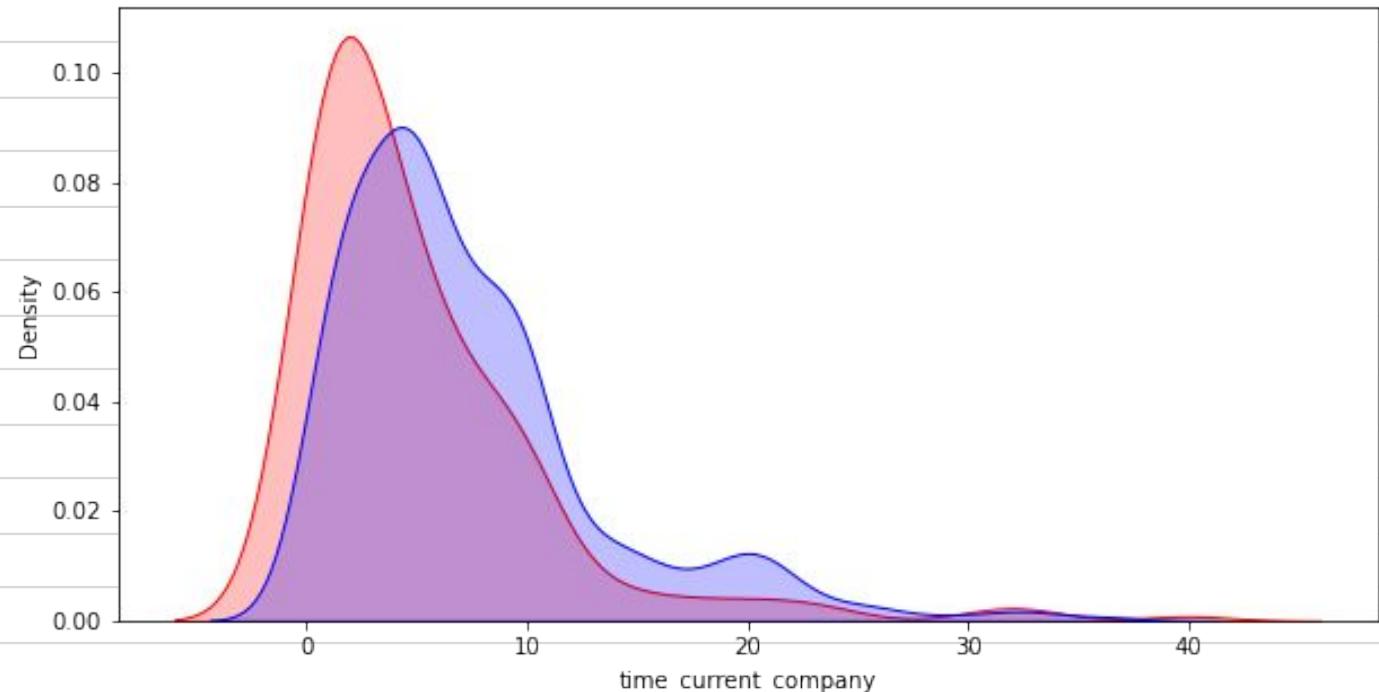
## over\_time



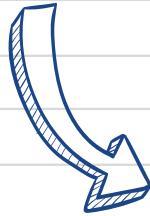
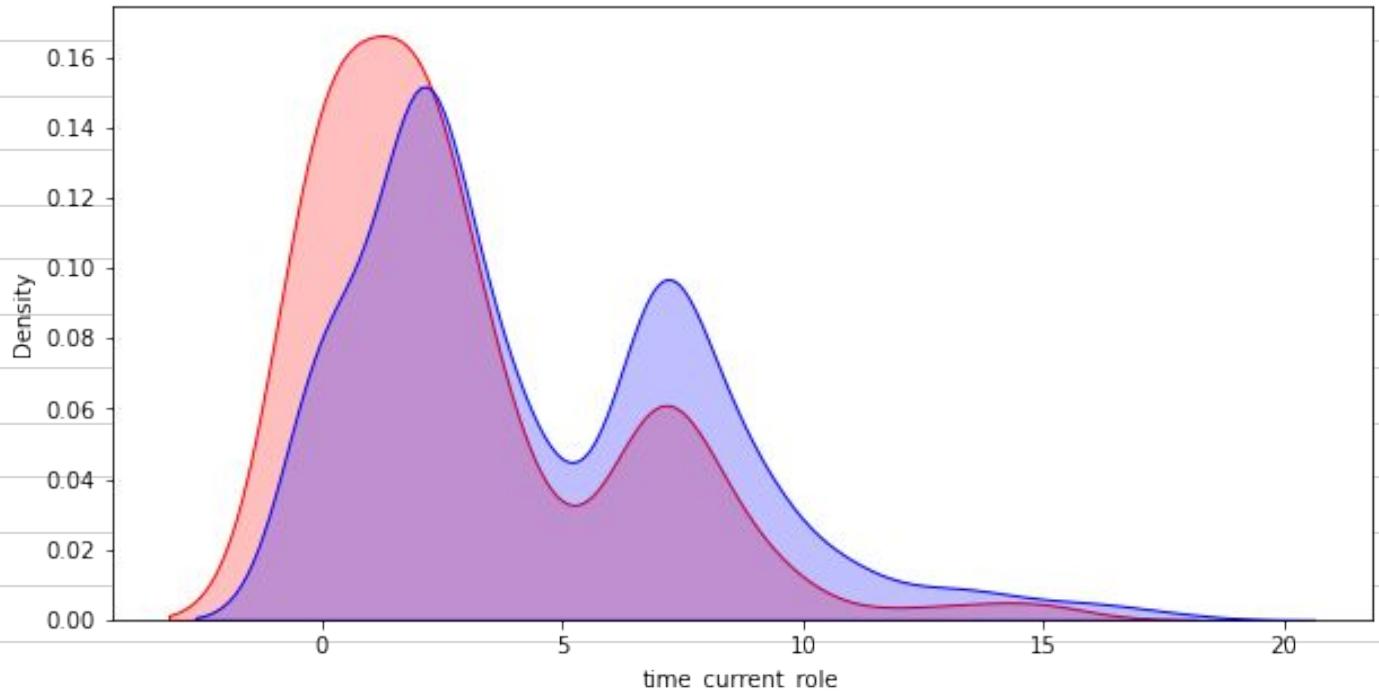
## time\_total\_working



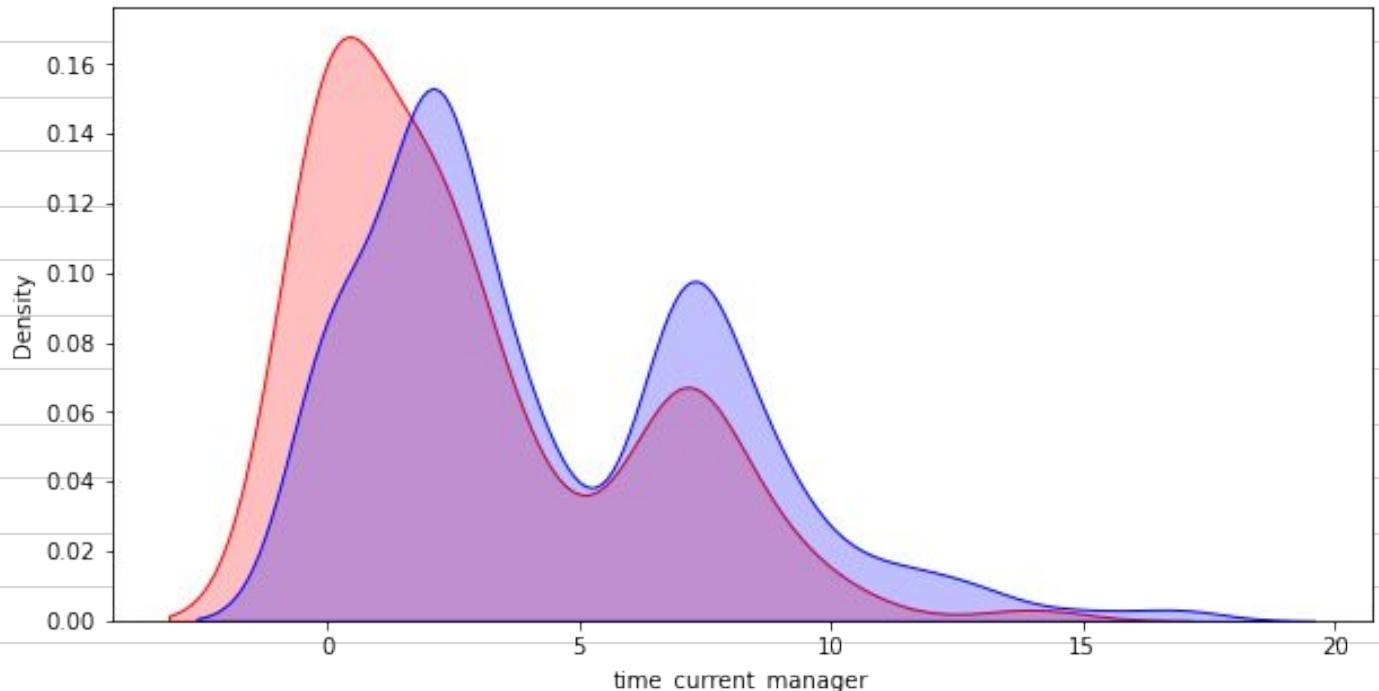
## time\_current\_company



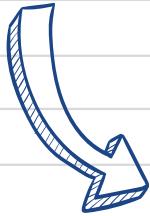
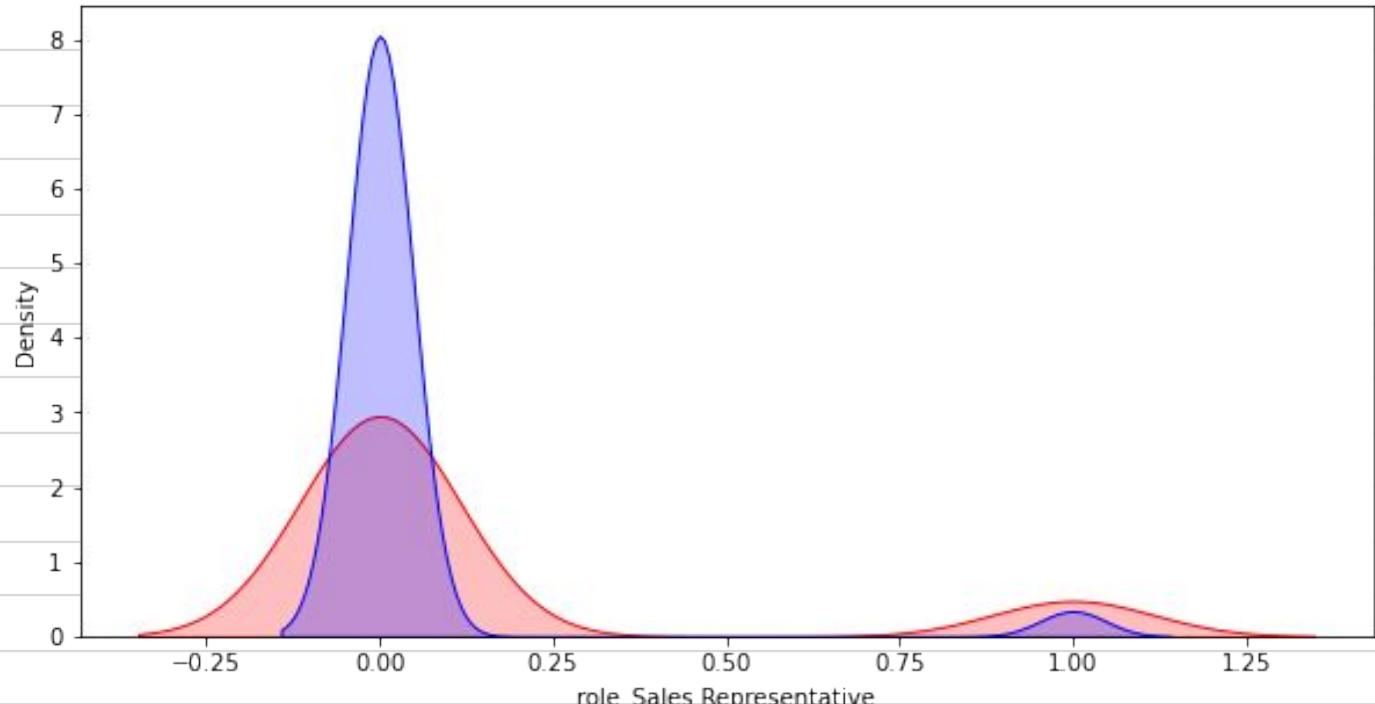
## time\_current\_role



