



TD5 Pointers

Ex 5.1 Execution History

Show the detailed execution history of the following two programs:

```
#include <stdio.h>
#include <stdlib.h>
void fct1 ( int *a, int *b)
{ int c;
  c = *a ;
  *a = *b ;
  *b = c ;
  printf ("At fct1 : *a=%d, *b=%d\n", *a, *b);
}
void fct2 ( int *a, int *b)
{ int *c;
  c = a ;
  a = b ;
  b = c ;
  printf (" At fct2 : *a=%d, *b=%d\n", *a, *b);
}
void main (){
int i=3, j=6, n=4, m=8 ;
fct1 (&i, &j) ;
printf (" After fct1 : i=%d, j=%d\n", i, j);
fct2 (&n, &m) ;
printf (" After fct2 : n=%d, m=%d\n", n, m); }
```

```
#include <stdio.h>
#include <stdlib.h>
void fct( int a, int *b, int *c)
{ --(*b);
  a++;
  (*c)++;
}
int main() {
int x=2, y=4, z=1;
int *P1, *P2 ;
P1=&x ;
P2=&y ;
*P1=( *P2)++;
*P2-=*P1 ;
printf("x=%d, y=%d \n", x, y) ;
*P1*=*P2 ;
z=++*P2**P1++;
printf("x=%d, y=%d, z=%d \n", x, y, z) ;
fct(x,&y,&z) ;
printf("x=%d, y=%d, z=%d \n", x, y, z) ;
return 0 ; }
```

- Observe and analyse the results of the second program. Deduce the difference between the expressions: $x = ++*P$, $x = *P++$ et $x = (*P)++$.

Ex 5.2 Sort

Write a function “**Sort**” that orders the values of 3 integer variables in ascending order. This function will have 3 parameters and will return 0 if the variables were already in order (The function will not have changed the order), or 1 if it has really ordered the variables.

Write a main function to test the “**sort**” function, which should order the values of the variables received from the main function.

Example. If in the main function we have $X=3$, $Y=1$, $Z=2$, after calling the function **Sort**, we get:
 $X=1$, $Y=2$, $Z=3$.

Ex 5.3 Temperature Conversion

The user is prompted to enter a temperature in Celsius, then the function **ConvertTemperature** is called to perform the conversions and return the equivalent temperature in Fahrenheit and Kelvin. The results are then displayed.