

1 OPERATING SYSTEMS LABORATORY

II - C Review I

1. Using **argc** and **argv** as command line arguments.

- [code5.c](#)

```
#include <stdio.h>
int main(int argc, char *argv[ ])
{
    int i;
    for (i=0; i < argc; i++)
        printf("command line argument [%d] = %s \n",i, argv[i]);
}
```

- Analyze the code.
- Execute the code. What is the output and why?
- Execute as

```
./code5 your name your surname your age
```

- Describe the functionalities of **argc** and **argv**?

2. Arrays, Pointers and Dynamic Memory Allocation

(a) Pointer: A variable that contains the address of a variable. [code6.c](#)

```
#include <stdio.h>
int main(int argc, char *argv[])
{
    int x = 1, y = 2, z[10];
    int *ip; /* ip is a pointer to int */
    ip = &x; /* ip now points to x */
    printf("The address of pointer 'ip' is %p \n",&ip);
    printf("The thing that pointer 'ip' contains inside is %p \n",ip);
    printf("The thing that pointer 'ip' points is %d \n",*ip);
    printf("The address of variable 'x' is %p \n",&x);
    printf("The value of variable 'x' is %d \n",x);
    y = *ip; /* y has the value of x now */
    *ip = 0; /* x is 0 now */
    ip = &z[0]; /* ip now points to z[0] */
    return 0;
}
```

- Analyze the code.
- Execute the code. What is the output and why?
- Exercise: Modify the code above that ;
 - creates two 'double' type pointers,
 - puts numbers in,
 - prints out the values inside the pointers (address info.),
 - prints out the values that pointers point.

- (b) In C, there is a strong relationship between pointers and arrays, strong enough that pointers and arrays should be discussed simultaneously. The pointer version of any code will in general be faster (Why?). [code7.c](#)
- Analyze the code.
 - Execute the code several times. What is the output and why? Observe the changes in the addressing scheme.
- (c) Dynamic Memory Allocation: Allocating memory at runtime.
- Malloc; [code8.c](#)
 - Analyze the code.
 - What is the function of 'malloc'.
 - Realloc; [code9.c](#)
 - Analyze the code.
 - What is the function of 'realloc'.
 - What is happening by the assignment? 'ip = tmp;'
 - For other memory related functions take a look at manpages. e.g., man malloc,
 - What is the difference between **malloc** and **calloc**? (We will discuss later)
 - What is **brk()**? (We will discuss later)