

SENARATHNA G.G.P.C. – 214189E.

Single dimensional arrays.

Exercises.

01)

a)

```
#include <stdio.h>
int main() {
    int n,max;
    printf("Input the n number of elementd in an array : \n");
    scanf("%d", &n);
    int arr[n];
    printf("Enter the n number of elements : \n");

    for(int i = 0;i < n;i++) {
        scanf("%d ", &arr[i]);
    }
    printf("\n");
    for(int j = 0;j < n;j++) {
        printf("%d ", arr[j]);
    }
    printf("\n");
    max = arr[0];
    for(int l = 0;l < n;l++) {
        if(arr[l] > max) {
            max = arr[l];
        }
    }
    printf("maximum number is : %d", max);
    return 0;
}
```

b)

```
#include <stdio.h>
void arr_max(int x);
int main() {
    int n;
    printf("Input the n number of elements in an array : \n");
    scanf("%d", &n);
    arr_max(n);

    return 0;
}
void arr_max(int x) {
    int arr[x],max;
    printf("Enter the number of elements : \n");
    for(int i = 0;i < x;i++) {
        scanf("%d", &arr[i]);
    }
}
```

```

printf("\n");
for(int j = 0;j < x;j++) {
    printf("%d ", arr[j]);
}
printf("\n");
max = arr[0];
for(int l = 0;l < x;l++) {
    if(arr[l] > max) {
        max = arr[l];
    }
}
printf("maximum number is : %d", max);
}

```

02)

a)

```

#include <stdio.h>
int main() {
    int n,min;
    printf("Input n number of elements in an array : \n");
    scanf("%d", &n);
    int arr[n];
    printf("Enter the n number of elements : \n");
    for(int i = 0;i < n;i++) {
        scanf("%d", &arr[i]);
    }
    printf("\n");
    for(int j = 0;j < n;j++) {
        printf("%d ", arr[j]);
    }
    printf("\n");
    min = arr[n - 1];
    for(int l = n - 1;l >= 0;l--) {
        if(arr[l] < min) {
            min = arr[l];
        }
    }
    printf("minimum number is : %d", min);
    return 0;
}

```

b)

```

#include <stdio.h>
void arr_min(int x);
int main() {
    int n;
    printf("Input n number of elements in an array : \n");
    scanf("%d", &n);
    arr_min(n);

    return 0;
}
void arr_min(int x) {
    int arr[x],min;
    printf("Enter the n elements : \n");

```

```

    for(int i = 0;i < x;i++) {
        scanf("%d", &arr[i]);
    }
    printf("\n");
    for(int j = 0;j < x;j++) {
        printf("%d ", arr[j]);
    }
    printf("\n");
    min = arr[x - 1];
    for(int l = x - 1;l >= 0;l--) {
        if(arr[l] < min) {
            min = arr[l];
        }
    }
    printf("minimum number is : %d", min);
}

```

03)

```

#include <stdio.h>
int main() {
    int age[10],count;
    printf("Input the age of 10 students : \n");
    for(int i = 0;i < 10;i++) {
        scanf("%d", &age[i]);
    }
    printf("\n");
    for(int j = 0;j < 10;j++) {
        printf("%d ", age[j]);
    }
    printf("\n");
    for(int l = 0;l < 10;l++) {
        if((age[l] >= 17) && (age[l] <= 19)) {
            count++;
        }
    }
    printf("number of students who have the age between 17-19 : %d", count);
}

```

04)

```

#include <stdio.h>
int main() {
    float salary[10];
    int count;
    printf("Input the salary of 10 employees : \n");
    for(int i = 0;i < 10;i++) {
        scanf("%f", &salary[i]);
    }
    printf("\n");
    for(int l = 0;l < 10;l++) {
        if((salary[l] >= 50000.00) && (salary[l] <= 75000.00)) {
            count++;
        }
    }
    printf("number of employees getting salary in between 50,000 - 75,000 : %d", count);
}

```

```
    return 0;
}
```

05)

a)

```
#include <stdio.h>
void avg(int arr[],int size);
int main() {
    int n;
    printf("Input n number of elements in array : \n");
    scanf("%d", &n);
    int arr[n];
    printf("Enter the n number of elements : \n");
    for(int i = 0;i < n;i++) {
        scanf("%d", &arr[i]);
    }
    avg(arr,n);

    return 0;
}

void avg(int arr[],int size) {
    float sum = 0,avg = 0;
    for(int j = 0;j < size;j++) {
        sum = sum + arr[j];
    }
    avg = sum / size;
    printf("average of array elements is : %f", avg);
}
```

b)

```
#include <stdio.h>
void arr(int x);
int main() {
    int n;
    printf("Input the n number of elements in an array : \n");
    scanf("%d", &n);
    arr(n);

    return 0;
}

void arr(int x) {
    int arr[x];
    float sum = 0,avg = 0;
    printf("Enter the n number of elements : \n");
    for(int i = 0;i < x;i++) {
        scanf("%d", &arr[i]);
    }
    printf("\n");
    for(int j = 0;j < x;j++) {
        sum = sum + arr[j];
    }
    avg = sum / x;
    printf("average of array elements is : %.4f", avg);
}
```

