**KB Calculations**

**Calculation of Percentiles is done as**

from scipy.stats import norm

norm.cdf(result, loc=mean, scale=standard\_deviation)

Reference: [Link](https://stackoverflow.com/questions/809362/how-to-calculate-cumulative-normal-distribution)

**Data used for calculation of percentile**

File: data/static\_distributions.csv

Dummy data taken from: [Link](https://www.researchgate.net/figure/Mean-and-standard-deviation-of-percent-fat-mass-fat-mass-and-lean-mass-in-355-men-and_fig4_277410153)

**Interpretations based on the calculated percentile**

Percentile = [0, 0.135, 2.275, 15.865, 84.135, 97.725, 99.685]

Percentile interpretations = ['Extremely Below Average', 'Significantly Below Average', 'Below Average', 'Average', 'Above Average', 'Significantly Above Average', 'Extremely Above Average']

**Patient Surveys**

We have 4 types of patient surveys

1. Sleep - PSQI
2. Mental health - PHQ9
3. Physical activity - IPAQ
4. Nutrition – DSQ

**Sleep – PSQI**

Questions asked in the Sleep Quality survey: [Link](https://quisitive-my.sharepoint.com/:f:/p/prudhvi_vuda/EgsEZYoG1gtEnbl3c5CW64YB7sARLSztJafqAM0kmkEjcg?e=abXNCk)

For calculations, please refer to: [Link](https://quisitive-my.sharepoint.com/:i:/p/prudhvi_vuda/EdL58zgfBS1Du2pIFSwH5-kB4uuhkjAWQwlgnGPjnoyvnQ?e=muPOpI) and [Link](https://quisitive-my.sharepoint.com/:u:/p/prudhvi_vuda/EQpavgIe7QZMrWCHgpJ0VSgB_cv-OAt-jhPp62VsSzEMQw?e=gHahIr)

Data will be sent to PSQI function in the format below,

"psqi": {  
    "Question\_1": "12:00:00",  
    "Question\_2": "5",  
    "Question\_3": "6:30:00",  
    "Question\_4": "6",  
    "Question\_5A": "Not during the past month",  
    "Question\_5B": "Three or more times a week",  
    "Question\_5C": "Not during the past month",  
    "Question\_5D": "Not during the past month",  
    "Question\_5E": "Not during the past month",  
    "Question\_5F": "Not during the past month",  
    "Question\_5G": "Less than once a week",  
    "Question\_5H": "Not during the past month",  
    "Question\_5I": "Not during the past month",  
    "Question\_5J": "Three or more times a week",  
    "Question\_6": "Fairly good",  
    "Question\_7": "Not during the past month",  
    "Question\_8": "Once or twice a week",  
    "Question\_9": "Less than once a week"  
  }

Output of the caclculations will be

    "psqi": {  
        "day\_dysfunction": 2,  
        "disturbance": 1,  
        "duration": 1,  
        "efficiency": 3,  
        "interpretation": "Poor",  
        "latency": 0,  
        "medication\_requirement": 0,  
        "psqi\_score": 8,  
        "quality": 1  
    }

**Mental health – PHQ9**

Questions asked in the Mental Health survey: [Link](https://quisitive-my.sharepoint.com/:f:/p/prudhvi_vuda/EuxwRF0EiJFJgH2-U_meSE0Bl_H_DzTC574fTNZhp--BpQ?e=HPDKCN)

For calculations, please refer to: [Link](https://quisitive-my.sharepoint.com/:u:/p/prudhvi_vuda/Ed2p3juB6xtGtAYgeF4DodgBsM9kOu3lIrNd06r4Lh3fzg?e=68yuxR)

Phq9 function will be called with the below data as input

"phq9": {  
        "doing\_things": "Several days",  
        "feeling\_down": "Not at all",  
        "falling\_asleep": "More than half the days",  
        "feeling\_tired": "More than half the days",  
        "poor\_appetite": "Several days",  
        "feeling\_bad": "Not at all",  
        "trouble\_concentrating": "Several days",  
        "moving\_slowly": "Not at all",  
        "thoughts\_of\_death": "Not at all",  
        "things\_at\_home": "Not difficult at all"  
    }

It returns the below output

    "phq9": {  
        "interpretation": "Severe Depression",  
        "phq9\_score": 7  
    }

**Physical Activity – IPAQ**

Questions asked in the Physcial Activity survey: [Link](https://quisitive-my.sharepoint.com/:f:/p/prudhvi_vuda/EsyBsr67Yp1IjaSXgcB5ICoBmluAfetKYTh6GpKK3e4LCQ?e=nZnpeb)