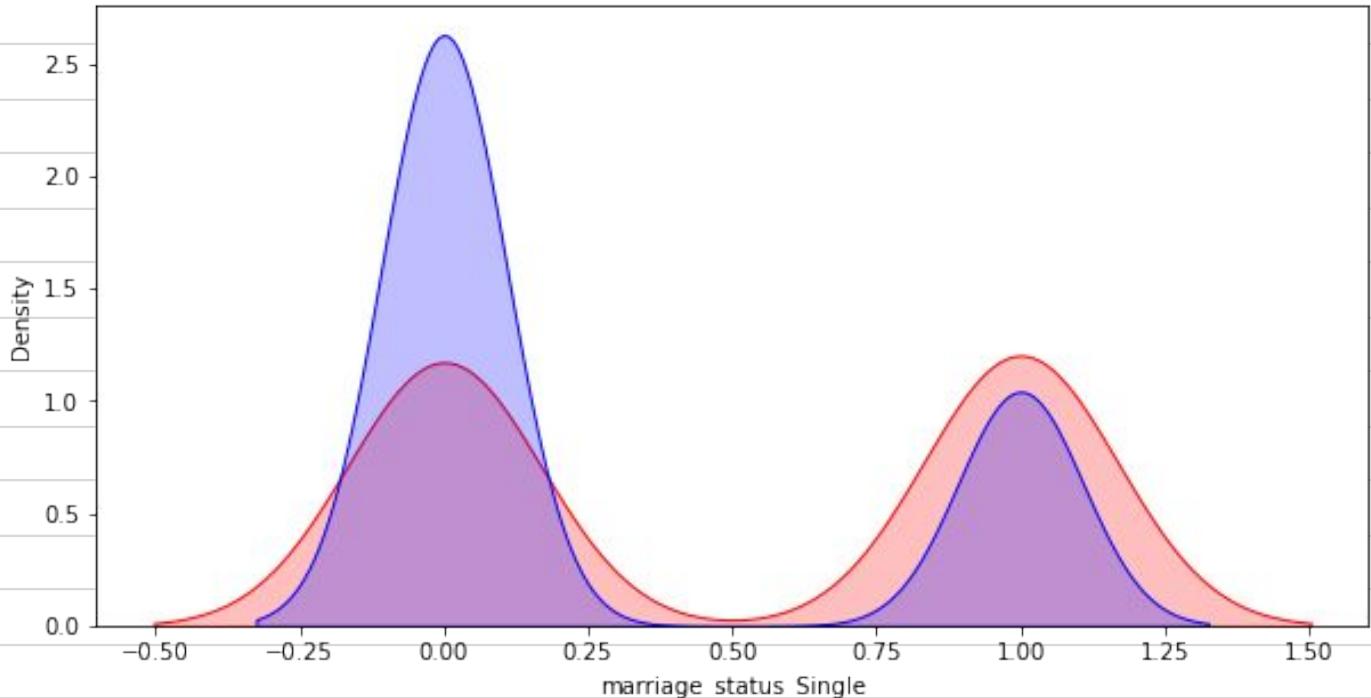
# time\_current\_manager

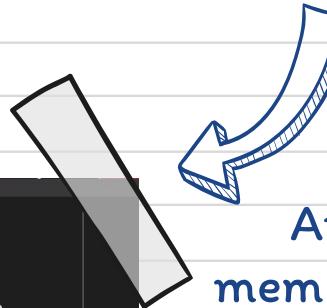


# role\_Sales Representative



## marriage\_status\_Single





Apakah karyawan  
memilih untuk resign  
setelah mendapatkan  
promosi?

```
[ ] df_norookie = df[(df['job_rank'] > 1)]
df_senior = df_norookie[(df_norookie['time_current_company'] > 0)]
df_last_promoted = df_senior[(df_senior['time_last_promotion'] <= 1)]
will_resign = len(df_last_promoted[(df_last_promoted['resign'] == "Yes")])
wont_resign = len(df_last_promoted[(df_last_promoted['resign'] == "No")])
print("Banyak karyawan akan resign setelah mendapat promosi:", will_resign)
print("Banyak karyawan tidak akan resign setelah mendapat promosi:", wont_resign)
```

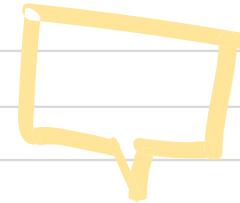
Untuk mencari apakah karyawan akan resign setelah mendapatkan promosi, kami mendefinisikan karyawan yang pernah dipromosikan dengan menggunakan atribut **job\_rank**, **time\_current\_company**, dan **time\_last\_promotion**. Kami mengasumsikan karyawan dengan job rank Entry Level belum pernah dipromosikan, sehingga tolok ukur yang kami pakai adalah karyawan dengan job rank yang berada di atas Entry Level. Kami juga mengasumsikan karyawan yang telah dipromosi setidaknya telah bekerja di atas satu tahun (**time\_current\_company**). Untuk edge case di mana seorang karyawan memiliki **job\_rank > 1** dan **time\_current\_company = 0**, kami mengasumsikan karyawan tersebut dari awal sudah berada di jabatannya tersebut sehingga bisa dibilang belum pernah dipromosikan di current company. Kemudian, dengan mengambil **time\_last\_promotion <=1**, kami mengasumsikan pertanyaan “setelah mendapatkan promosi” adalah baru saja mendapatkan promosi, sehingga kami mengambil karyawan yang baru saja dipromosikan dalam 0-1 tahun.





```
[ ] df_norookie = df[(df['job_rank'] > 1)]
df_senior = df_norookie[(df_norookie['time_current_company'] > 0)]
df_last_promoted = df_senior[(df_senior['time_last_promotion'] <= 1)]
will_resign = len(df_last_promoted[(df_last_promoted['resign'] == "Yes")])
wont_resign = len(df_last_promoted[(df_last_promoted['resign'] == "No")])
print("Banyak karyawan akan resign setelah mendapat promosi:", will_resign)
print("Banyak karyawan tidak akan resign setelah mendapat promosi:", wont_resign)

Banyak karyawan akan resign setelah mendapat promosi: 45
Banyak karyawan tidak akan resign setelah mendapat promosi: 474
```

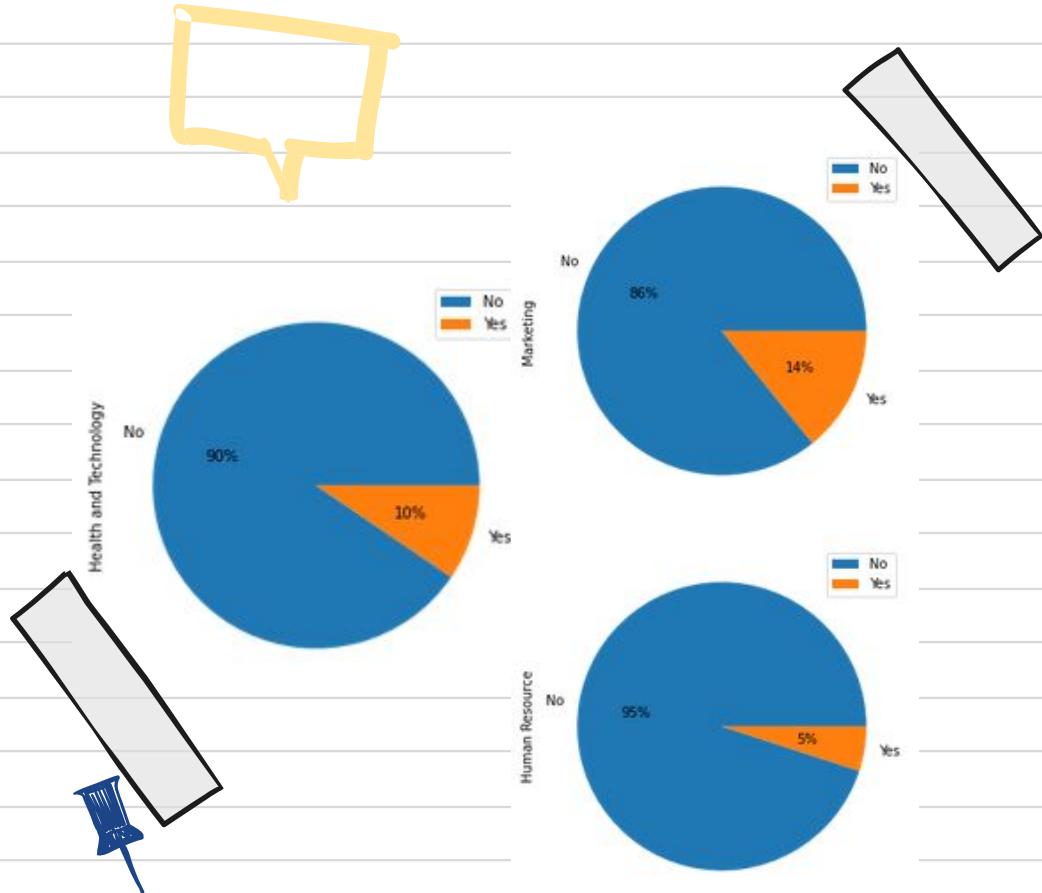


Dari percobaan yang kami temukan, sebanyak **45 karyawan** akan resign setelah mendapatkan promosi dan sebanyak **474 karyawan** tidak akan resign setelah mendapatkan promosi. Karena mayoritas karyawan tidak akan resign setelah mendapatkan promosi, dapat kami ambil kesimpulan **karyawan memilih tidak akan resign setelah mendapatkan promosi.**



## Departemen manakah yang memiliki karyawan loyal paling banyak?

Dengan menggunakan Mean dari **time\_current\_company** pada masing-masing divisi sebagai ambang batas loyal, dapat dilihat bahwa Employee dengan Departemen **Human and Resources** memiliki rasio karyawan loyal terbanyak, yaitu sebanyak **95%**. Kami menggunakan pendekatan ini karena jumlah karyawan yang berbeda jauh antara divisi HR dan Health and Tech



