P R O J E C T

Click on below link to download dataset:
Dataset link (https://info.stackoverflowsolutions.com/rs/719-EMH-566/images/stack-overflow-developer-survey-2022.zip)

importing libraries

In [9]:
```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np
```

reading dataset

In [10]:
```
survey_df = pd.read_csv('sods2022/survey_results_public.csv')
```

In [11]:
```
schema_df = pd.read_csv('sods2022/survey_results_schema.csv')
```

preprocessing

In [12]:
```
schema_df.head()
```

Out[12]:

	qid	qname	question	force_resp	type	selector
0	QID16	S0	Hel...	False	DB	TB
1	QID12	MetaInfo	Browser Meta Info	False	Meta	Browser
2	QID1	S1	<span style="font-size:22px; font-family: aria...	False	DB	TB
3	QID2	MainBranch	Which of the following options best describes ...	True	MC	SAVR
4	QID296	Employment	Which of the following best describes your cur...	False	MC	MAVR

we need column *qname* as index of `schema_df` DataFrame

In [13]:
```
1 schema_df.set_index('qname', inplace=True)
```

only data in *question* column is useful, so we will delete other columns

In [14]:
```
1 schema_df = schema_df.question
```

After deletion

In [15]:
```
1 schema_df
```

Out[15]:
```
qname
S0              <div><span style="font-size:19px;"><strong>Hel...
MetaInfo                                          Browser Meta Info
S1              <span style="font-size:22px; font-family: aria...
MainBranch      Which of the following options best describes ...
Employment      Which of the following best describes your cur...
                                          ...
Frequency_2     Interacting with people outside of your immedi...
Frequency_3     Encountering knowledge silos (where one indivi...
TrueFalse_1     Are you involved in supporting new hires durin...
TrueFalse_2     Do you use learning resources provided by your...
TrueFalse_3     Does your employer give you time to learn new ...
Name: question, Length: 79, dtype: object
```

plot function

In [18]:

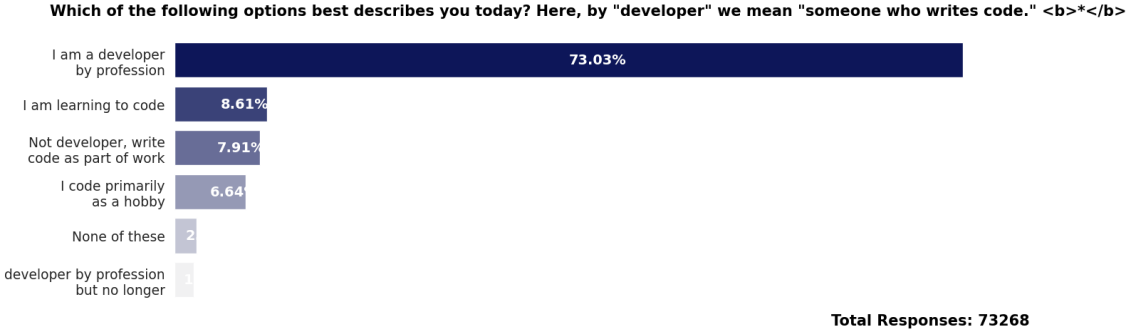
```
def custom_plot(series, plot_height=15, plot_width=5,
                y_label_font_size=13.5,
                title = '', title_font_size=15,
                percent_font_size=14,
                color = 'light:#59C1BD'):

    # create figure to display plot
    plt.figure(figsize=(plot_width, plot_height))

    # to hide square of the plot
    custom_params = {
                        "axes.spines.bottom": False,
                        "axes.spines.right": False,
                        "axes.spines.left"  : False,
                        "axes.spines.top": False
                    }


    sns.set_theme(style="white", rc=custom_params)

    # creating different shades of colors(color palette) of size
    # pal stores rgb values for different color shades
    pal = sns.color_palette(color, len(series)) # light:#5A9

    # argsort return indices of elements according to sorting or
    # means lowest number will be indexed as 0, and so on
    # rank stores rank of series whr highest count value comes f
    # using this rank to assign color shades to diffrnt bars in
    rank = series.argsort().argsort()

    ax = sns.barplot(x = series.values, y=series.index,
                     #palette='PuBuGn_r'
                     #order=series.sort_values('Growth').State,
                     palette=np.array(pal[::])[rank]
                    )

    # to calculate percentage
    s = series.values.sum()

    for rect in ax.patches:
        x_value = rect.get_width()
        y_value = (rect.get_y() + rect.get_height() / 2)
        space = 0

        # calculating percentage and assigning to variable label
        label = "{:.2f}%".format( (100*x_value/s))

        # to display percentage value on bar
        plt.annotate(
            text=label,                      # Use `label` as labe
            xy=((x_value/2)-5, y_value),    # Place label at end
            xytext=(space, 0),           # Horizontally shift lab
            textcoords="offset points", # Interpret `xytext` as
            va='center',                # Vertically center labe
            color = 'white',
            #ha='center',
            weight='bold', size=percent_font_size
        )

```

```
    plt.title('\n'+title+'\n',
              fontdict=
              {
                  "color": 'black',
                  "weight":'bold',
                  "size":title_font_size
              }
             )


    plt.yticks(size=y_label_font_size)#, weight='bold')
    plt.xticks([], []) # to hide xticks

    f_dict={"color": 'black',"weight":'bold',  "size":15}
    plt.figtext(.74, .042, "Total Responses: {}".format(s),
                fontdict = f_dict);
```

what is your main branch..?

In [40]:
```
def MainBranch_ylabel_text_process(s):
    if s == 'I am not primarily a developer, but I write code so
        return 'Not developer, write\n code as part of work'
    elif s == 'I used to be a developer by profession, but no lo
        return 'developer by profession\n but no longer'
    elif s == 'I am a developer by profession':
        return 'I am a developer\n by profession'
    elif s == 'I code primarily as a hobby':
        return 'I code primarily\n as a hobby'
    else:
        return s
```

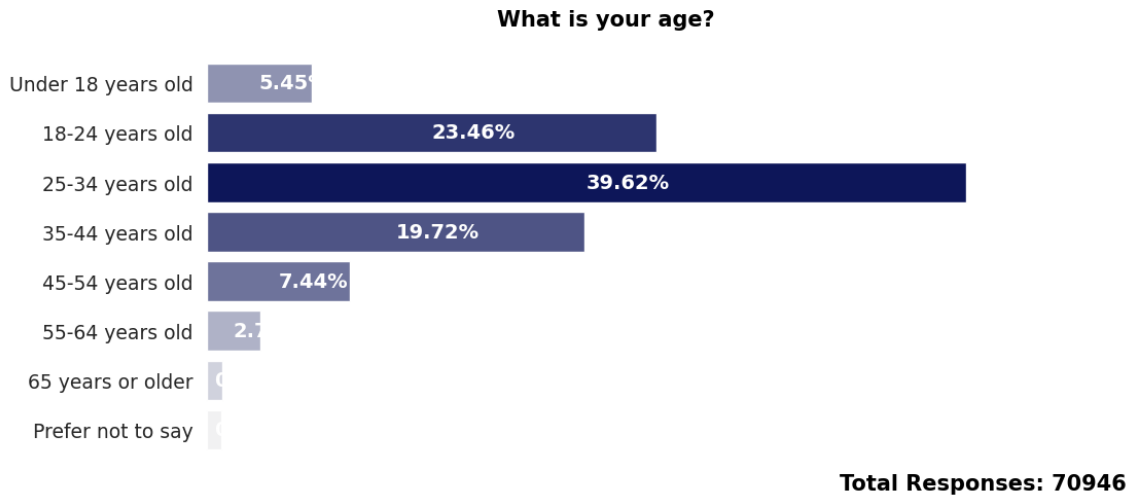
In [59]:
```
survey_df['MainBranch'] = survey_df.MainBranch.apply(MainBranch_

mb = survey_df.MainBranch.value_counts()

custom_plot(
            mb,
            plot_width=15, plot_height=4.8,
            y_label_font_size=13.5,
            title = schema_df.MainBranch,
            color = 'light:#000C66'
            )

```



In [ ]:
```
1
```

How old is the average professional developer..?