For calculations please refer: [Link](https://quisitive-my.sharepoint.com/:u:/p/prudhvi_vuda/EXy9wtBDxcJFhYzeqvEvVYgBycch4alR0LskPgYKG837PQ?e=HGf4C0)

Ipaq function will be called with below data

"ipaq": {  
        "vigorous\_days": "3",  
        "vigorous\_hours": "0",  
        "vigorous\_mins": "30",  
        "moderate\_days": "2",  
        "moderate\_hours": "0",  
        "moderate\_mins": "22",  
        "walking\_days": "5",  
        "walking\_hours": "1",  
        "walking\_mins": "0",  
        "sit\_min": 10  
    }

It returns the output as

"ipaq": {  
        "met\_minutes\_per\_week": 1886.0,  
        "moderate\_activity": {  
            "met\_minutes\_per\_week": 176.0,  
            "percent\_of\_total": 9.331919406150584  
        },  
        "physComment": "Your daily physical activity is qualitatively and quantitatively appropriate: both intensity and duration of your daily physical activity fully meet the general guidelines for health. Remember that both daily physical activity and sedentary time are independently correlated with health.",  
        "vigorous\_activity": {  
            "met\_minutes\_per\_week": 720.0,  
            "percent\_of\_total": 38.17603393425239  
        },  
        "walking\_activity": {  
            "met\_minutes\_per\_week": 990.0,  
            "percent\_of\_total": 52.49204665959704  
        },  
        "weekly\_level": "High"  
    }

**Nutrition – DSQ**

Questions asked in the Nutrition survey: [Link](https://quisitive-my.sharepoint.com/:f:/p/prudhvi_vuda/EvCbSufz_TdHlp3vvFsfH4QBi69EAP1fjC-g0ZryyDw2Rw?e=6QPKz3)

Reference: [Link](https://epi.grants.cancer.gov/nhanes/dietscreen/)

Reference for Calculations: [Link](https://quisitive-my.sharepoint.com/:u:/p/prudhvi_vuda/Ee2VFeTl0jdCkRdwkfrtFUMBMIa9naUGmgNAoIJi1aLKOw?e=nu7O2K)

"dsq": {  
        "age": 30,  
        "sex": 1,  
        "cereal": {  
            "cereals": [  
                {  
                    "freq": 0.10,  
                    "name": "Cheerios",  
                    "type": "all"  
                },  
                {  
                    "freq": 0.25,  
                    "name": "Branola",  
                    "type": "all"  
                },  
                {  
                    "freq": 0.5,  
                    "name": "Fruit Harvest",  
                    "type": "all"  
                },  
                {  
                    "freq": 0.5,  
                    "name": "Oat bran cereal, cooked, fat not added in cooking",  
                    "type": "all"  
                }  
            ]  
        },  
        "milk": {  
            "freq": "1.0"  
        },  
        "soda": {  
            "freq": "0.133"  
        },  
        "fruit\_juice": {  
            "freq": "0.1"  
        },  
        "coffee": {  
            "freq": 0  
        },  
        "sweet\_drinks": {  
            "freq": 0  
        },  
        "fruit": {  
            "freq": "0.133"  
        },  
        "salad": {  
            "freq": "0.714"  
        },  
        "potatoes\_fried": {  
            "freq": "0.266"  
        },  
        "dry\_beans": {  
            "freq": "0.133"  
        },  
        "potatoes\_other": {  
            "freq": "0.2"  
        },  
        "grains": {  
            "freq": "0.133"  
        },  
        "vegetables": {  
            "freq": "1.0"  
        },  
        "salsa": {  
            "freq": "0.166"  
        },  
        "pizza": {  
            "freq": "0.0"  
        },  
        "tomato\_sauce": {  
            "freq": "0.166"  
        },  
        "cheese": {  
            "freq": "0.286"  
        },  
        "red\_meat": {  
            "freq": "0.286"  
        },  
        "proc\_meat": {  
            "freq": "0.1"  
        },  
        "bread": {  
            "freq": "0"  
        },  
        "candy": {  
            "freq": 0  
        },  
        "doughnuts": {  
            "freq": "0.0333"  
        },  
        "cookies": {  
            "freq": "0.133"  
        },  
        "desserts": {  
            "freq": "0.0"  
        },  
        "popcorn": {  
            "freq": "0.0666"  
        }  
    }

The response is: [Link](https://quisitive-my.sharepoint.com/:t:/p/prudhvi_vuda/EdgPfw71wzFAvKdJUPB3jjIBd9hLlNnpn0INTNoa-DtEHA?e=CWAh8m)