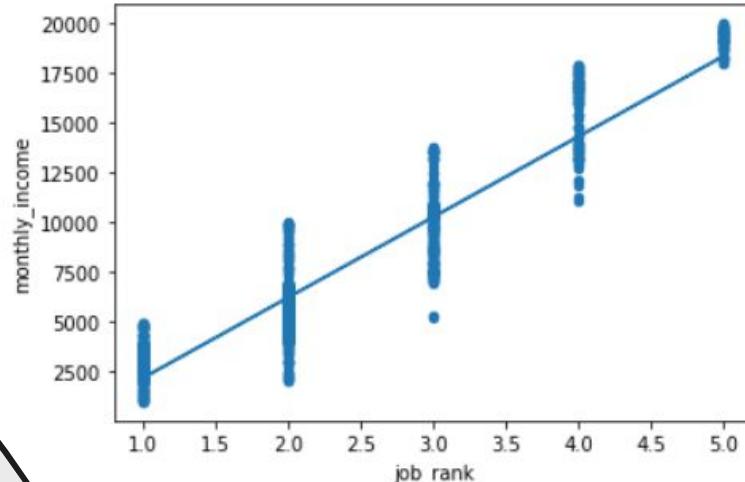
## Analisis Korelasi Antar Atribut

```
In [26]: corr = df_enc.corr(method='pearson')
col = corr.columns
corr[col[3]][col[2]]
count = 0
for i in range (len(col)):
    for j in range (i+1,len(col)):
        if corr[col[i]][col[j]] >= 0.7 or corr[col[i]][col[j]] <= -0.7:
            if i != j:
                print("{:40s} {:40s} {:.f}".format(col[i], col[j], corr[col[i]][col[j]]))
```

job_rank	monthly_income	0.950300
job_rank	time_total_working	0.782208
monthly_income	time_total_working	0.772893
salary_increment_percentage	rate_performance	0.773550
time_current_company	time_current_role	0.758754
time_current_company	time_current_manager	0.769212
time_current_role	time_current_manager	0.714365
division_Health and Technology	division_Marketing	-0.906818
division_Health and Technology	role_Sales Executive	-0.733497
division_Human Resource	role_Human Resources	0.904983
division_Marketing	role_Sales Executive	0.808869

Setelah mengetahui Korelasi antar atribut, kami mengambil pasangan atribut yang memiliki korelasi lebih dari 0.7 dan kurang dari -0.7 untuk divisualisasikan

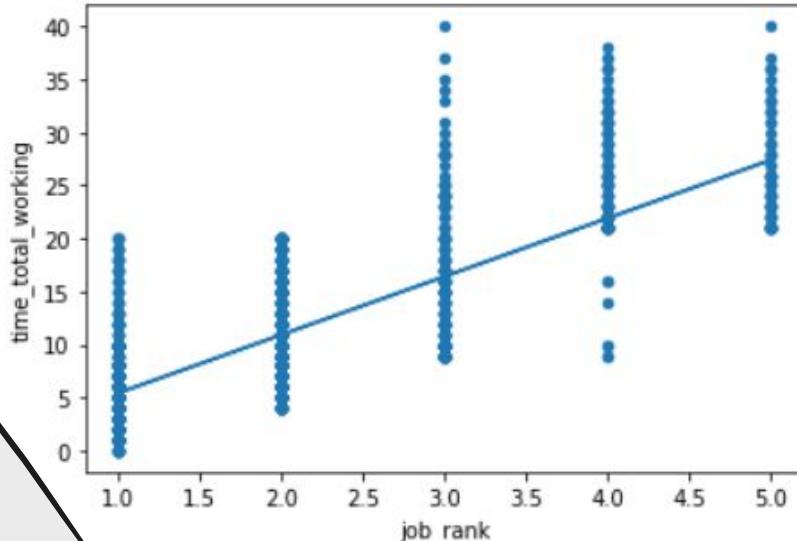
## Visualisasikan atribut-atribut yang memiliki korelasi



Dapat dilihat bahwa atribut **job\_rank** berkorelasi positif dengan **monthly\_income**.

Artinya semakin tinggi **job\_rank** nya akan semakin tinggi **monthly\_income** nya

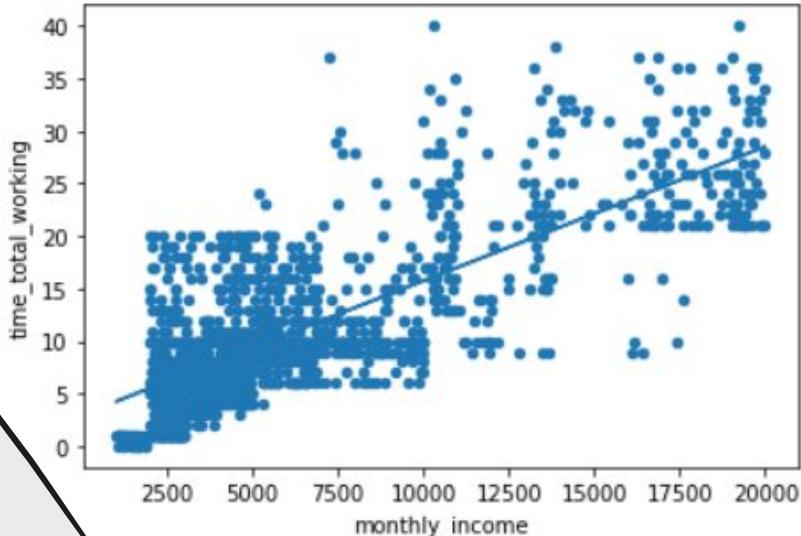
Visualisasikan atribut-atribut yang memiliki korelasi



Dapat dilihat bahwa atribut `job_rank` berkorelasi positif dengan `time_total_working`.

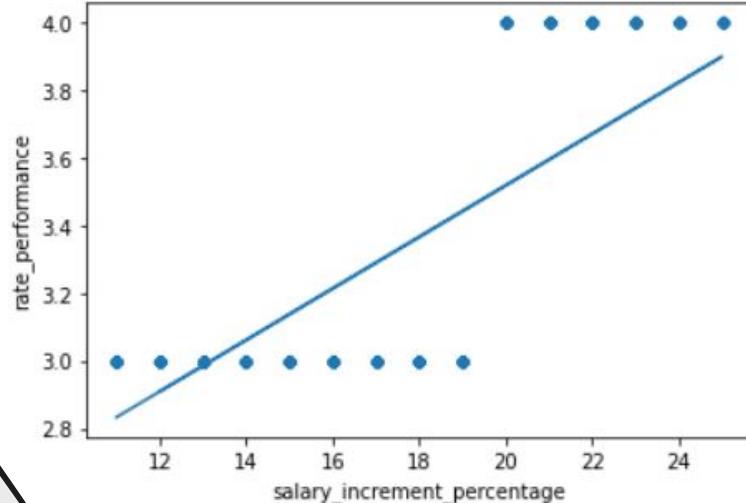
Artinya semakin tinggi `job_rank` nya akan semakin tinggi `time_total_working` nya

## Visualisasikan atribut-atribut yang memiliki korelasi



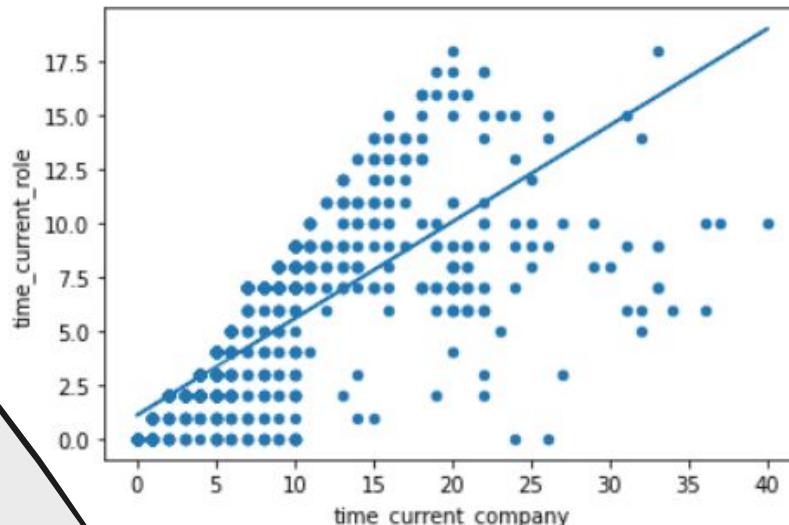
Dapat dilihat bahwa atribut **monthly\_income** berkorelasi positif dengan **time\_total\_working**. Artinya semakin tinggi **monthly\_income** nya akan semakin tinggi **time\_total\_working** nya

## Visualisasikan atribut-atribut yang memiliki korelasi



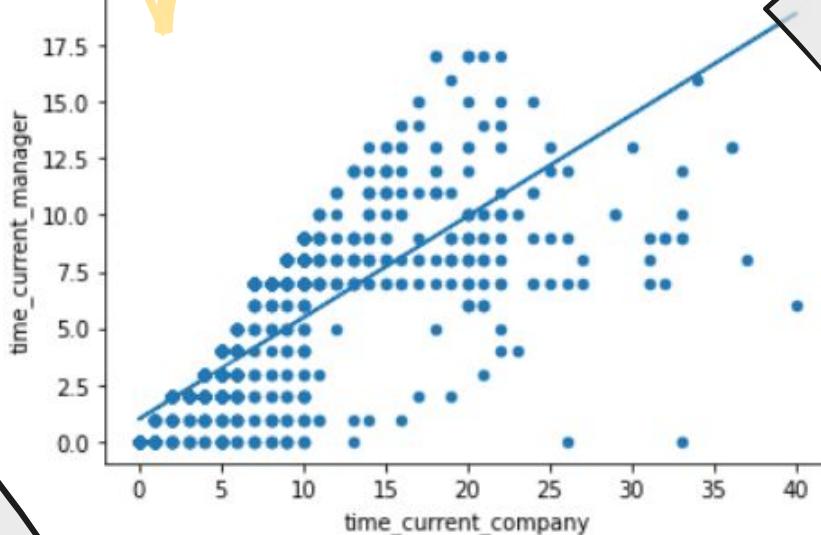
Dapat dilihat bahwa atribut **salary\_increment\_percentage** berkorelasi positif dengan **rate\_performance**. Artinya semakin tinggi **salary\_increment\_percentage** nya akan semakin tinggi **rate\_performance** nya