06)

a)

```
#include <stdio.h>
void desc_order(int arr[],int size);
int main() {
    int n;
    printf("Input n number of elements in an array : \n");
    scanf("%d", &n);
    int arr[n];
    printf("Enter n number of elements : \n");
    for(int i = 0;i < n;i++) {
        scanf("%d", &arr[i]);
    }
    desc_order(arr,n);

    return 0;
}
void desc_order(int arr[],int size) {
    int temp;
    for(int j = 0;j < size;j++) {
        for(int l = j;l < size;l++) {
            if(arr[l] > arr[j]) {
                temp = arr[j];
                arr[j] = arr[l];
                arr[l] = temp;
            }
        }
        printf("%d ", arr[j]);
    }
}
```

b)

```
#include <stdio.h>
void desc_order(int size);
int main() {
    int n;
    printf("Input n number of elements in an array : \n");
    scanf("%d", &n);
    desc_order(n);

    return 0;
}
void desc_order(int size) {
    int arr[size],temp;
    printf("Enter the n number of elements : \n");
    for(int i = 0;i < size;i++) {
        scanf("%d", &arr[i]);
    }
    for(int j = 0;j < size;j++) {
        for(int l = j;l < size;l++) {
            if(arr[l] > arr[j]) {
                temp = arr[l];
                arr[l] = arr[j];
                arr[j] = temp;
            }
        }
    }
}
```

```

    }
    printf("%d ", arr[j]);
}
}

```

07)

a)

```

#include <stdio.h>
#include "math.h"

float corrCoefficient(float xVals[], float yVals[], int n){
    float Ex=0, Ey=0, Exy=0, Ex2=0, Ey2=0, r;

    for (int i = 0; i < n; ++i) {
        Ex+=xVals[i];
        Ey+=yVals[i];

        Ex2+=xVals[i]*xVals[i];
        Ey2+=yVals[i]*yVals[i];

        Exy+=xVals[i]*yVals[i];
    }
    float numerator = Exy - (Ex*Ey)/n;
    float part1 = Ex2 - (Ex*Ex)/n;
    float part2 = Ey2 - (Ey*Ey)/n;
    float denominator = sqrt(part1) * sqrt(part2);

    r = numerator/denominator;
    return r;
}

float regrCoefficient(float xVals[], float yVals[], int n){
    float Ex=0, Ey=0, Exy=0, Ex2=0, byx;

    for (int i = 0; i < n; ++i) {
        Ex+=xVals[i];
        Ey+=yVals[i];

        Ex2+=xVals[i]*xVals[i];
        Exy+=xVals[i]*yVals[i];
    }
    float numerator = Exy - (Ex*Ey)/n;
    float denominator = Ex2 - (Ex*Ex)/n;

    byx = numerator/denominator;
    return byx;
}

int main() {
    int n=12;
    float xVals[12]= {1,0,3.2, 4,1,5,7,0,2,1.1,-1,4.1};
    float yVals[12]= {3,5,0,-1,0.5,-1,-2,3,4,1,8.1,2};

    float r = corrCoefficient(xVals, yVals, n);
}

```

```

printf("r: %.4f\n", r);

float byx = regrCoefficient(xVals, yVals, n);
printf("y - ybar = %.4f(x - xbar)", byx);
return 0;
}

```

b)

```

#include <stdio.h>
#include <math.h>
int main() {

    double
sum_xy=0,sum_xx=0,sum_yy=0,sum_x=0,sum_y=0,r,byx,fStep,sStep,tStep;
    double x[12]={1,0,3.2,4,1,5,7,0,2,1.1,-1,4.1};
    double y[12]={3,5,0,-1,0.5,-1,-2,3,4,1,8.1,2};

    for(int i=0;i<12;i++)
    {
        sum_xy+=(x[i]*y[i]);
        sum_x+=x[i];
        sum_y+=y[i];
        sum_xx+=pow(x[i],2);
        sum_yy+=pow(y[i],2);

    }
    fStep = sum_xy-((sum_x*sum_y)/12);
    sStep = sqrt(sum_xx-(pow(sum_x,2)/12));
    tStep = sqrt(sum_yy-(pow(sum_y,2)/12));

    r = fStep / (sStep * tStep);
    byx = fStep / (pow(sStep,2));

    printf("  r = %lf\n",r);
    printf("byx = %lf",byx);
    return 0;
}

```