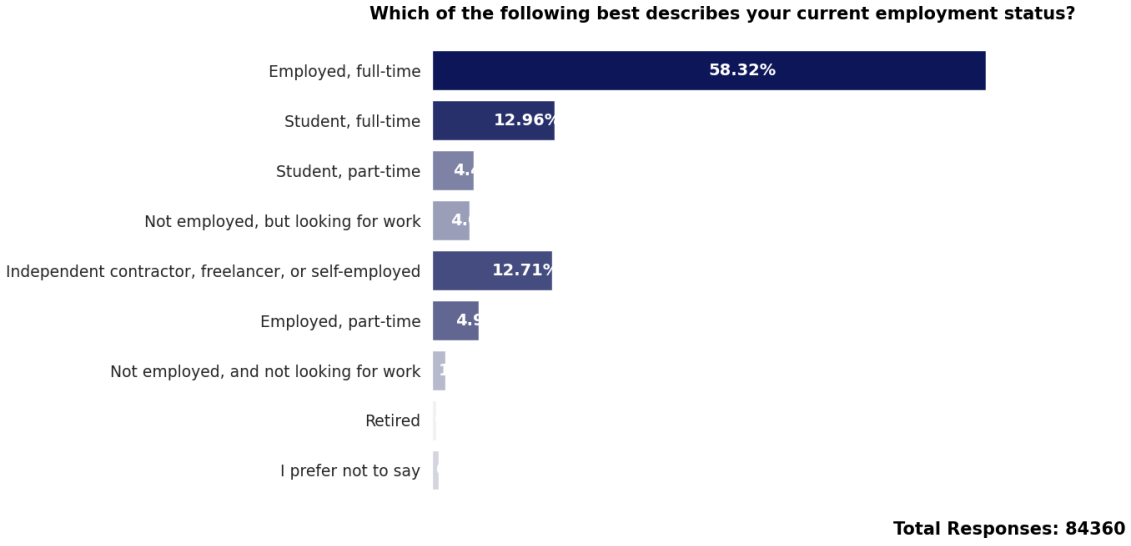
In [134]:
```
1  # Age
2
3  reorder_list = ['Under 18 years old', '18-24 years old',
4                  '25-34 years old', '35-44 years old',
5                   '45-54 years old', '55-64 years old',
6                   '65 years or older', 'Prefer not to say']
7
8  age_data = survey_df.Age.value_counts().reindex(reorder_list)
9
10 custom_plot(age_data, plot_height=5, color='light:#000C66',
11             title = schema_df.Age, plot_width=10)
```



Employment status of an employee

In [21]:

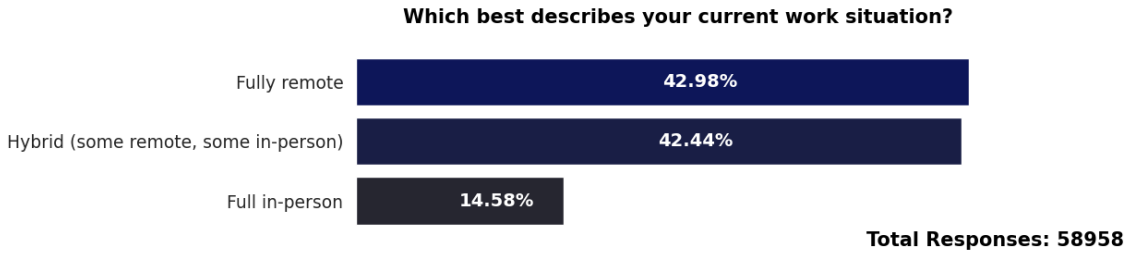
```
# Employment

def colum_expand( s ):
    d = {}

    for t in s.dropna().values:
        for i in t.split(';'):
            if i in d.keys():
                d[i] += 1
            else:
                d[i] = 1

    return pd.Series(d)


emp = colum_expand(survey_df.Employment)

custom_plot(emp, plot_height=7, color='light:#000C66',
            title=schema_df.Employment, plot_width=9)
```



mode of working of employee(remote/hybrid)

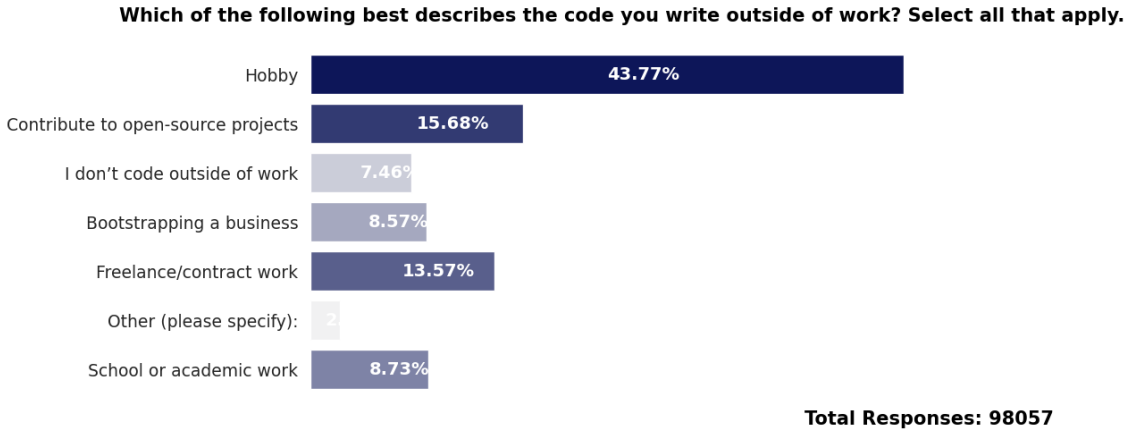
In [19]:

```
# RemoteWork

remote_work = survey_df.RemoteWork.value_counts()

custom_plot(remote_work, plot_height=2.5, plot_width=9
            , color='dark:#000C66', title=schema_df.RemoteWork)
```



how many of you write code outside of your work

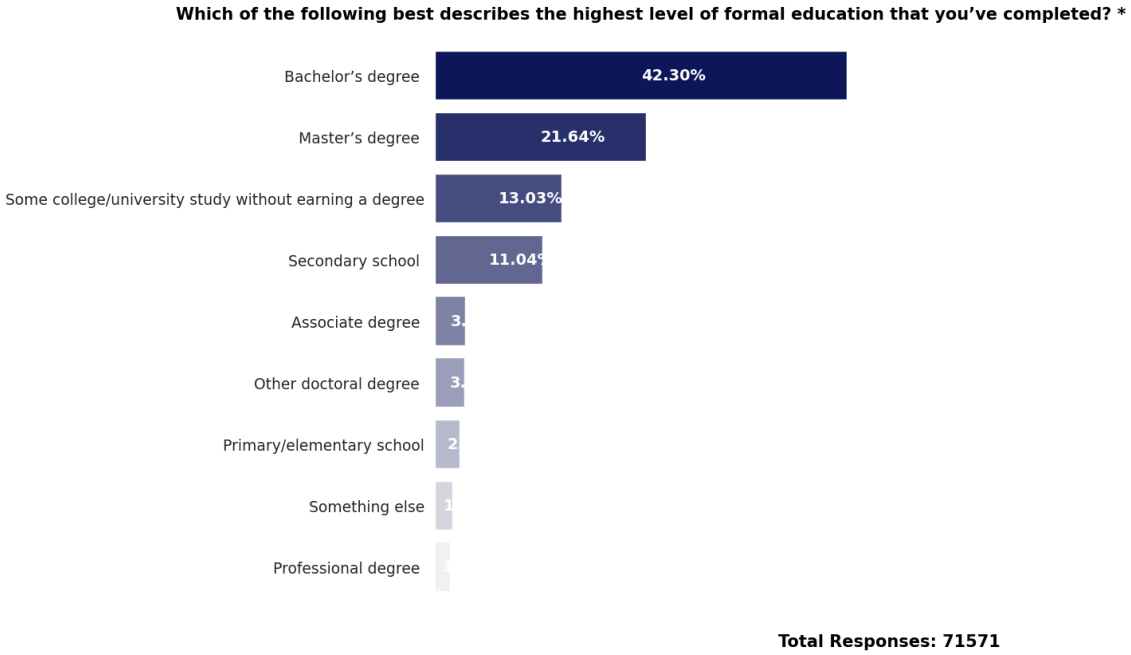
In [164]:
```
# CodingActivities

coding_act = colum_expand(survey_df.CodingActivities)

custom_plot(coding_act, plot_height=5, plot_width=9,
            color='light:#000C66', title=schema_df.CodingActivit
```



What is your highest level of formal education..?