## Visualisasikan atribut-atribut yang memiliki korelasi



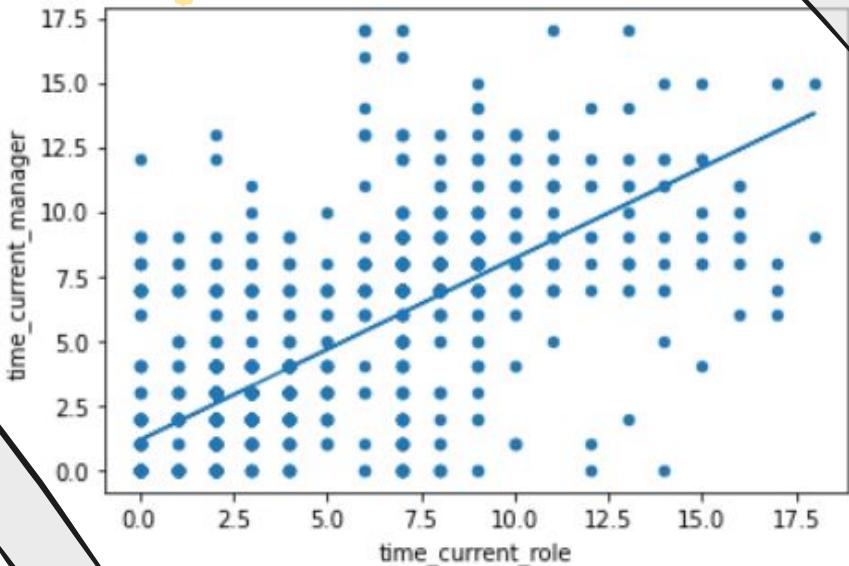
Dapat dilihat bahwa atribut `time_current_company` berkorelasi positif dengan `time_current_role`. Artinya semakin tinggi `time_current_company` nya akan semakin tinggi `time_current_role` nya

## Visualisasikan atribut-atribut yang memiliki korelasi



Dapat dilihat bahwa atribut `time_current_company` berkorelasi positif dengan `time_current_manager`. Artinya semakin tinggi `time_current_company` nya akan semakin tinggi `time_current_manager` nya

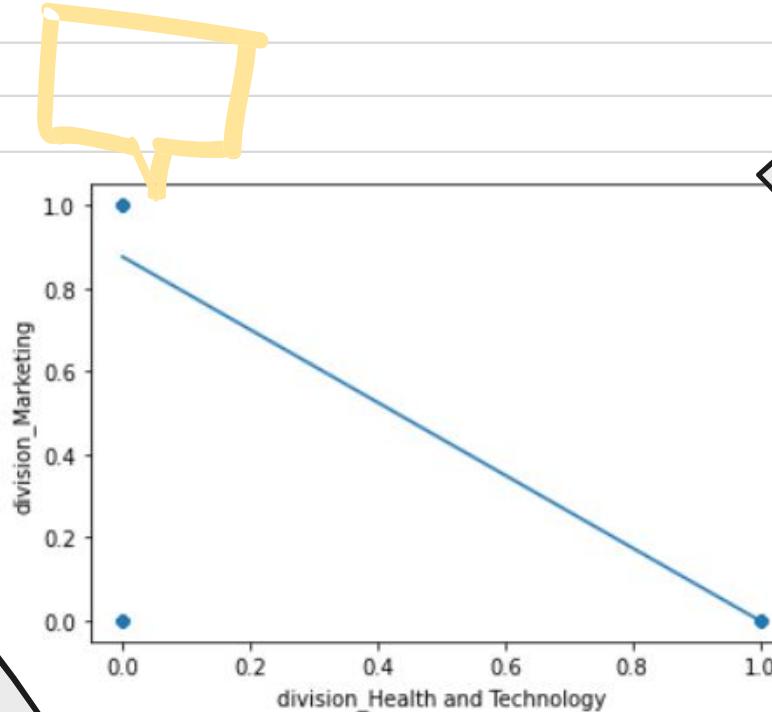
## Visualisasikan atribut-atribut yang memiliki korelasi



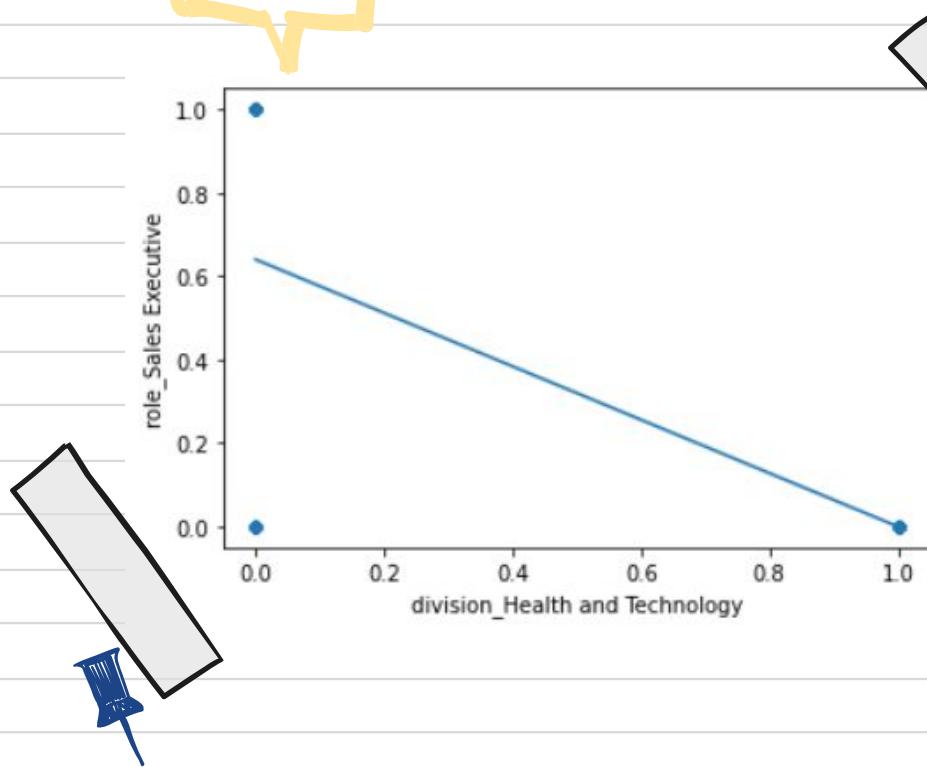
Dapat dilihat bahwa atribut `time_current_role` berkorelasi positif dengan `time_current_manager`. Artinya semakin tinggi `time_current_role` nya akan semakin tinggi `time_current_manager` nya

Visualisasikan atribut-atribut yang memiliki korelasi

Dapat dilihat bahwa atribut **division\_Health** and **Technology** berkorelasi negatif dengan **division\_Marketing**. Artinya semakin tinggi **division\_Health** and **Technology** nya akan semakin rendah **division\_Marketing** nya

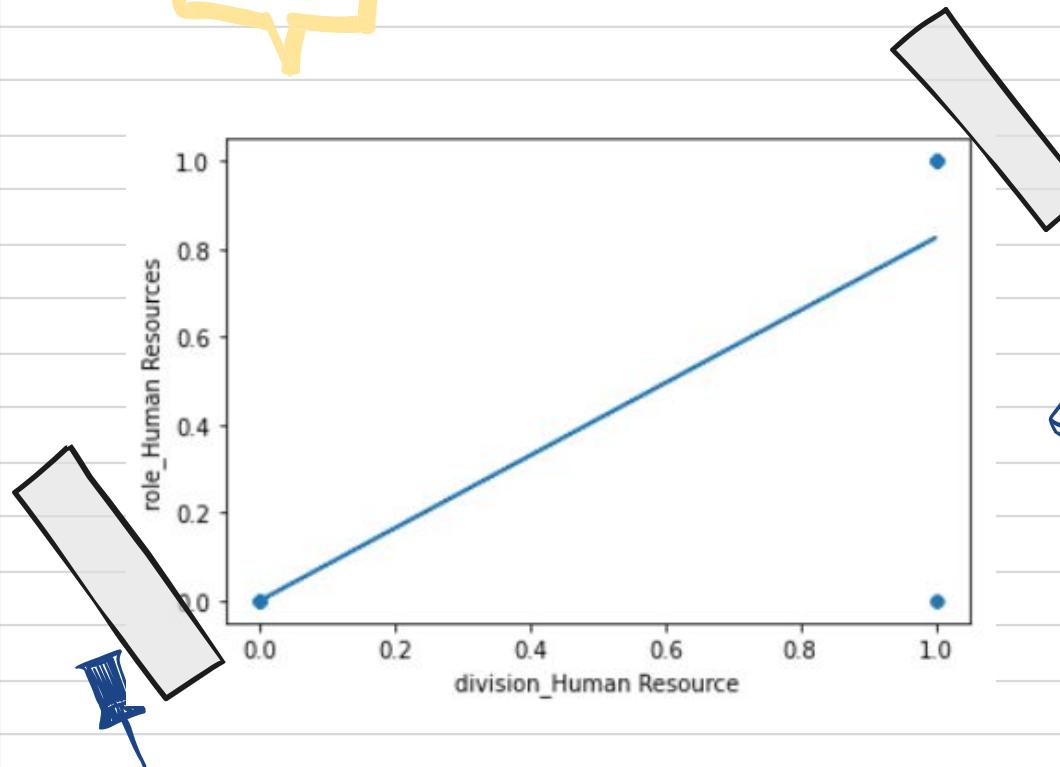


## Visualisasikan atribut-atribut yang memiliki korelasi



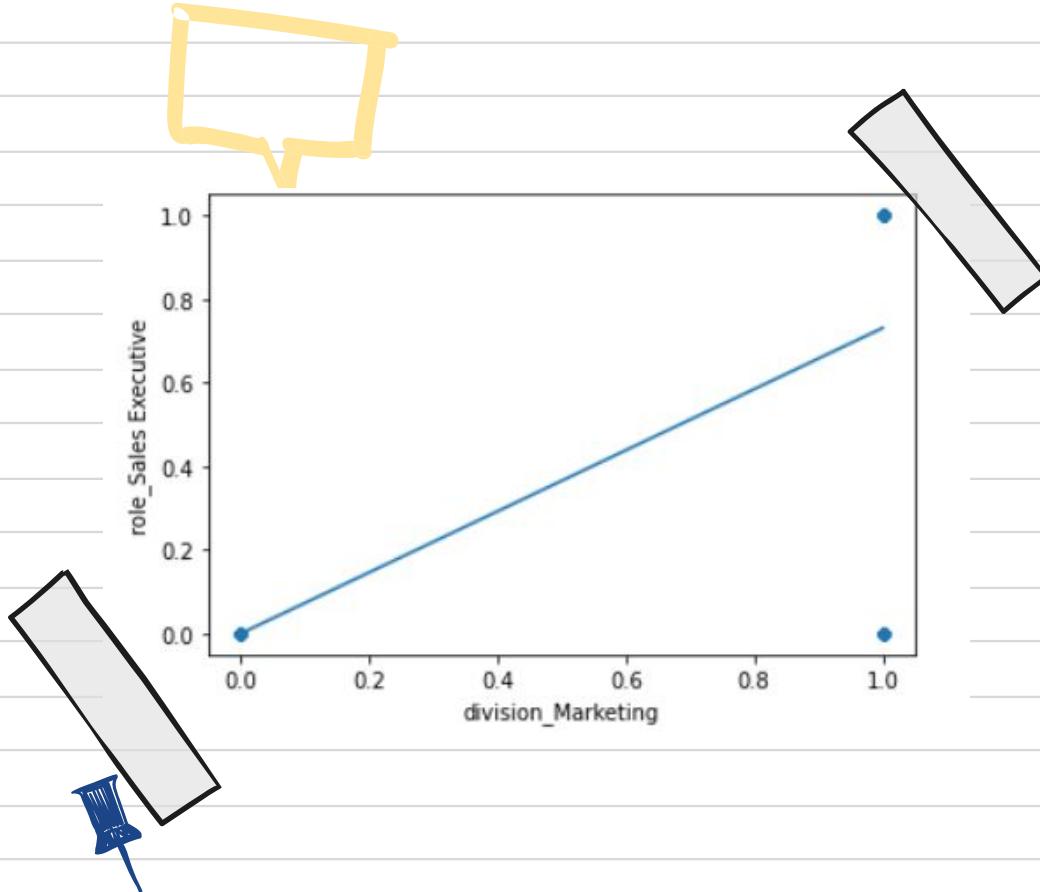
Dapat dilihat bahwa atribut **division\_Health and Technology** berkorelasi negatif dengan **role\_Sales Executive**. Artinya semakin tinggi **division\_Health and Technology** nya akan semakin rendah **role\_Sales Executive** nya

