21BDS0340

Abhinav Dinesh Srivatsa

Structured and Object-Oriented Programming

BCSE102

Program Set 2

Question 1

AIM

Develop C program to dynamically receive n float values which are nothing but bmi of people working in an organization. Print the index who have ideal bmi (18.6 - 24.9). Define a function named printIndex_Regno, to complete the task.

Algorithm / Pseudocode

void printIndex_21BDS0340(int N, float *Bmi)

Loop from 0 to N as X

If Bmi[X] is between 18.6 and 24.9, then display X

Declare integer N

Read input and assign as N

Declare float array Bmi with N spaces

Loop from 0 to N as X

Read input and assign as Bmi[X]

Call printIndex_21BDS0340() and pass N and Bmi as arguments

Program Code

```c
// 21BDS0340 Abhinav Dinesh Srivatsa

#include <stdio.h>
#include <stdlib.h>

void printIndex_21BDS0340(int n, float *bmi)
{
    for (int x = 0; x < n; x++)
        if (*(bmi + x) >= 18.6 && *(bmi + x) <= 24.9)
            printf("%d\n", x);
}

int main()
{
    int n;
    scanf("%d", &n);
    float *bmi = malloc(n * sizeof(float));
    for (int x = 0; x < n; x++)
    {
        scanf("%f", (bmi + x));
    }
    printIndex_21BDS0340(n, bmi);
}
```

Output

Test	Input	Result
1	4 17.3 18.8 28.2 23.4	1 3

Answer: (penalty regime: 0 %)

```
// 21BDS0340 Abhinav Dinesh Srivatsa
/*
void printIndex_21BDS0340(int N, float *Bmi)
    Loop from 0 to N as X
        If Bmi[X] is between 18.6 and 24.9, then display X

Declare integer N
Read input and assign as N
Declare float array Bmi with N spaces
Loop from 0 to N as X
    Read input and assign as Bmi[X]
Call printIndex_21BDS0340() and pass N and Bmi
*/

#include <stdio.h>
#include <stdlib.h>

void printIndex_21BDS0340(int n, float *bmi)
{
    for (int x = 0; x < n; x++)
        if (*(bmi + x) >= 18.6 && *(bmi + x) <= 24.9)
            printf("%d\n", x);
```

Check

	Test	Input	Expected	Got	
✔	1	4 17.3 18.8 28.2 23.4	1 3	1 3	✔
✔	2	6 17.3 19.8 29.3 23.6 31.0 24.6	1 3 5	1 3 5	✔

Passed all tests! ✔

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1 2

Finish attempt ...

Question 2

AIM

Define a structure named staff with details like name, age, staffID, weight, height, create n structure variables to deal with respective details. Develop a function (readStaffInfo_Regno) to read an array of structure variables' values, then define another function (bmi_Regno) for calculating bmi for each staff and categorize them based on the below value, display staffID, bmi, category for each.

Underweight [<=18.5]

Ideal [18.6-24.9]

Overweight [>=25]

Note: [weight (kg) / height (cm) / height (cm)] x 10,000

Algorithm / Pseudocode

Declare structure staff with 5 fields:

Character array Name with 15 spaces

Integer Age

Integer StaffID

Integer Weight

Integer Height

void readStaffInfo_21BDS0340(int N, struct staff *S)

Loop from 0 to N as X

Read 5 inputs and assign to S[X]'s Name, Age, StaffID, Weight and Height respectively

float bmi_21BDS0340(struct staff S)

Declare float Bmi

Calculate Bmi as S's Weight * 10000 / (S's Height)^2

Return Bmi

Declare integer N

Read input and assign to N

Declare struct staff array S with N spaces

Call readStaffInfo_21BDS0340() and pass N and S as arguments

Loop from 0 to N as X

    Declare float Bmi and assign by calling bmi_21BDS0340() and pass S[X] as argument

    Display S[X]'s StaffID and Bmi

    If Bmi <= 18.5, then display "Underweight"

    Else if Bmi <= 24.9 and Bmi >= 18.6, then display "Ideal"

    Else if Bmi >= 25, then display "Overweight"

Program Code

```c
// 21BDS0340 Abhinav Dinesh Srivatsa

#include <stdio.h>
#include <stdlib.h>

struct staff
{
    char name[15];
    int age;
    int staffID;
    int weight;
    int height;
};

void readStaffInfo_21BDS0340(int n, struct staff *s)
{
    for (int x = 0; x < n; x++)
        scanf("%s%d%d%d%d", (s + x)->name, &(s + x)->age, &(s + x)->staffID,
&(s + x)->weight, &(s + x)->height);
}

float bmi_21BDS0340(struct staff s)
{
    float bmi = (float)s.weight * 10000 / (s.height * s.height);
    return bmi;
}

int main()
{
    int n;
    scanf("%d", &n);
    struct staff *s = malloc(n * sizeof(struct staff));
    readStaffInfo_21BDS0340(n, s);
    for (int x = 0; x < n; x++)
    {
        float bmi = bmi_21BDS0340(*(s + x));
        printf("%d\n%0.2f\n", (s + x)->staffID, bmi);
        if (bmi <= 18.5)
            printf("Underweight\n");
        else if (bmi >= 18.6 && bmi <= 24.9)
            printf("Ideal\n");
        else if (bmi >= 25.0)
            printf("Overweight\n");
    }
    free(s);
}
```

Output

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```c
#include <stdio.h>
#include <stdlib.h>

struct staff
{
    char name[15];
    int age;
    int staffID;
    int weight;
    int height;
```

Check

	Test	Input	Expected	Got	
✔	1	3 name1 25 10001 80 168 name2 32 10002 72 166 name3 45 10003 50 160	10001 28.34 Overweight 10002 26.13 Overweight 10003 19.53 Ideal	10001 28.34 Overweight 10002 26.13 Overweight 10003 19.53 Ideal	✔
✔	2	4 name4 25 10004 82 168 name5 32 10005 74 166 name6 45 10006 54 158 name7 31 10010 50 150	10004 29.05 Overweight 10005 26.85 Overweight 10006 21.63 Ideal 10010 22.22 Ideal	10004 29.05 Overweight 10005 26.85 Overweight 10006 21.63 Ideal 10010 22.22 Ideal	✔

Passed all tests! ✔