In [172]:

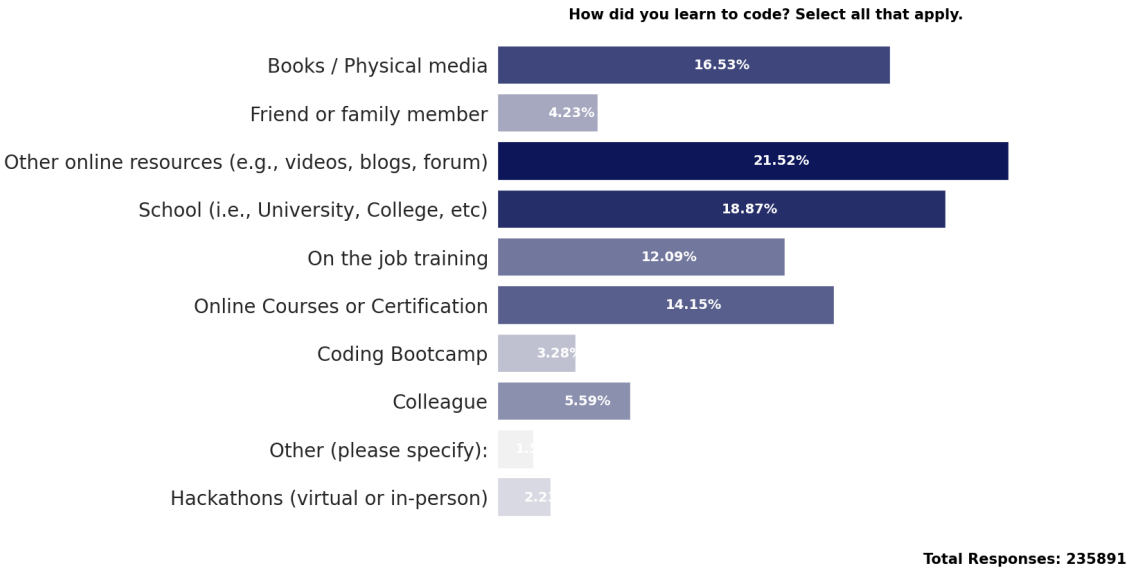
```
edu = survey_df.EdLevel.value_counts()

custom_plot(edu, plot_height=9, plot_width=7, color='light:#000C
           title=schema_df.EdLevel)
```



How did you learn to code

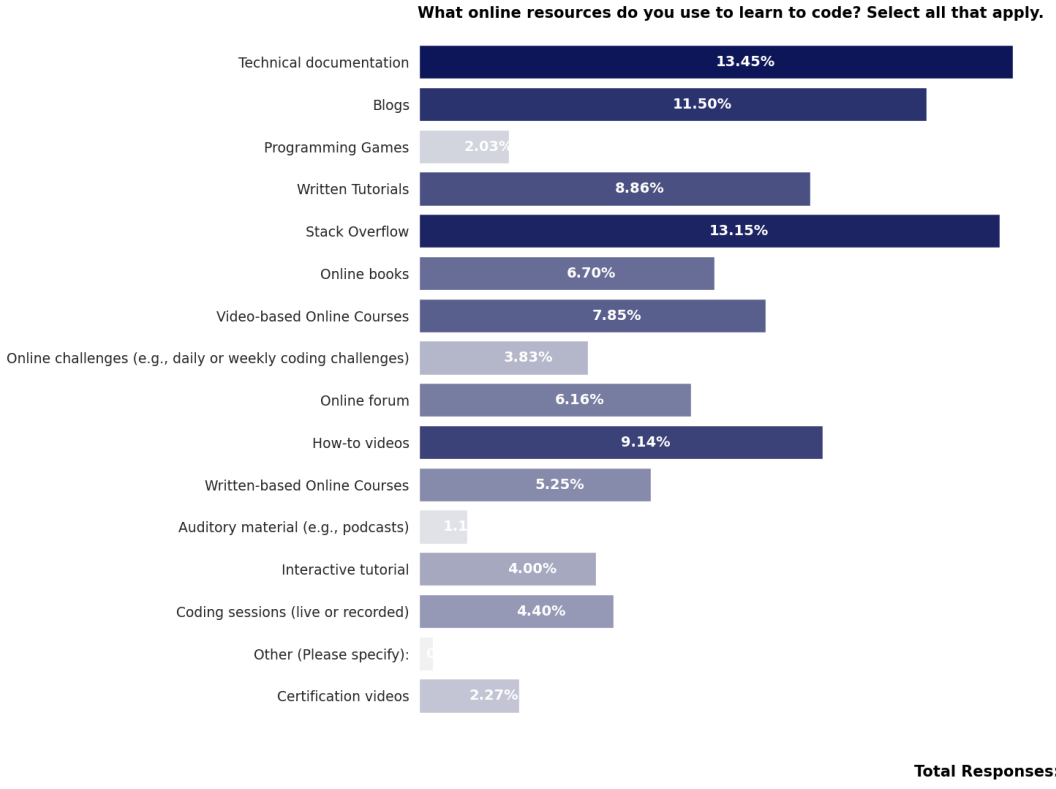
In [186]:

```
# LearnCode

learn_code_data = colum_expand(survey_df.LearnCode)


custom_plot(learn_code_data, plot_height=9, plot_width=10,
           color='light:#000C66', title=schema_df.LearnCode,
           y_label_font_size=20)
```



What online resources do you use to learn to code?

In [195]:
```
# LearnCodeOnline
learn_code_online = colum_expand(survey_df.LearnCodeOnline)


custom_plot(learn_code_online, plot_height=12, plot_width=11,
            color='light:#000C66', title=schema_df.LearnCodeOnlin
```

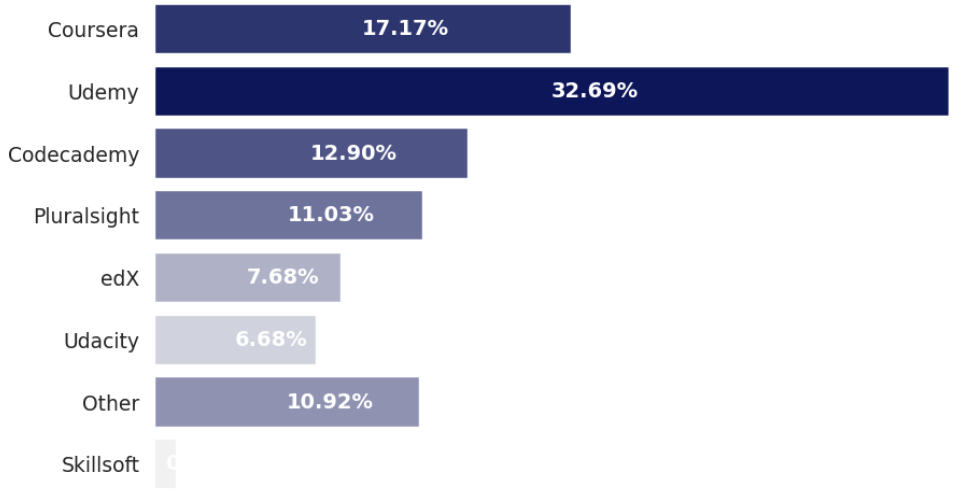


What online courses or certifications do you use to learn to code?

In [205]:

```
learn_code_cert = colum_expand(survey_df.LearnCodeCoursesCert)

custom_plot(learn_code_cert, plot_height=6, plot_width=10,
            color='light:#000C66', title=schema_df.LearnCodeCours
```

What online courses or certifications do you use to learn to code? Select all that apply.