Visualisasikan atribut-atribut yang memiliki korelasi



Dapat dilihat bahwa atribut **division\_Human Resource** berkorelasi positif dengan **role\_Human Resources**. Artinya semakin tinggi **division\_Human Resource** nya akan semakin tinggi **role\_Human Resources** nya

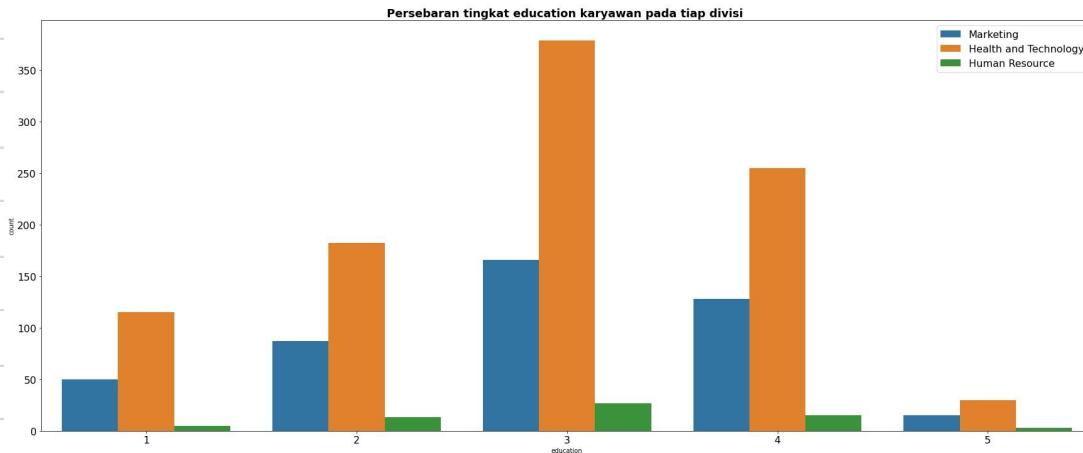
Visualisasikan atribut-atribut yang memiliki korelasi



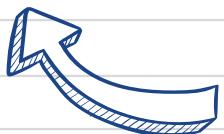
Dapat dilihat bahwa atribut **division\_Marketing** berkorelasi positif dengan **role\_Sales Executive**. Artinya semakin tinggi **division\_Marketing** nya akan semakin tinggi **role\_Sales Executive** nya



Bagaimana  
persebaran tingkat  
pendidikan karyawan  
pada masing-masing  
divisi



Persebaran tingkat pendidikan karyawan pada masing-masing divisi terlihat merata dengan karyawan dengan pendidikan terakhir **Sarjana (3)** merupakan yang terbanyak pada setiap divisi dan karyawan dengan pendidikan terakhir **Doktor (5)** merupakan yang paling sedikit





Apakah karyawan  
resign karena tidak  
senang bekerja di  
perusahaan tersebut?

```
df_resign = df_enc.loc[df_enc["resign"]==1]

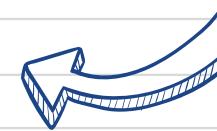
# Kita lihat rata-rata dari score_environment nya
rata_rata_score_env = df_resign['score_environment'].mean()
print("Rata-rata score_environment dari karyawan yang resign: " , rata_rata_score_env)

# Kita lihat rata-rata dari score_job_satisfaction nya
rata_rata_score_job_satisfaction = df_resign['score_job_satisfaction'].mean()
print("Rata-rata score_job_satisfaction dari karyawan yang resign: " , rata_rata_score_job_satisfaction)

# Kita lihat rata-rata dari score_work_relationship nya
rata_rata_score_work_relationship = df_resign['score_work_relationship'].mean()
print("Rata-rata score_work_relationship dari karyawan yang resign: " , rata_rata_score_work_relationship)

✓ 0.4s

Rata-rata score_environment dari karyawan yang resign: 2.4641350210970465
Rata-rata score_job_satisfaction dari karyawan yang resign: 2.4683544303797467
Rata-rata score_work_relationship dari karyawan yang resign: 2.5991561181434597
```

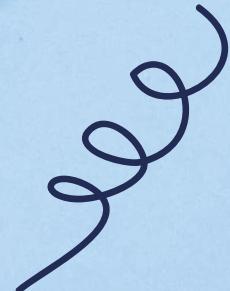
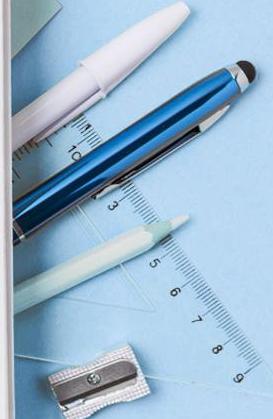
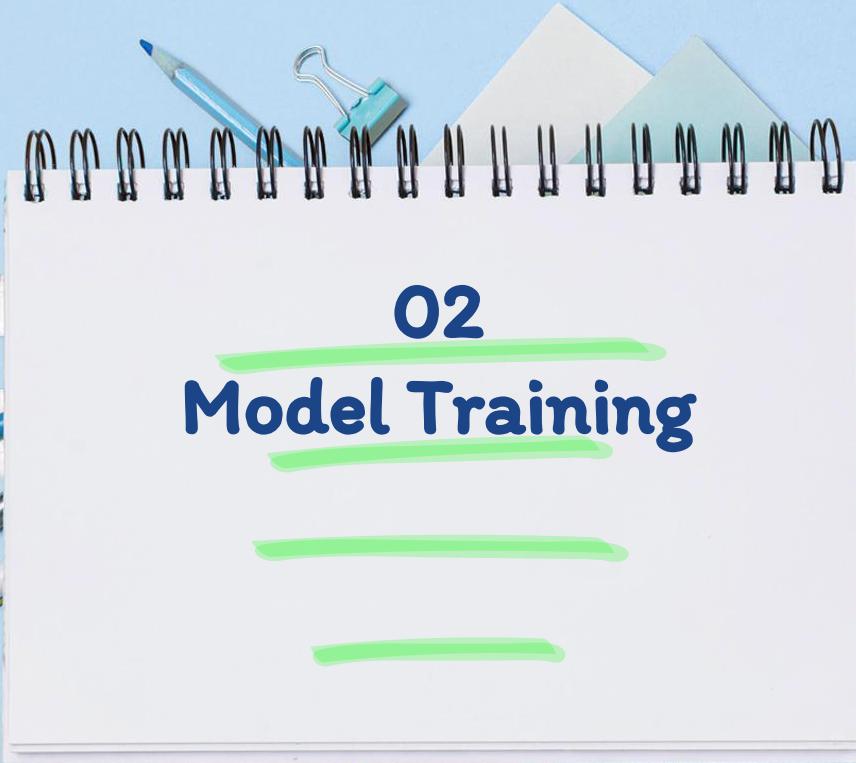


Dapat kita lihat dari data di atas, rata-rata dari **score\_environment**, **score\_job\_satisfaction**, dan **score\_work\_relationship** memiliki nilai di bawah 3 yang artinya rata-rata orang yang resign memiliki tingkat kesenangan yang terbilang rendah ketika bekerja di perusahaan tersebut. Dengan demikian, dapat kita simpulkan bahwa tingkat kesenangan karyawan bekerja di perusahaan tersebut mempengaruhi keputusan karyawan untuk resign atau tidak.



02

## Model Training



## 2a. Prediksi karyawan resign/tidak

### Menggunakan Decision Tree Classifier

Hasil Evaluasi berdasarkan classification report

	precision	recall	f1-score	support
0	0.84	0.99	0.91	236
1	0.87	0.22	0.36	58
accuracy			0.84	294
macro avg	0.85	0.61	0.63	294
weighted avg	0.84	0.84	0.80	294

Informasi lebih lengkap

F1 Macro Average: 0.6324511238196568

F1 Micro Average: 0.8401360544217686

Precision Macro Average: 0.8526881720430108

Precision Micro Average: 0.8401360544217688

Recall Macro Average: 0.6078316773816481

Recall Micro Average: 0.8401360544217688

Confusion Matrix:

prediction		0	1
actual	0	234	2
1	45	13	

Untuk saat ini, model yang terbaik untuk memprediksi kecenderungan resign karyawan adalah dengan menggunakan model

**DecisionTreeClassifier** dengan parameter **min\_samples\_leaf=50**

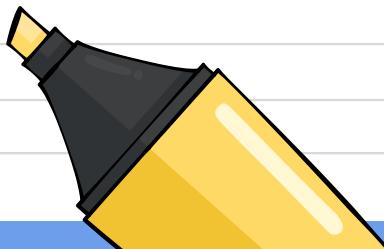
karena didapatkan model dengan metrik klasifikasi dibandingkan

model-model lain yang sedang kami eksplorasi. Hasil evaluasi model tersebut dapat dilihat dari gambar disamping.



# AWESOME WORDS

Because key words are great for catching your audience's attention



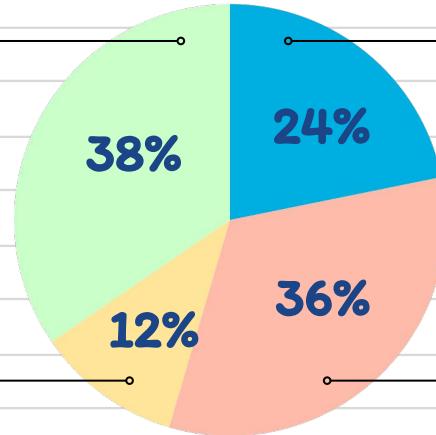
# This Is a Graph

**Mercury**

Did you know  
that this graph is  
editable?

