

Exercise 1 : (5 pts)

Consider the following program:

- Correct the four syntactic errors present in the code. (1 pts)

- Run the program for $n=16$ and $n=27$. (2 pts)

$n=16 \Rightarrow x=4$ $n=27 \Rightarrow x=5$

- What does this code do? (1 pts)

This program calculates the integer square root of number

- Rewrite the program using a **while** loop. (1 pts)

```
x = n;
y = 0;
while (y < x) {
    x = (x + y) / 2;
    y = n / x;
}
```

```
#include <stdio.h>
int main() {
int x, y, n;
printf("Enter an integer: ");
scanf("%d", &n);
x = n;
for (y = 0; y < x; y = n / x)
    x = (x + y) / 2;
printf("%d\n", x);
return 0;
}
```

Exercise 2 : (5 pts)

Let U and V be sequences defined as follows:

$$u_0 = 0, \quad v_0 = 1, \quad u_{n+1} = v_n + u_n, \quad v_{n+1} = u_{n+1} + v_n$$

Write an algorithm to calculate u_n and v_n , and if n is odd, display u_n ; if n is even, display v_n .

Algorithm Fibonacci

```
Var U, V, i, n:integer
Begin
Write("enter n")
Read(n)
U←0
V←1
for i←1 to n do
    U←V+U
    V←U+V
endfor
if n mod 2=0 then
    write(U)
else
    write(V)
endif
end
```

Exercise 3 : (5 pts)

Write an algorithm that performs statistical calculations on a set of numbers entered by the user. The algorithm should:

- Input “n” real numbers into array A
- Calculate and display the mean “m” of the entered numbers.
- Calculate and display the variance “v” of the entered numbers.

Algorithm stat

```
Var A:array[100] of real
    i, n:integer
    s, m, v:real
Begin
Write("enter the size of array")
```

```

Read(n)
for i←1 to n do
  Read(A[i])
Endfor
s←0
for i←1 to n do
  s←s+A[i]
Endfor
m←s/n
write("mean=",m)
s←0
for i←1 to n do
  s←s+(m-A[i]) * (m-A[i])
Endfor
v←s/n
write("variance =",v)
end

```

Exercise 4 : (5 pts)

Define a structure representing a car with attributes : model, year, and price.

Implement a C program that:

Asks the user to input details for an array of n cars.

Asks the user to enter a specific year.

Calculates and display the average price of cars manufactured in the specified year.

```

#include <stdio.h>
Typedef struct{
  char model[30];
  int year;
  float price;
} Car;
int main() {
  Car t[100];
  int y, i, nb, n;
  float s,m;
  printf("Enter the number of cars: ");
  scanf("%d", &n);
  for (i = 0; i < n; i++){
    printf("enter car number %d",i);
    printf("enter the model");
    gets(t[i].model);
    printf("enter the year of fabrication: ");
    scanf("%d",&t[i].year);
    printf("enter the price: ");
    scanf("%f",&t[i].price);
  }
  printf("enter a year of fabrication: ");
  scanf("%d",&y);
  s=0;
  nb=0;
  for (i = 0; i < n; i++)
    if(t[i].year==y){
      s=s+t[i].price;
      nb++;
    }
  m=s/nb;
  printf("the average price of cars manufactured in %d is %f", y,m);
  return 0;
}

```

Good luck.