Total Responses: 59773

---

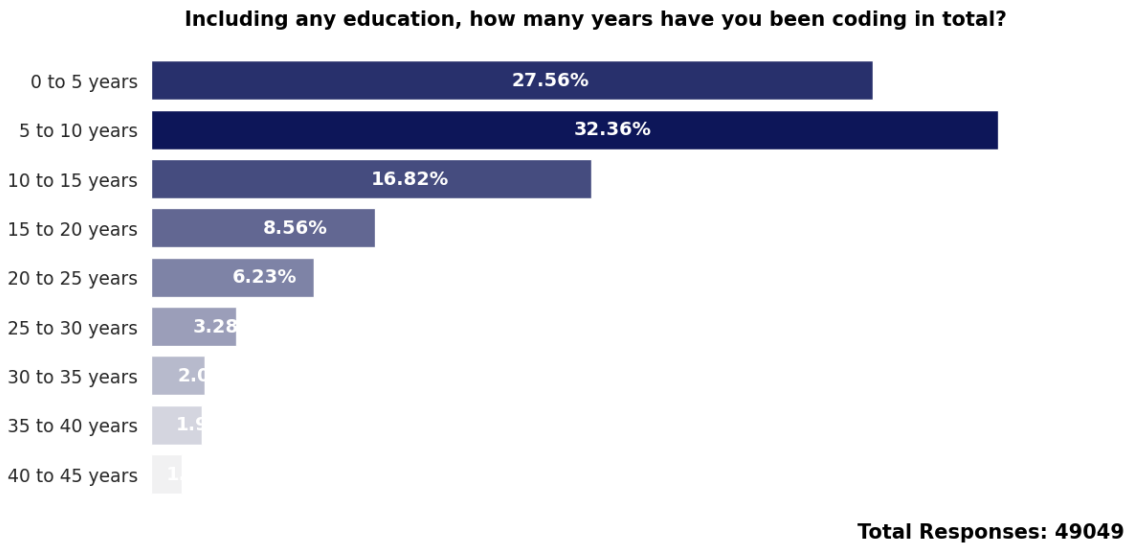
how many years have you been coding in total (Including education)

In [27]:

```
def make_groups(s):
    try:
        s = int(s)
        if s > 0 and s < 5:
            return '0 to 5 years'
        if s > 5 and s < 10:
            return '5 to 10 years'
        if s > 10 and s < 15:
            return '10 to 15 years'
        if s > 15 and s < 20:
            return '15 to 20 years'
        if s > 20 and s < 25:
            return '20 to 25 years'
        if s > 25 and s < 30:
            return '25 to 30 years'
        if s > 30 and s < 35:
            return '30 to 35 years'
        if s > 35 and s < 40:
            return '35 to 40 years'
        if s > 40 and s < 45:
            return '40 to 45 years'
        if s > 45 and s < 50:
            return '5 to 10 years'
    except (TypeError, ValueError):
        pass

```

In [226]:
```
survey_df['coding_experience'] = survey_df.YearsCode.apply(make_
```

In [238]:
```

reorder_list = ['0 to 5 years', '5 to 10 years', '10 to 15 years
                '15 to 20 years', '20 to 25 years', '25 to 30 yea
                '30 to 35 years','35 to 40 years', '40 to 45 year

ce = survey_df.coding_experience.value_counts().reindex(reorder_

custom_plot(ce, plot_height=6, plot_width=12,
            title=schema_df.YearsCode, color='light:#000C66')
```

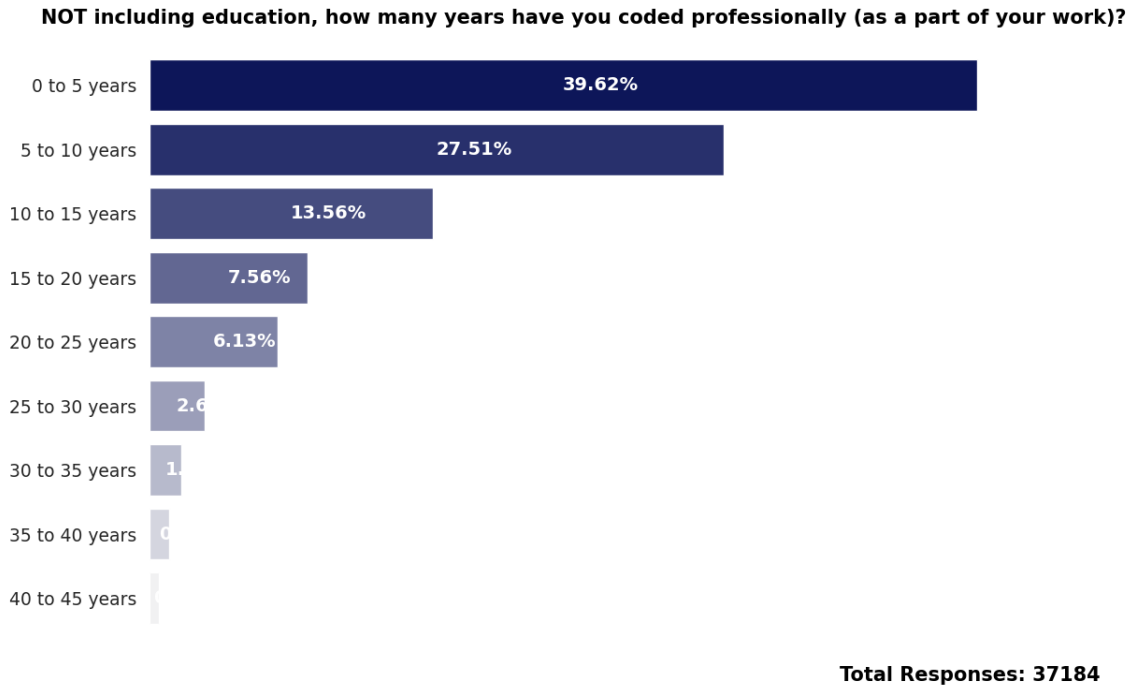


how many years have you been coding in total (not Including education)

In [244]:
```
survey_df['prof_code_exp'] = survey_df.YearsCodePro.dropna().app
```

In [253]:

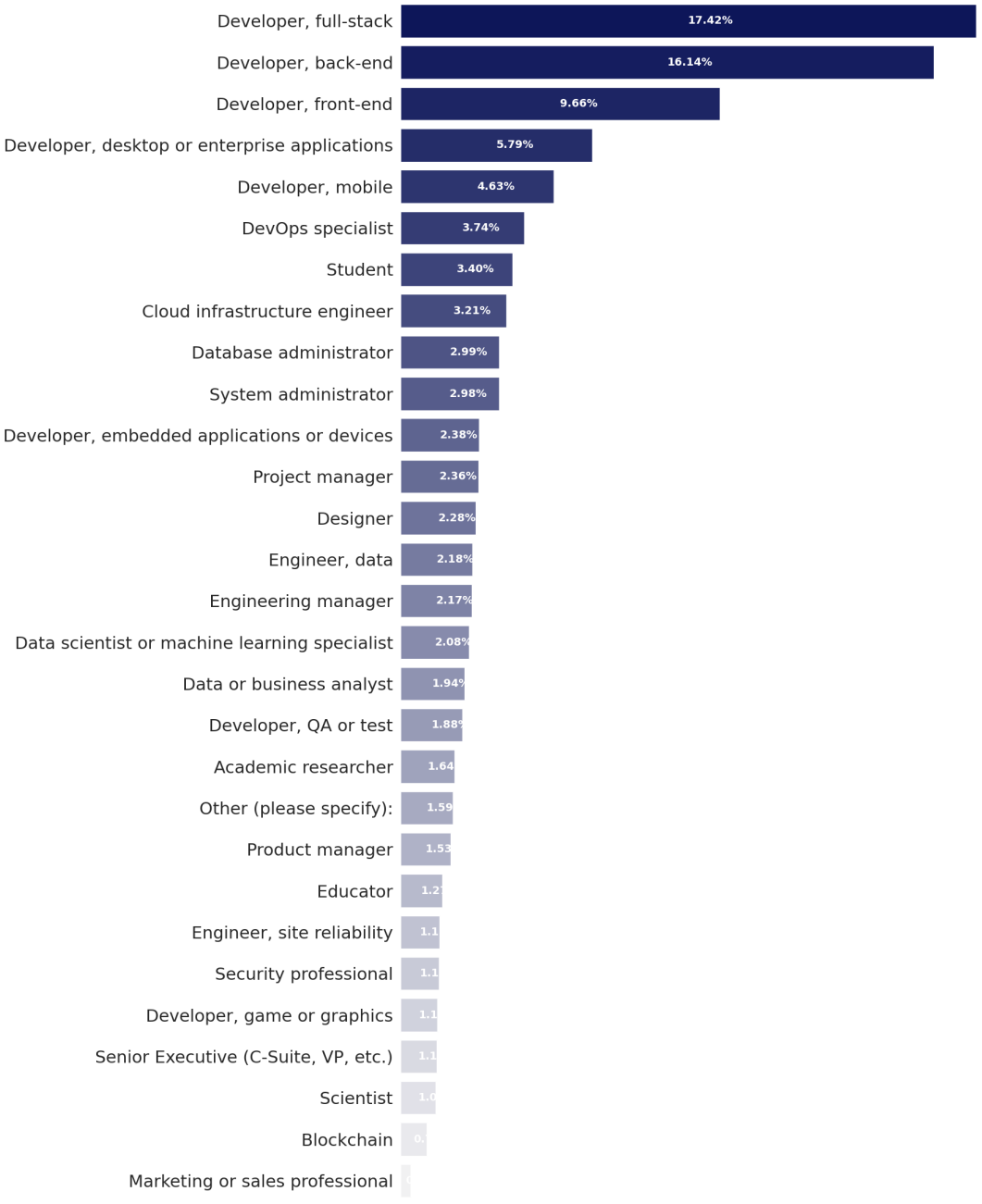
```
pce = survey_df.prof_code_exp.value_counts()

custom_plot(pce, plot_height=8,plot_width=12,
            title=schema_df.YearsCodePro, color='light:#000C66')
```