**Mars**

Click on it, follow  
the link and  
change the data



**Venus**

Then copy the  
new graph and  
paste it here

**Saturn**

Don't forget to  
delete the old  
graph afterward



# You Could Use Four Columns

## Mercury

Mercury is the closest planet to the Sun

## Mars

Despite being red, Mars is a cold place

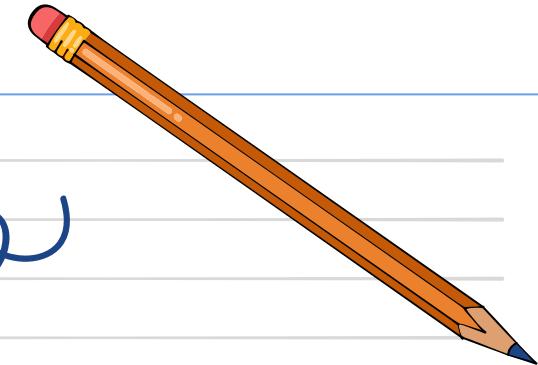


## Venus

Venus has a beautiful name, but it's hot

## Saturn

Saturn is the ringed one and a gas giant



# How About the Percentages?

30%

Mercury is the closest planet to the Sun

22%

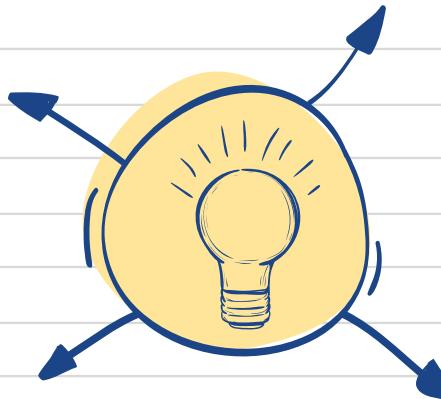
Saturn is the ringed one and a gas giant

15%

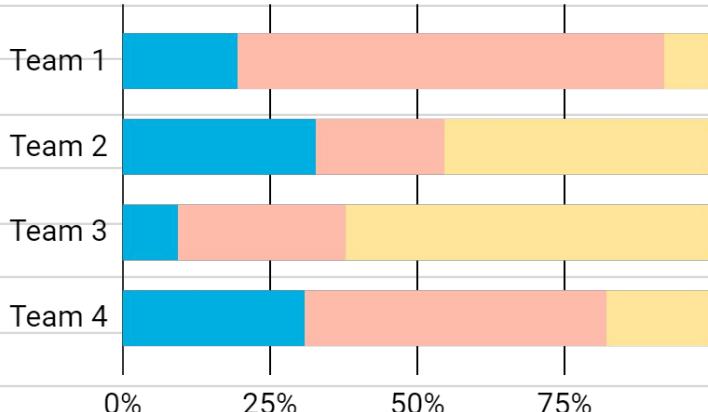
Despite being red, Mars is a cold place

45%

Venus has a beautiful name, but it's hot



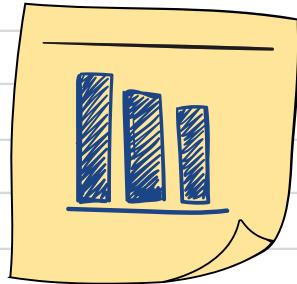
# This Is a Graph



To modify this graph, click on it, follow the link,  
change the data and paste the new graph here

## Mars

Despite being  
red, Mars is a  
cold place



## Venus

Venus has a  
beautiful name,  
but it's hot

## Saturn

Saturn is the  
ringed one and a  
gas giant

# Reviewing Concepts Is Usually a Good Idea

## Mercury

Mercury is the closest planet to the Sun

## Venus

Venus has a beautiful name, but it's hot

## Mars

Despite being red, Mars is a cold place

## Jupiter

It's the biggest planet in the Solar System

## Saturn

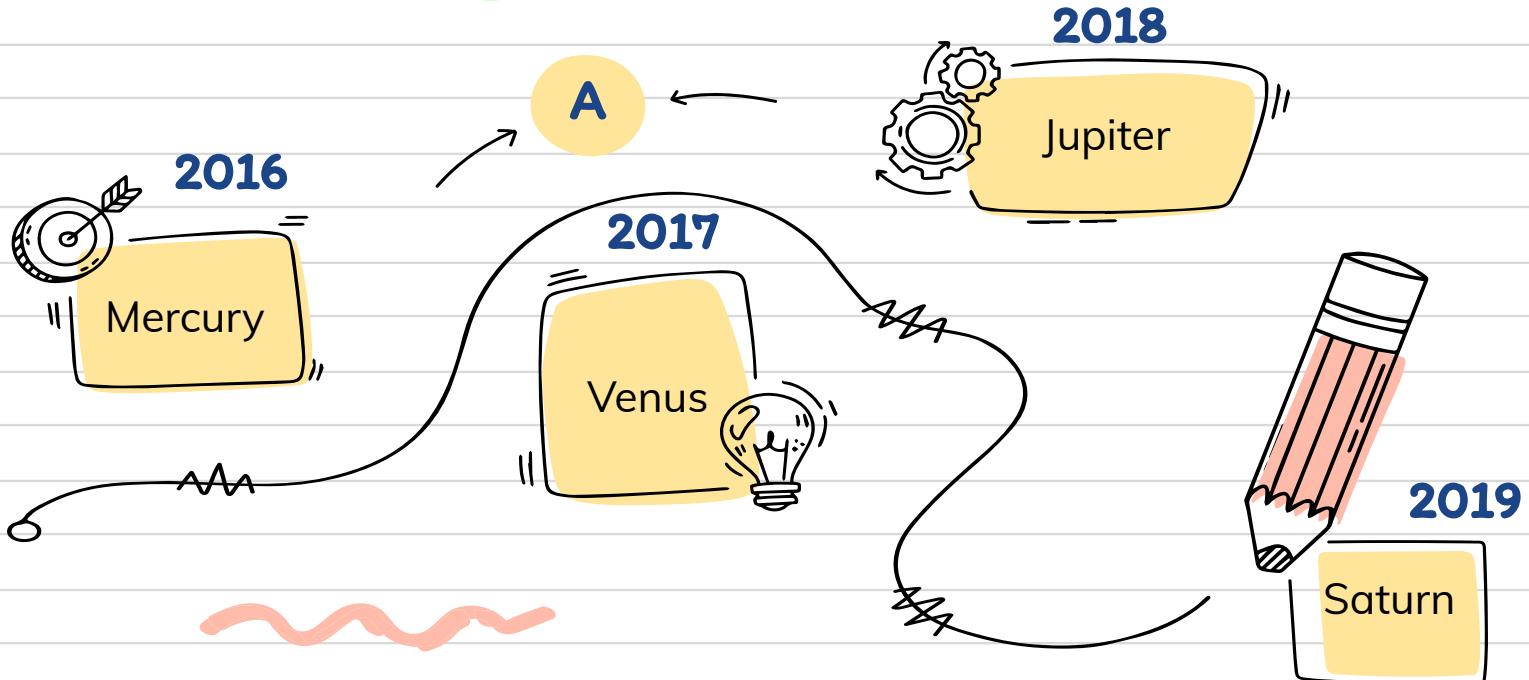
Saturn is the ringed one and a gas giant

## Neptune

Neptune is the farthest planet from the Sun



# Infographics Make Your Idea Understandable...

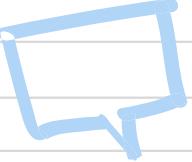


# ... And Tables Do the Same!

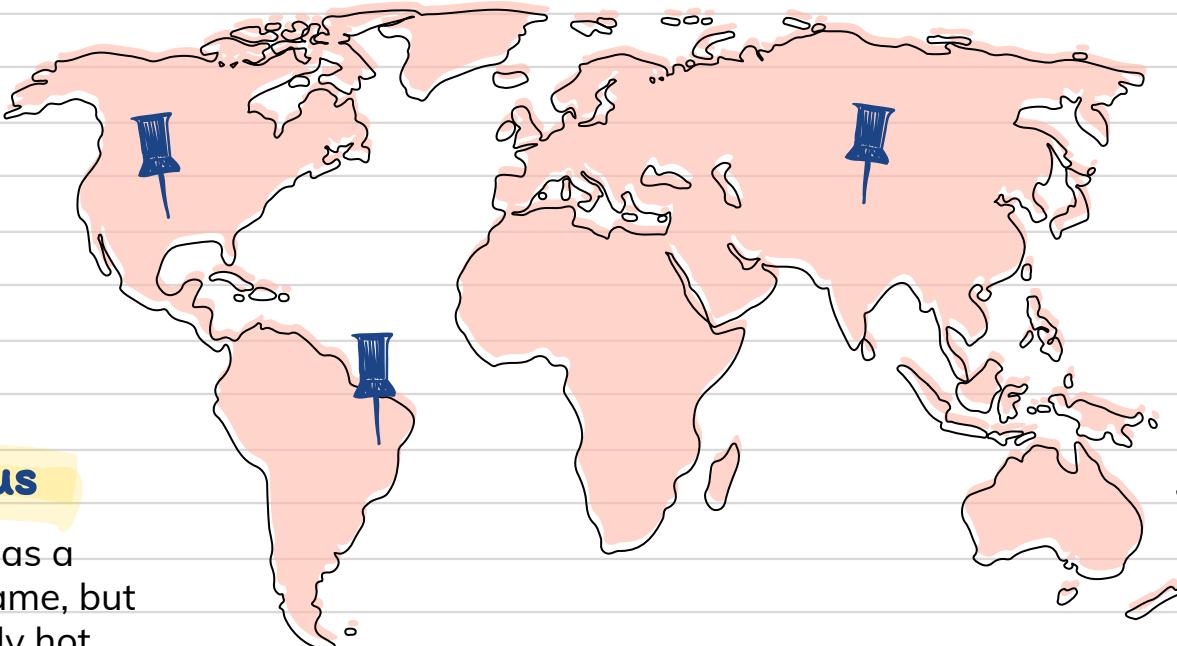
10

	Mass (Earths)	Diameter (Earths)	Surface Gravity (Earths)
Mercury	0.06	0.38	0.38
Mars	0.11	0.53	0.38
Saturn	95.2	9.4	1.16





