Programming with C I

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Pointers

pointer (pointer variable)

- A pointer is a variable whose value is the address of a location in memory.

- **8 bytes on server but depends on machine**

- **syntax:** *type *variable*

```
int m = 25;
int *itemp=&m;        /* a pointer to an integer */
char q= 'c';
char *ch = &q;  /*a pointer to a character*/
```
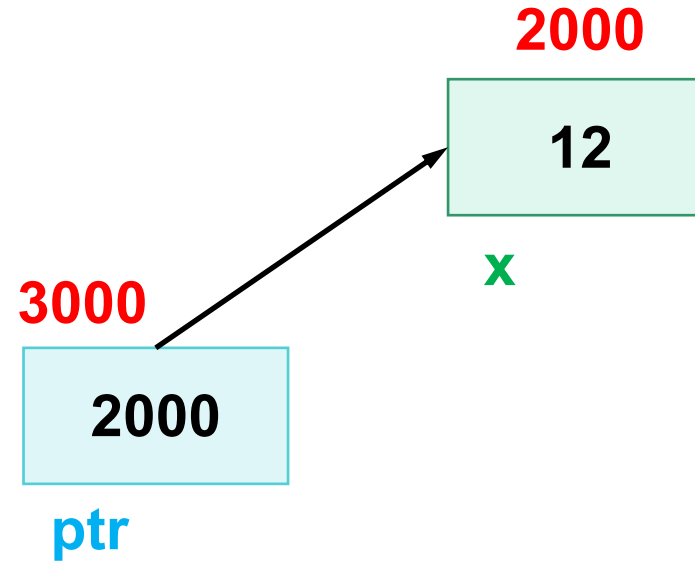
& operator (address of)

Returns the address of a variable

the * *never* returns the address of a variable

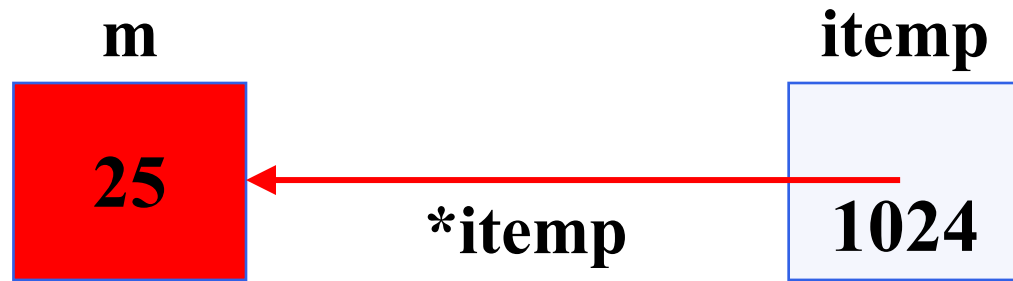# Using a Pointer Variable

```
int x;

x=12;


int* ptr;
ptr=&x;
```

2000

12

x

3000

2000

ptr

NOTE: Because ptr holds the address of x, we say that ptr "points to" x.

Indirection/indirect reference

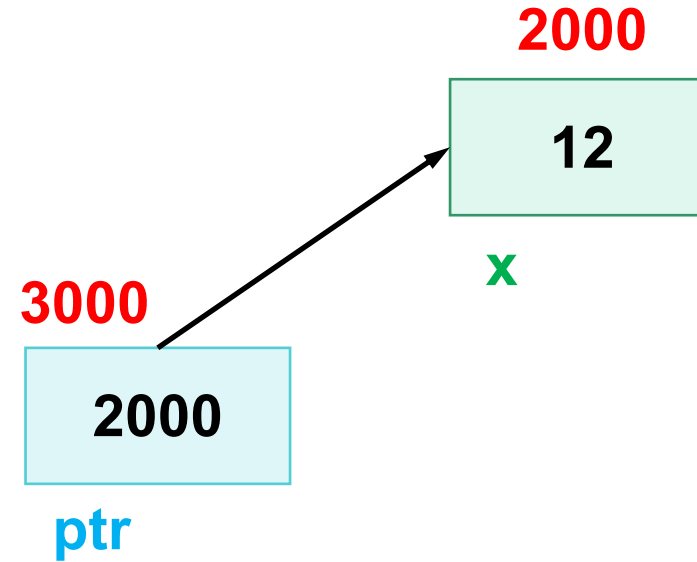➤ **accessing the contents of a memory cell through a pointer variable that stores its address**

m   itemp

25   ⟵ **itemp*   **1024**

➢ ***Figure** Referencing a Variable Through a Pointer*

Table **References with Pointers**

Reference	Cell Referenced	Cell Type Value)
itemp	gray shaded cell	pointer (1024)
*itemp	cell in color	int (25)

*: dereference operator

int x;

x=12;

int* ptr;

ptr=&x;

printf("%d\n",*ptr);

2000

12

x

3000

2000

ptr

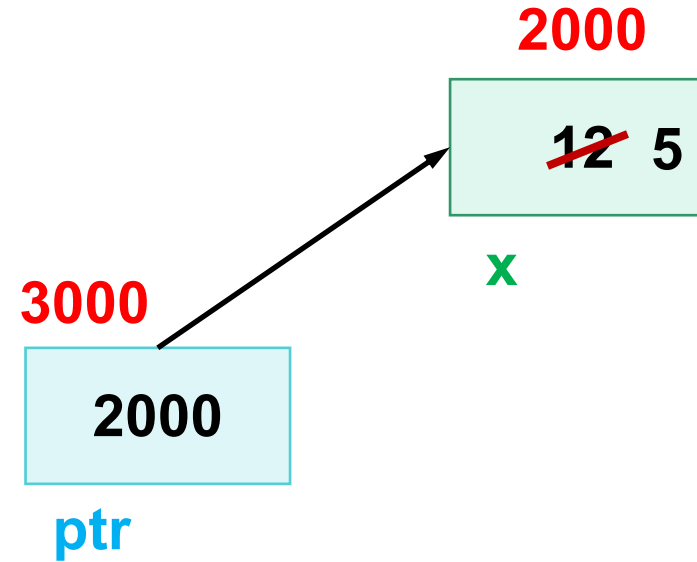**NOTE:** The value pointed to by ptr is denoted by *ptr.

Using the Dereference Operator

```
int x;
x=12;

int* ptr;
ptr=&x;
*ptr=5;
```

2000

~~12~~ **5**

x

3000

2000

ptr

// changes the value at the address ptr points to 5

* operator (indirection)

➤ **Follows a pointer to what it points to**

➤ **(the thing at the address it stores)**

Pointers to Files

- **C allows a program to explicitly name a file for input or output.**

- **Declare file pointers:**
  - FILE *inp;   /* pointer to input file */
  - FILE *outp;   /* pointer to output file */

- **Prepare for input or output before permitting access:**
  - inp = fopen("infile.txt", "r");
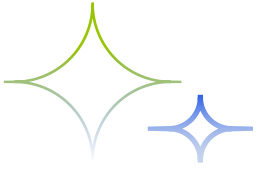 - outp = fopen("outfile.txt", "w");

Pointers to Files

fscanf
- file equivalent of scanf
- fscanf(inp, "%lf", &item);

fprintf
- file equivalent of printf
- fprintf(outp, "%.2f\n", item);

closing a file when done
- fclose(inp);
- fclose(outp);

THE END

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