

**Higher School of Applied Sciences of Tlemcen**  
**1-year computer science course**



# **The structures**

## **Part 1**

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# **Part 1**

## **Overview of Structures**

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# Structures

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## Predefined Types

Int

Float

Char

Int \*

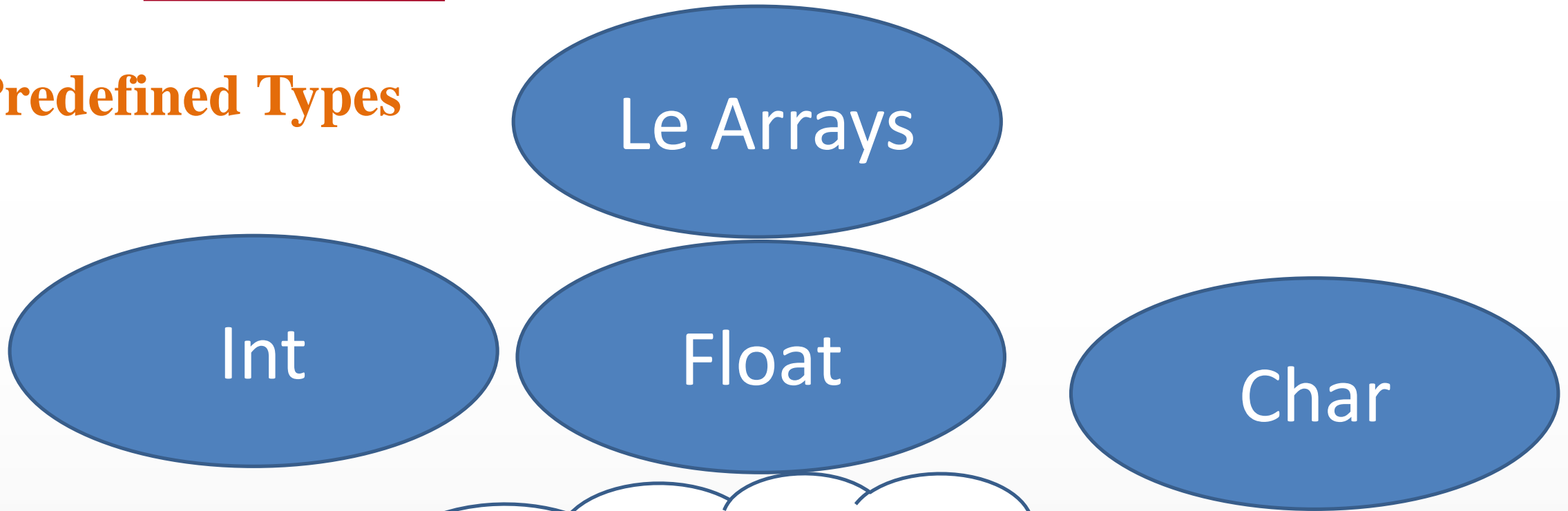
Float \*

Char\*

# Structures

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## Predefined Types



How to represent a set of values that can be of different types?



# Structures

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## Definition

- A structure is a **user-defined** data type in C.
- It allows you to bundle **multiple related variables together** in a single unit.
- Unlike an array, a structure can store various data types such as integers, floats, characters, and more.

# Structures

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## Creating a Structure

You can create a structure using the '**struct**' keyword and declare each of its members inside curly braces

```
struct Student{  
int age ;  
float score;  
};
```

```
typedef struct Student{  
int age ;  
float score;  
} Student;
```

# Structures

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## Creating a Structure

To access the structure, you need to create a variable of it.

```
struct Student{  
int age ;  
float score;  
};  
int main() {  
    struct Student e;  
    return 0; }
```

```
typedef struct Student{  
int age ;  
float score;  
} Student;  
int main() {  
    Student e;  
    return 0; }
```

# Structures

## Accessing the Structure's Elements

```
#include<stdio.h>
struct Student{
int age ;
float score;};
int main() {
struct Student e;
e.age=23;
e.score =15.5;
printf("The age is %d\n",e.age);
printf("The score is %.2f\n",e.score);
return 0;}
```

The age is 23.00  
The score is 15.50



# Structures

## Modifying the Values

```
#include<stdio.h>
struct Student {
int age ;
float score;};
int main() {
  struct Student e={23,15.5};
e.age=19;
e.score=8.5;
printf("The age is %d\n",e.age);
printf("The score is %.2f\n",e.score);
return 0;}
```

The age is 19.00  
The score is 8.50

# Structures

## Copying Structures

```
#include<stdio.h>
struct Student{
int age ;
float score;};
int main() {
struct Student e={23,15.5}, e2;
e2=e;
printf("The age is %d\n",e2.age);
printf("The score is %.2f\n",e2.score);
return 0;}
```

The age is 23.00  
The score is 15.50

# Structures

## Reading a Structure

```
#include<stdio.h>
struct Student{
int age ;
float score;};
int main() {
struct Student e;
printf("Provide the age \n");
scanf ("%d",&e.age);
printf(" Provide the score \n");
scanf("%f",&e.score);
printf("The age is %d \n",e.age);
printf("The score is %.2f \n",e.score);
return 0;}
```

Provide the age

12

Provide the score

6

The age is 12.00

The score is 6.00

# Structures

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## String

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```
struct Student{  
    char name [20] ;  
    char first_name [20] ;  
};
```

## Accessing the Structure's Elements

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

```
#include<string.h>
```

```
struct Student{
```

```
char name[20] ;
```

```
char first_name[20] ;};
```

```
int main() {
```

```
struct Student e;
```

```
strcpy (e.name, " HADJ" );
```

```
strcpy (e.first_name, "Mohamed" );
```

```
printf("The name is %s \n",e.name);
```

```
printf("The first name is %s \n",e.first_name);
```

```
return 0;}
```

The name is HADJ

The first name is Mohamed

## Reading a Structure

```
#include<stdio.h>
#include<string.h>
struct Student{
char name[20] ;
char first_name[20] ;};
int main() {
struct Student e;
printf("Provide the name \n");
gets(e.name);
printf("Provide the first name \n");
gets(e.first_name);
printf("Name is : %s \n",e.name);
printf("First name is %s \n",e.first_name);
return 0;}
```

Name is Youbi  
First name is Mohamed

# Structures

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## Arrays

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```
struct Student{  
    char name[20] ;  
    float score[3]; };
```

### Accessing the Structure's Elements

```
#include<stdio.h>
#include<string.h>
struct Student{
char name[20] ;
float score[3]; };
int main() { int i;
struct Student e;
strcpy (e.name, "HADJ" );
e.score[0]=10;
e.score[1]=15;
e.score[3]=8;
printf("The name is %s\n", e.name);
for(i=0;i<3;i++)
printf("Score is %d=%d \n",i+1,e.score[i]);
return 0;}
```

```
The name is HADJ
Score 1=10.00
Score 2=15.00
Score 3=8.00
```



### Reading a Structure

```
#include<stdio.h>
#include<string.h>
struct Student{
char name[20] ;
float score[3]; };
int main() { int i;
struct Student e;
printf("Provide the name\n");
gets(e.name);
printf("Provide the scores\n");
for(i=0;i<3;i++)
scanf("%f",&e.score[i]);
printf("Name is %s\n", e.name);
for(i=0;i<3;i++)
printf("Score %d=%.2f \n",i+1,e.score [i]);
return 0;}
```

Provide the name

Youbi

Provide the scores

10

2

15

Name is Youbi

Score 1=10.00

Score 2=2.00

Score 3=15.00