# This Is a Map



## Venus

Venus has a  
beautiful name, but  
it's terribly hot

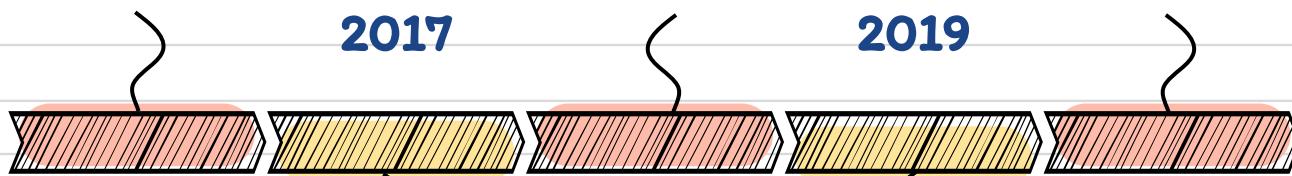


# A Timeline Always Works Well

Mercury is the closest planet to the Sun

Venus has a beautiful name, but it's hot

Despite being red, Mars is a cold place



2016

Jupiter is the biggest planet of them all

2017

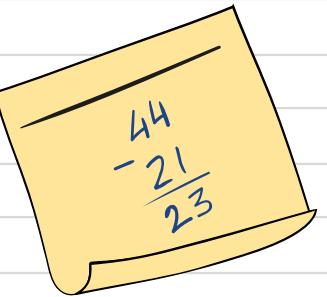
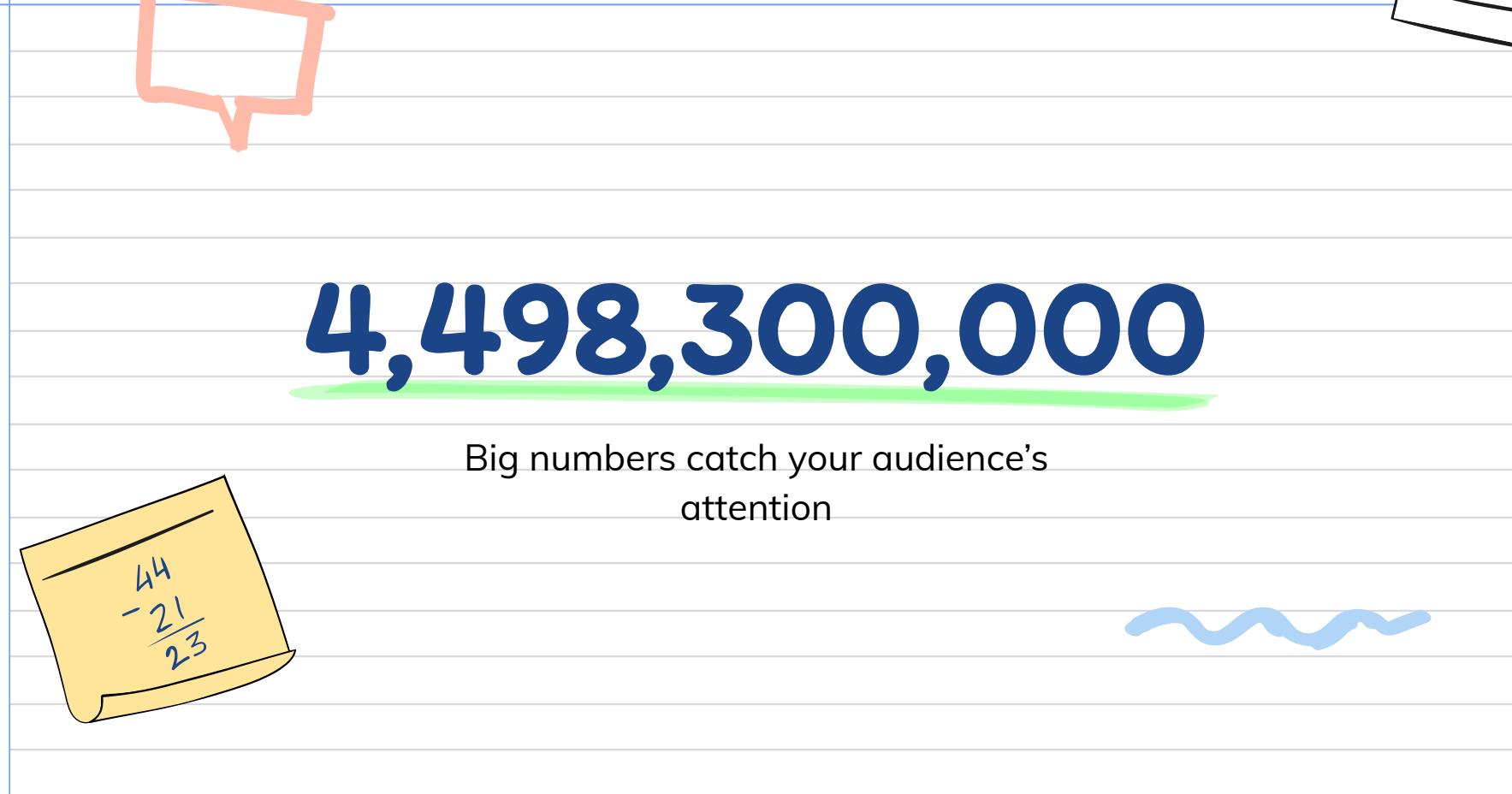
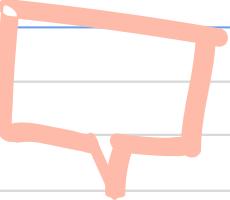
2018

Saturn is the ringed one and a gas giant

2019

2020





**4,498,300,000**

Big numbers catch your audience's  
attention



**333,000.00**

earths is the Sun's mass

**24h 37m 23s**

is Jupiter's rotation period



**386,000 km**

is the distance between Earth  
and the Moon

# Reinforce the Concept Using Infographics!



04

VENUS

Venus is  
terribly hot

MARS

Mars is a  
cold place

01

JUPITER

Jupiter is the  
biggest planet



03

EARTH

Earth  
harbors life

02



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You can explain  
your product or  
your service

Characteristic  
Characteristic

## Pro

\$60

You can explain  
your product or  
your service

Characteristic  
Characteristic

## Premium

\$85

You can explain  
your product or  
your service

Characteristic  
Characteristic

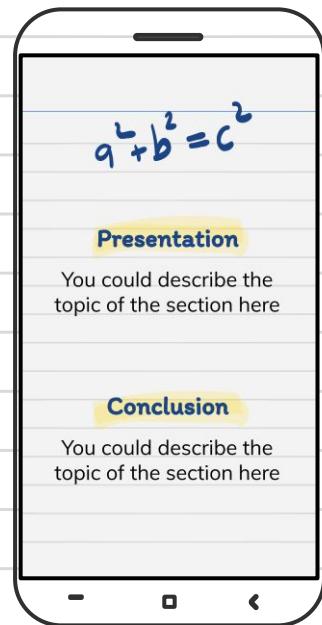
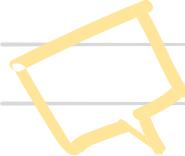


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You can replace the image on the screen with your own work.  
Just delete this one,  
add yours and center it properly

@





## Mobile Web

You can replace the image on the screen with your own work.  
Just delete this one, add yours and center it properly



# Tablet App

You can replace the image on the screen with your own work.  
Just delete this one,  
add yours and center it properly





# Our Team



**John Doe**

You can replace the  
star on the screen with  
a picture of this person



**Helena Patterson**

You can replace the  
star on the screen with  
a picture of this person



**Ann Smith**

You can replace the  
star on the screen with  
a picture of this person

# Thanks!



Do you have any questions?

addyouremail@freepik.com

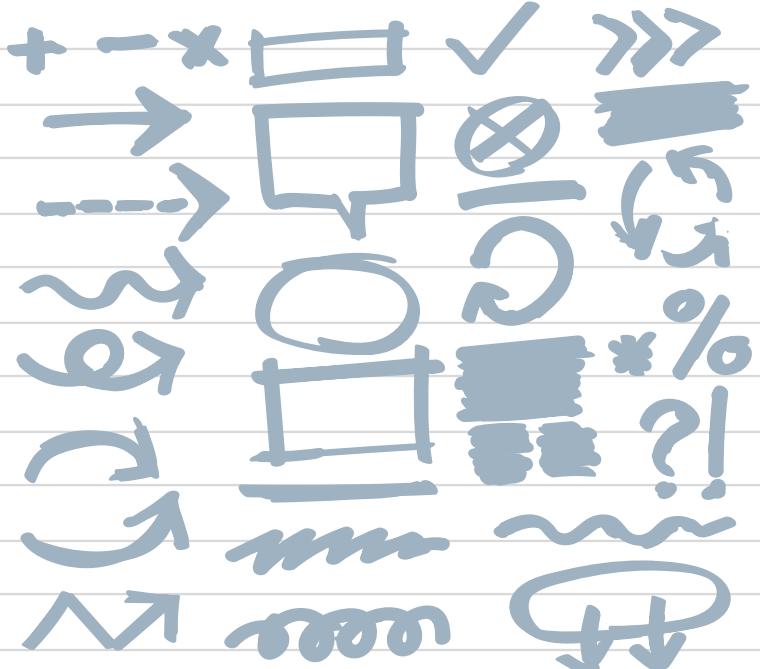
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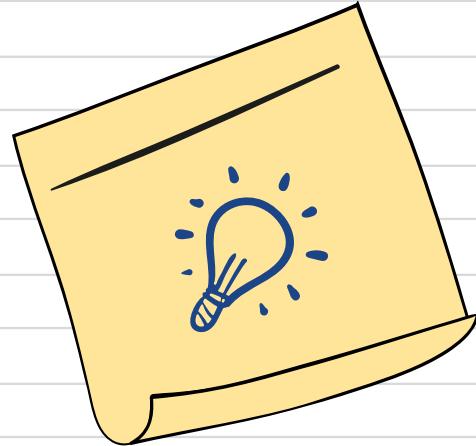
# Alternative Resources



# Resources

## Vector

- Hand drawn notebook with pencils and material
- Travel pattern with elements and dash lines
- Hand drawn arrow collection
- Assortment of arrows highlighter
- Cartoon math elements background
- Planning elements sample
- Collection of colored notes with adhesive tap
- Online learning background with variety of hand-drawn items
- Background of mobile phone with hand-drawn items
- Hand drawn timeline infographic template
- Hand drawn template timeline infographic



## Photo

- Top view of graphic designer working with graphic tablet and laptop
- Flat lay of back to school concept with copy space