what kind of developer you are..?

In [269]:

```
dev_type = colum_expand(survey_df.DevType)

dev_type = dev_type.sort_values(ascending=False)

custom_plot(dev_type, color='light:#000C66', plot_height=28,
            plot_width=14, y_label_font_size=22)
```



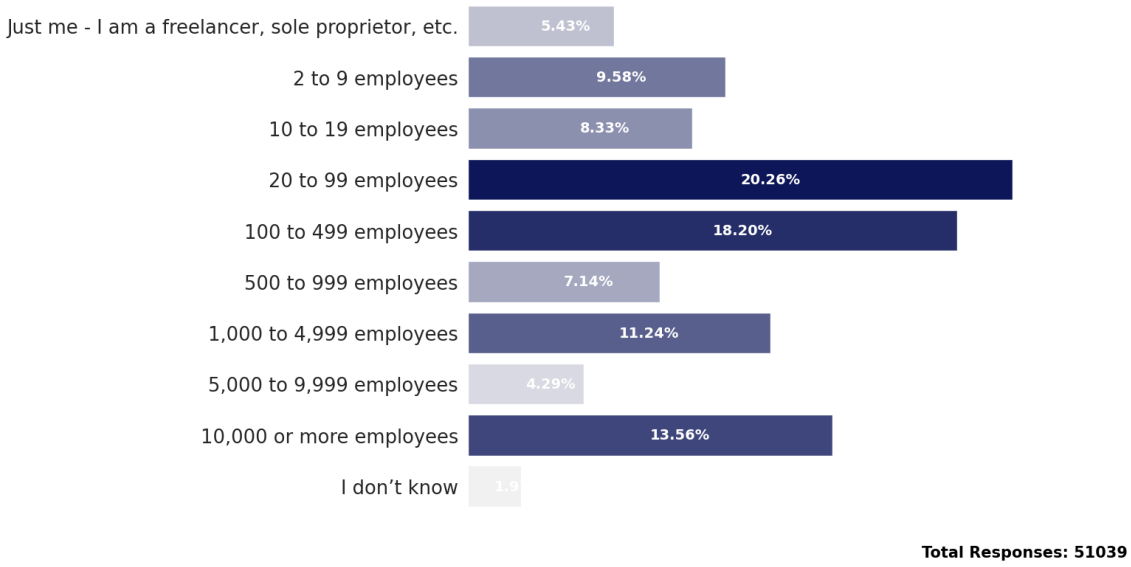
Total Responses: 164790

---

what is organization size of the developer...?

In [13]:

```
reorder_list = [
    "Just me - I am a freelancer, sole proprietor, etc.",
    "2 to 9 employees", "10 to 19 employees", "20 to 99 employee
    "100 to 499 employees", "500 to 999 employees",
    "1,000 to 4,999 employees", "5,000 to 9,999 employees",
    "10,000 or more employees", "I don't know"
]

org_size = survey_df.OrgSize.value_counts().reindex(reorder_list

custom_plot(org_size,plot_height=9, plot_width=10,
            color = 'light:#000C66',
            y_label_font_size=18.5)
```



Total Responses: 51039

What level of influence developer, have over new technology purchases at your organization?

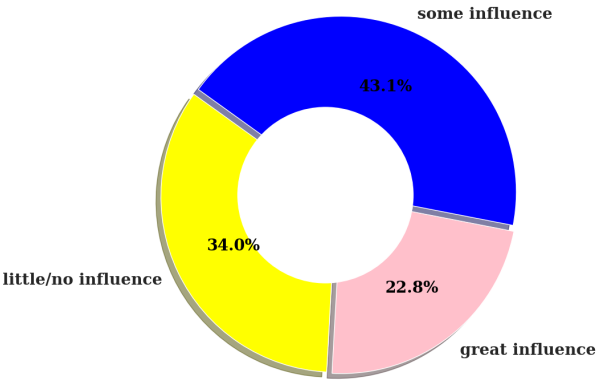
In [23]:

```
def plot_pie(data , title='', distance_btwn_pieces=0.09, startan
    a=distance_btwn_pieces
    explode = (a,) * len(data)

    plt.figure(figsize=(14,10))

    patches, texts, pcts = plt.pie(data, explode=explode,
                                   labels=data.index,
            #labeldistance=1.1,
            pctdistance=0.65,
            colors = ['red', 'blue', 'yellow','pink','blue'],

            #wedgeprops={'linewidth': 1.5, 'edgecolor' : "green"
            textprops={"weight":'bold', "size":20, 'family':'ser
            autopct='%1.1f%%',
            startangle=startangle,
            shadow=True,
           )


    plt.setp(pcts, color='black')
    hfont = {'fontname': 'serif', 'weight': 'bold'}
    plt.title(title, size=25, **hfont)
    centre_circle = plt.Circle((-0.08,0), 0.5, fc='white')
    fig = plt.gcf() # get current figure
    fig.gca().add_artist(centre_circle)
    ;
```

In [37]:

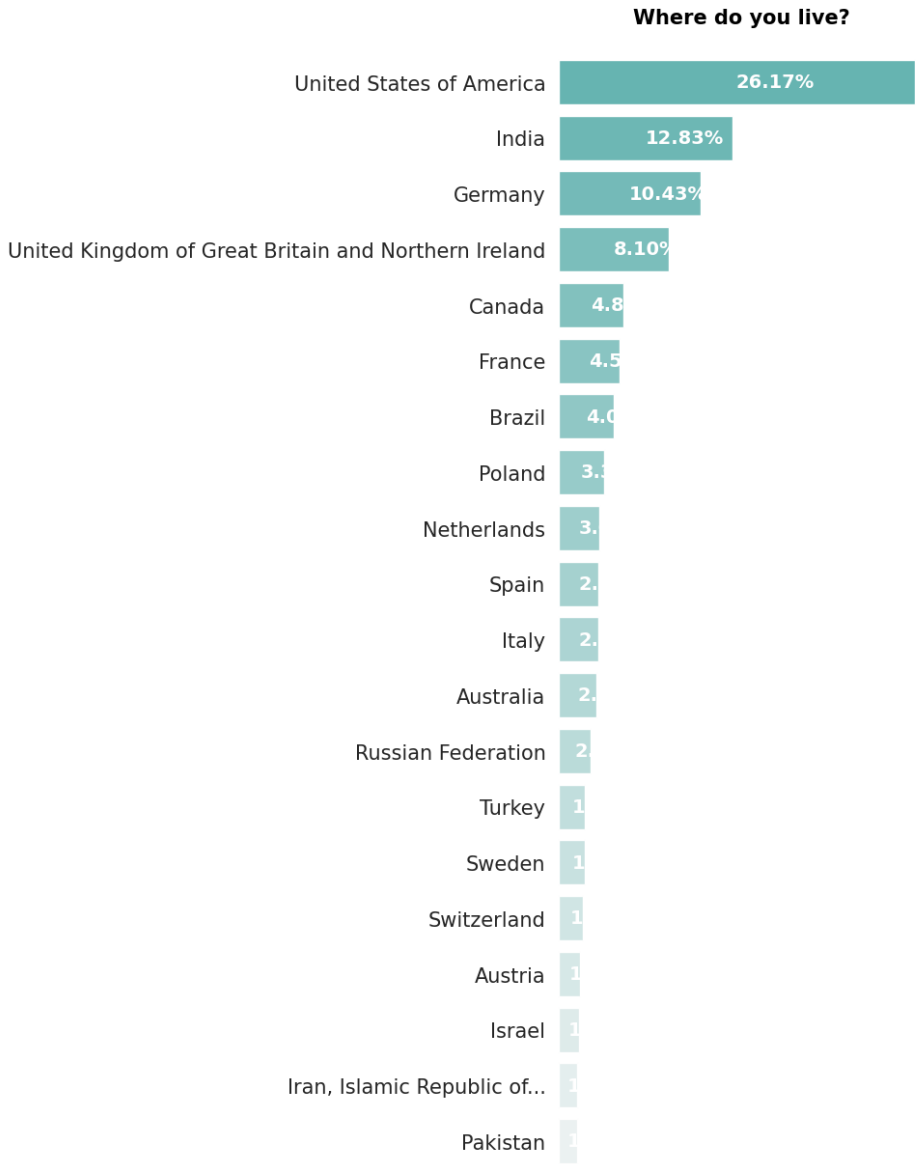
```
def shorten_names(s):
    if s == 'I have some influence':
        return 'some influence'
    elif s == 'I have little or no influence':
        return 'little/no influence'
    elif s == 'I have a great deal of influence':
        return 'great influence'

tech_influence = survey_df.PurchaseInfluence.apply(shorten_names
tech_influence = tech_influence.value_counts()

plot_pie(data=tech_influence,
         title = schema_df.PurchaseInfluence,
         distance_btwn_pieces=0.02
        )
```