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#ffe599

#caffca

#ffbbaa

#eeeeee

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Pana



Amico



Bro



Rafiki



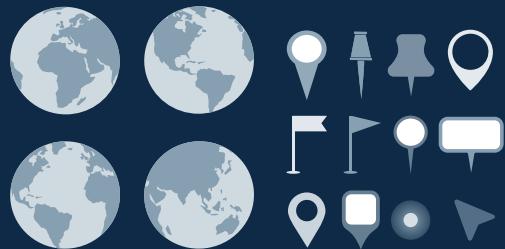
Cuate

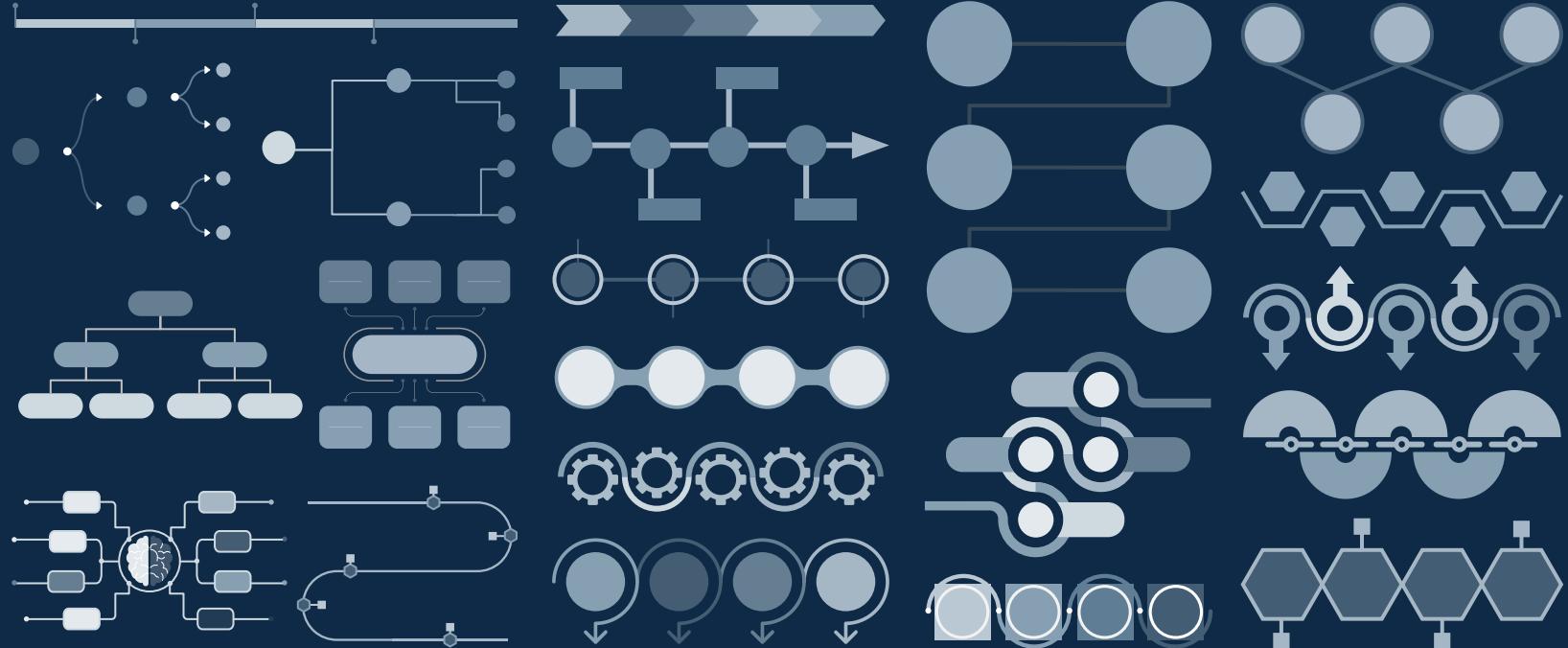
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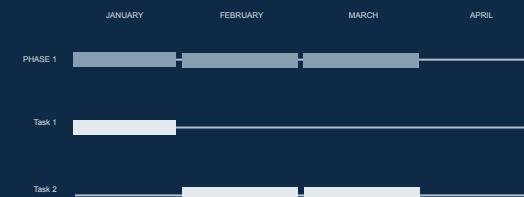
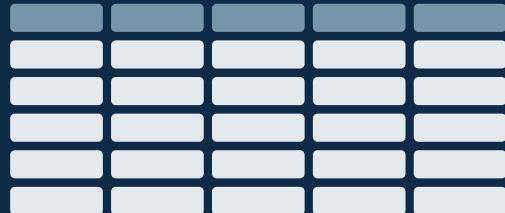
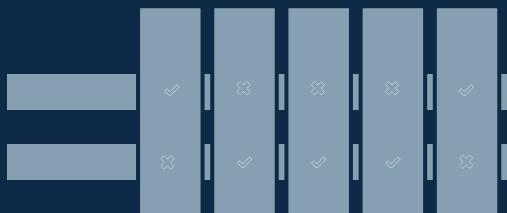
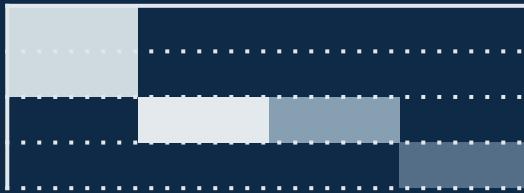
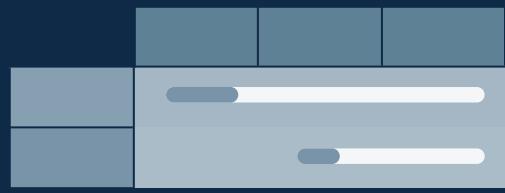
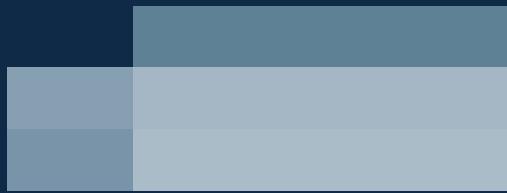
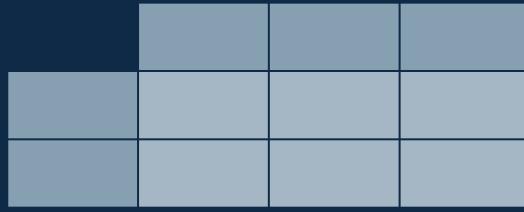
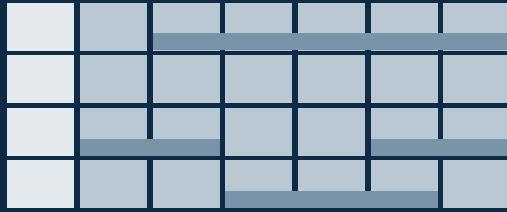
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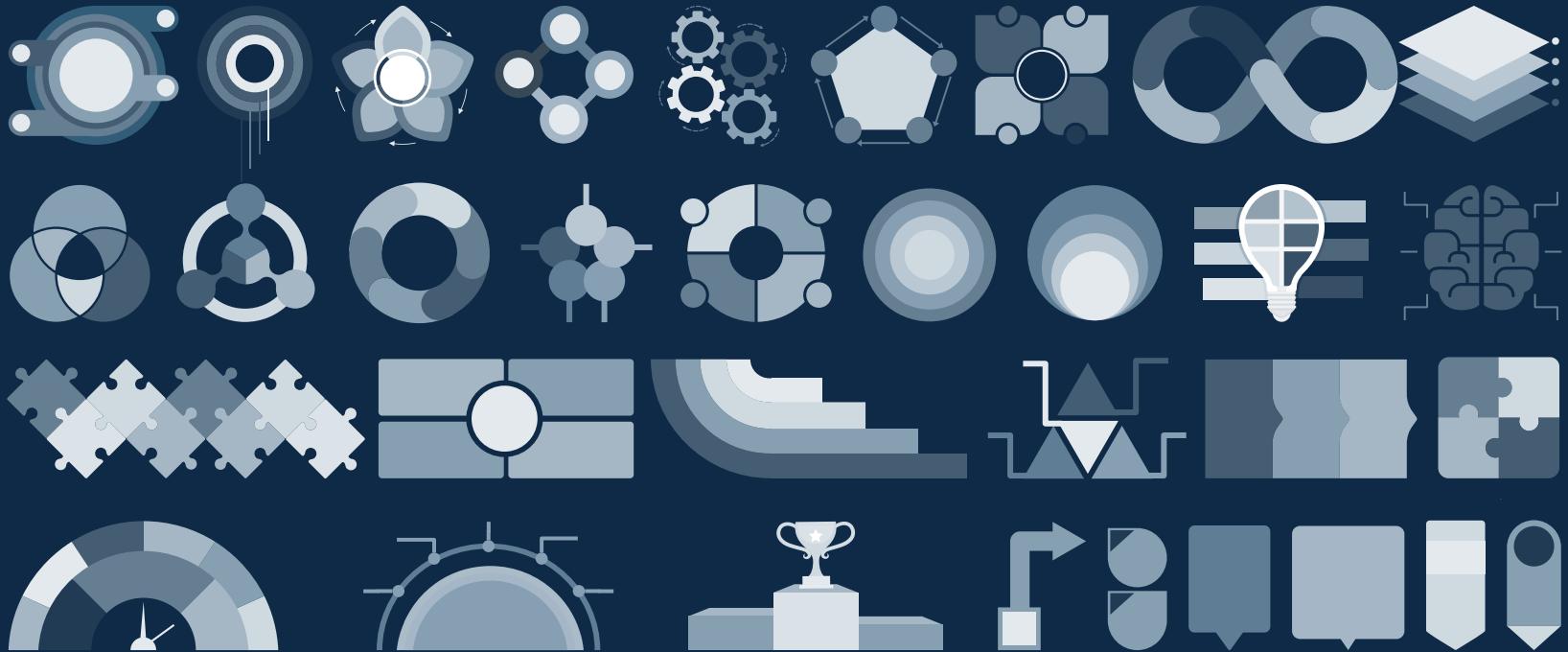
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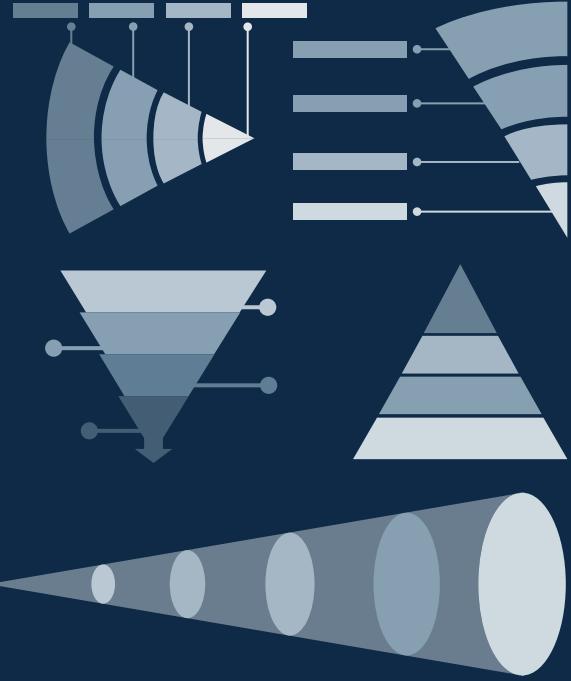
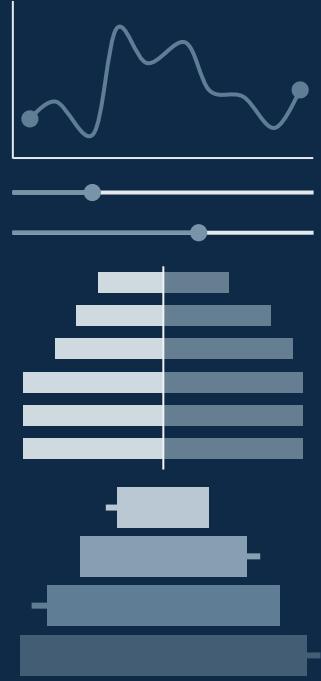
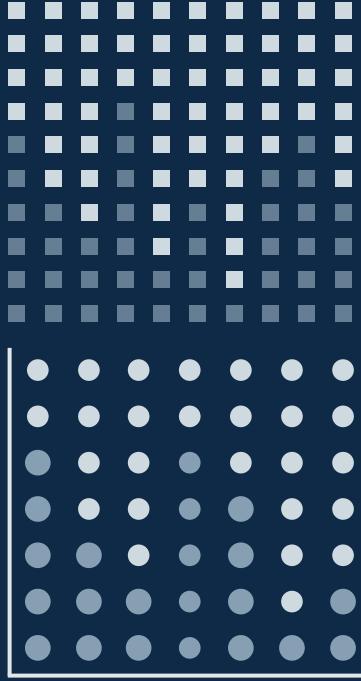












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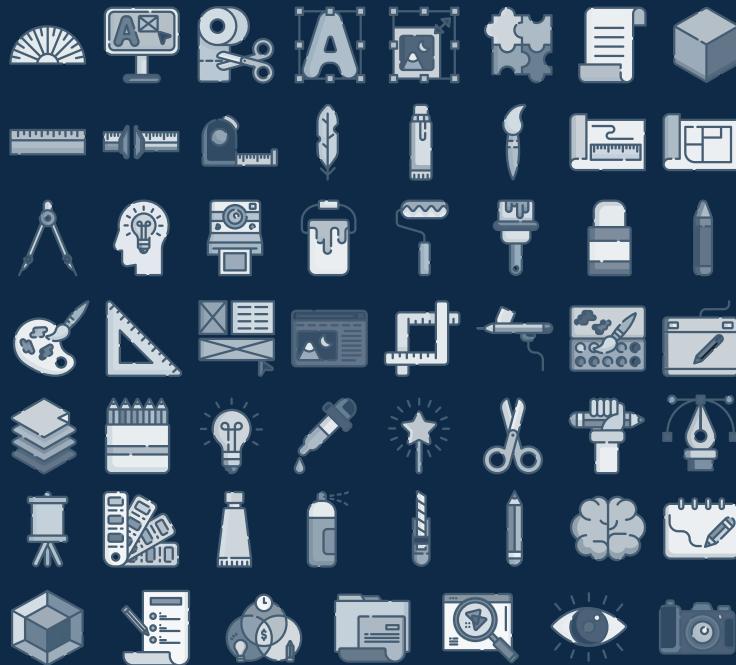
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# Avatar Icons



## Creative Process Icons



## Performing Arts Icons



# Nature Icons



# SEO & Marketing Icons