What level of influence do you, personally, have over new technology purchases at your organization?



Where do developer live?

In [41]:
```
country = survey_df.Country.value_counts()[:20]

custom_plot(country, y_label_font_size=15,
            title= schema_df.Country.split('<')[0] )
```

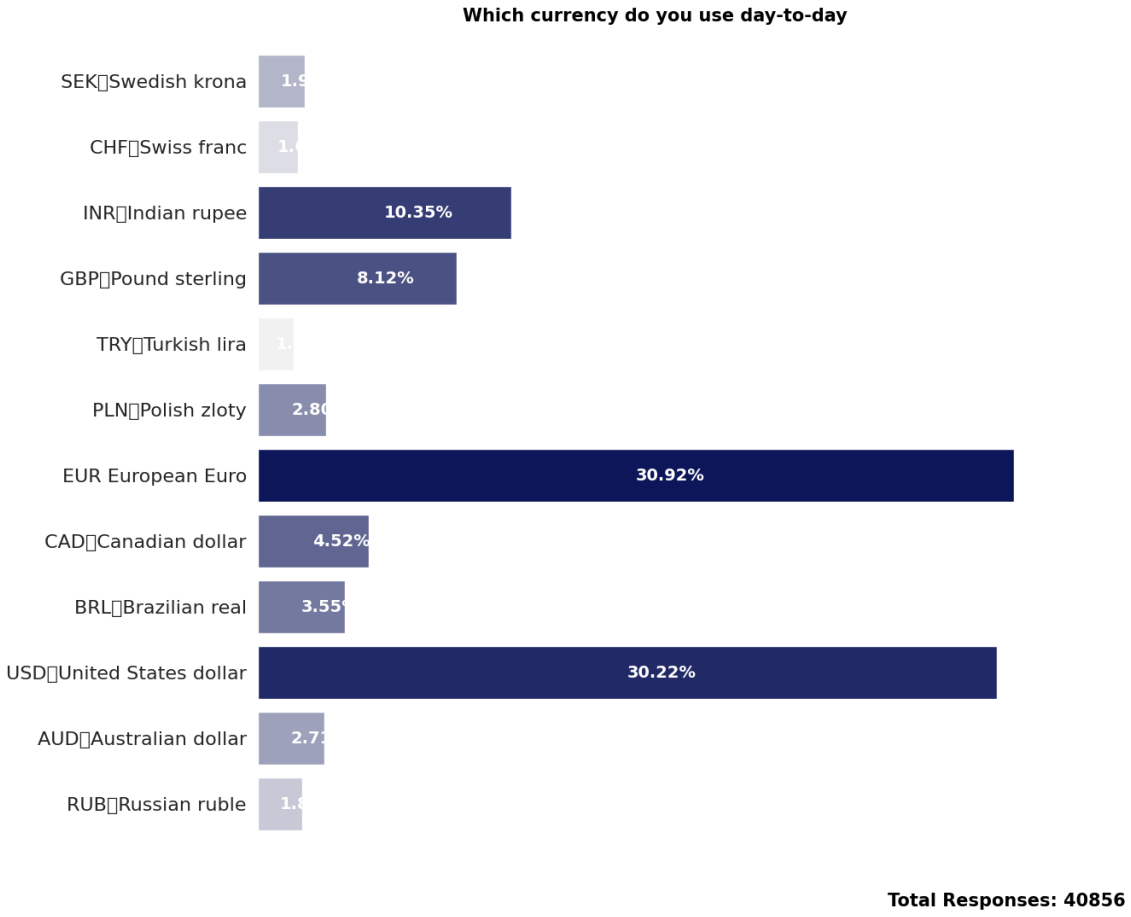


Total Responses: 51741

Which currency does developer use day-to-day?

In [52]:

```
currency = survey_df.Currency.value_counts()[:12]
currency = currency.sample(len(currency))

custom_plot(currency, plot_height=12, plot_width=12,
            color = 'light:#000C66',
            title=schema_df.Currency.split('?')[0],
            y_label_font_size=16)
```



In [50]:

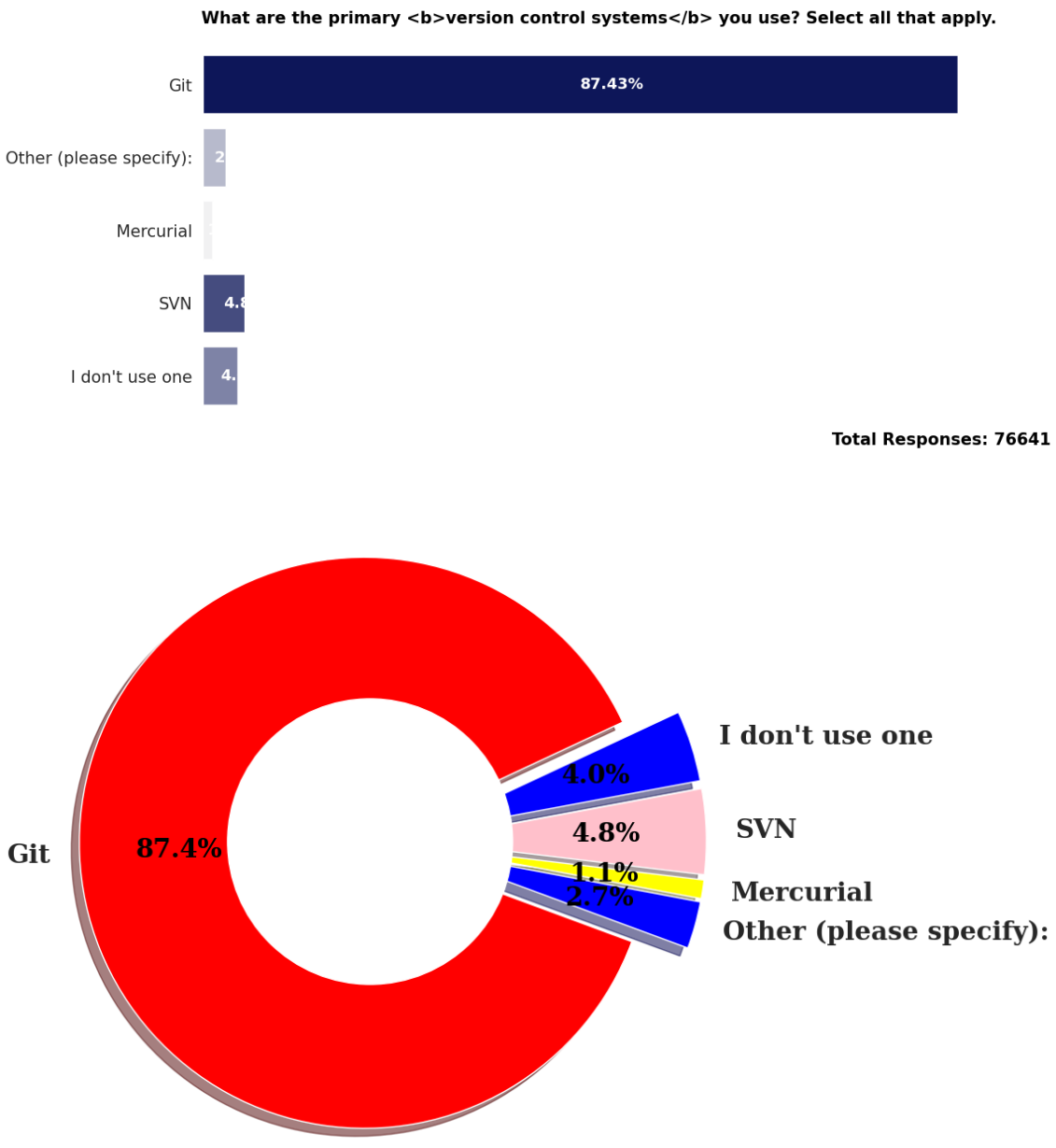
```
import warnings
warnings.filterwarnings('ignore')
```

In [ ]:

```

```

In [25]:

```
vcs = colum_expand(survey_df.VersionControlSystem)


custom_plot(vcs, plot_height=6, plot_width=13, color = 'light:#0
           y_label_font_size=15, title=schema_df.VersionControlS

plot_pie(vcs, startangle=25,
        distance_btwn_pieces=0.1)

```

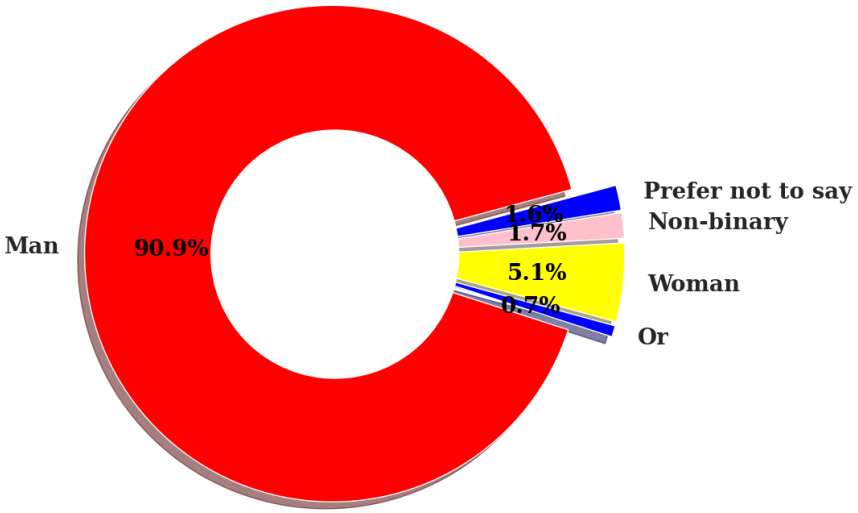


what is your gender..?

In [109]:

```
# survey_df.Gender.value_counts()

gender = colum_expand(survey_df.Gender)

gender.rename( lambda x: x.split(',')[0], inplace=True )

plot_pie(gender,distance_btwn_pieces=0.09, startangle=15,
        title=schema_df.Gender)
```

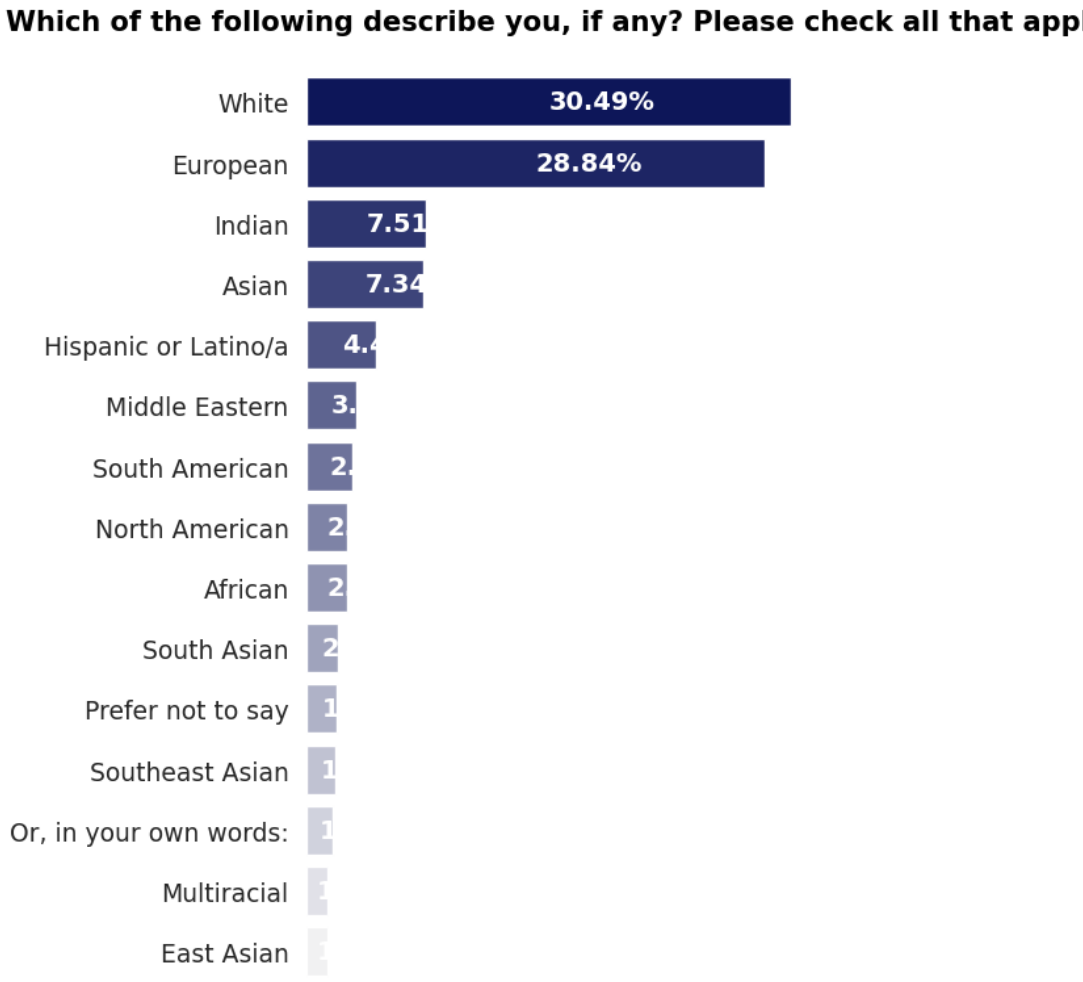
Which of the following describe you, if any? Please check all that apply.



ethincity of developer

In [120]:

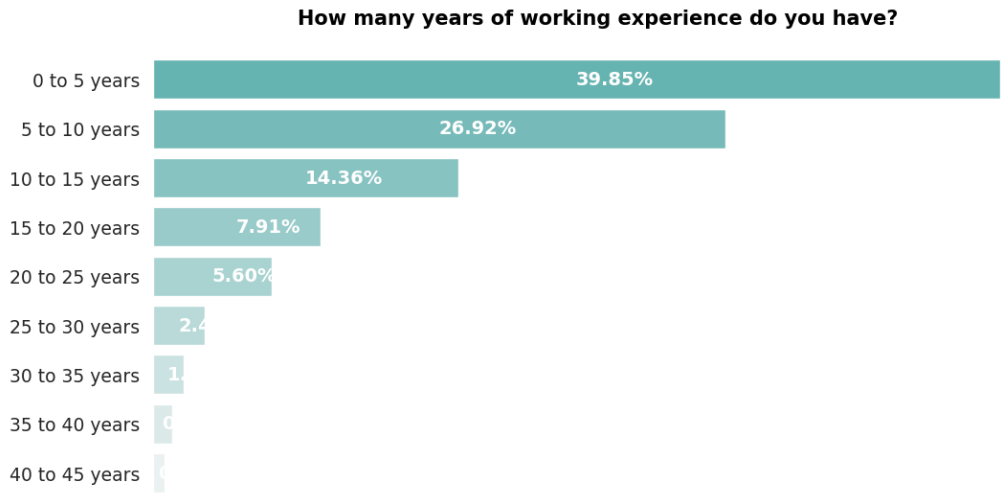
```
1 ethincity = colum_expand(survey_df.Ethnicity).nlargest(15)
2
3 custom_plot(ethincity, plot_height=9, title=schema_df.Ethnicity,
```



How many years of working experience do you have?

In [29]:

```
work_exp = survey_df.WorkExp.apply(make_groups).value_counts()


custom_plot(work_exp, plot_height=6, plot_width=12, title=schema
```

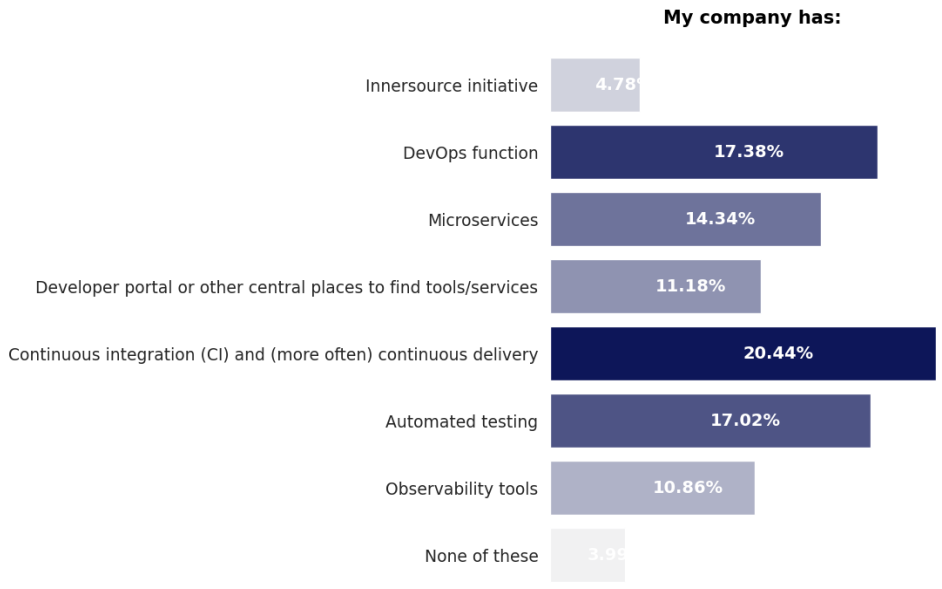


Total Responses: 26803

which technologies does your company have?

In [149]:

```
tech = colum_expand(survey_df.ProfessionalTech)

custom_plot(tech, plot_height=8, plot_width=6, color = 'light:#0
            title=schema_df.ProfessionalTech)
```



Total Responses: 119166

In [ ]:

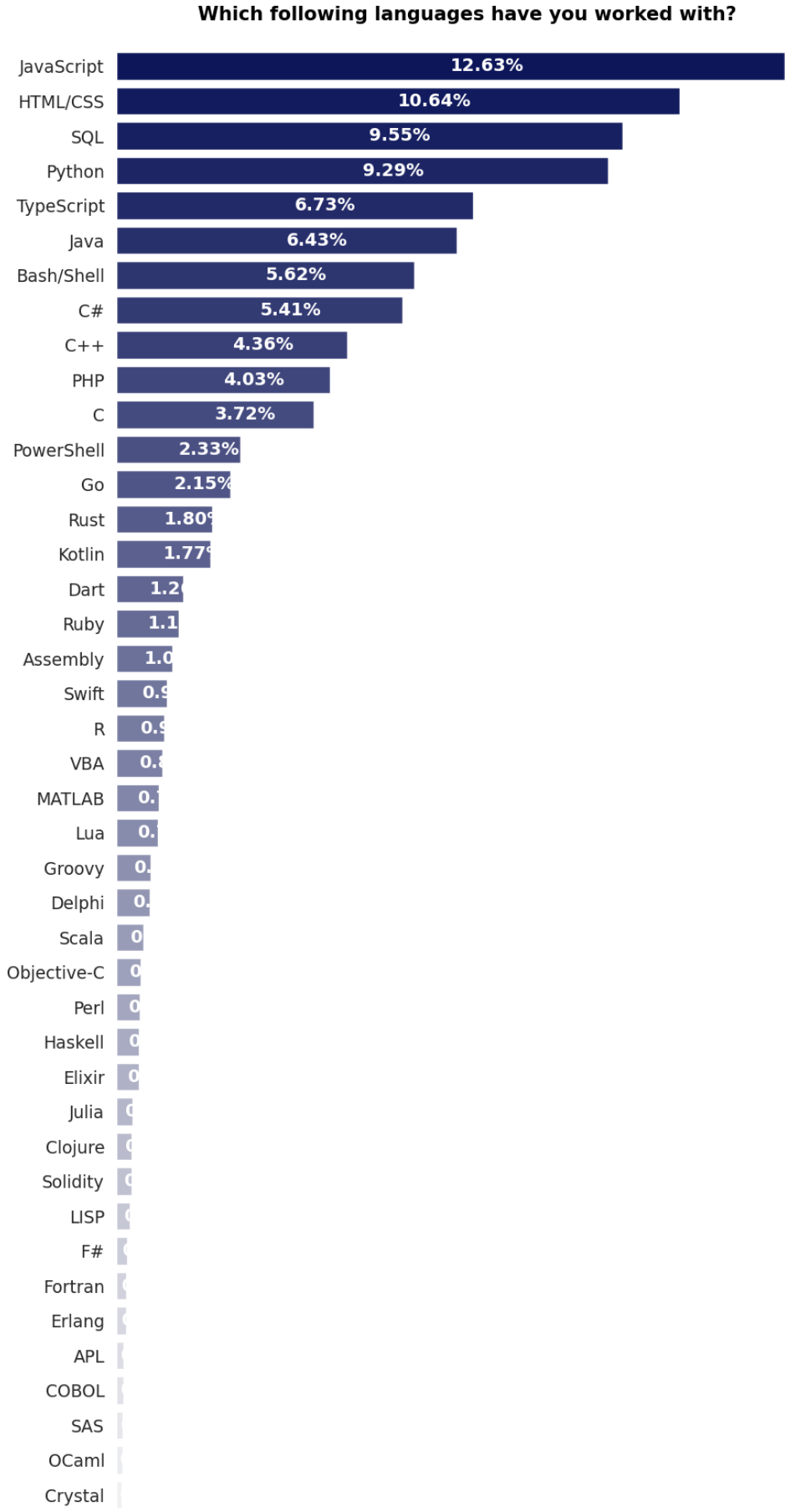
```

```

In [150]:
```
1 schema_df.Language
```

Out[150]:
```
'Which <b>programming, scripting, and markup languages</b> have you
done extensive development work in over the past year, and which do
you want to work in over the next year? (If you both worked with th
e language and want to continue to do so, please check both boxes i
n that row.)'
```

In [163]:

```
languages = colum_expand(survey_df.LanguageHaveWorkedWith).sort_

s = 'Which following languages have you worked with?'

custom_plot(languages, plot_height=21,plot_width=10, title=s,col
```



Total Responses: 367821

In [ ]:

```
1
```

In [165]:

```
survey_df.WebframeHaveWorkedWith      # django flask
survey_df.WebframeWantToWorkWith

survey_df.LanguageWantToWorkWith

survey_df.DatabaseHaveWorkedWith
survey_df.DatabaseWantToWorkWith

survey_df.PlatformHaveWorkedWith
survey_df.PlatformWantToWorkWith

survey_df.MiscTechHaveWorkedWith
survey_df.MiscTechWantToWorkWith

survey_df.ToolsTechHaveWorkedWith
survey_df.ToolsTechWantToWorkWith

survey_df.CompTotal                   # annual income
survey_df['OpSysPersonal use']        # operating system
```

Out[165]:

```
0             NaN
1             NaN
2         32000.0
3         60000.0
4             NaN
            ...
73263     60000.0
73264    107000.0
73265         NaN
73266     58500.0
73267         NaN
Name: CompTotal, Length: 73268, dtype: float64
```

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