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西交利物浦大學

CPT104 - Operating Systems Concepts

Lab 2

Arrays

Array of integers

- Store integers sequentially in an array

```c
#include <stdio.h>

int main() {

    int array[3];
    array[0] = 25;
    array[1] = 100;
    array[2] = -8;
    printf("First element is %d.\n", array[0]);
    printf("Second element is %d.\n", array[1]);
    printf("Third element is %d.\n", array[2]);

    return 0;
}
```

say we want to store three integers next to each other, we use array
we name it array, tell the type of the elements and we declare how many integers to store

Array of integers

- Store integers sequentially in an array

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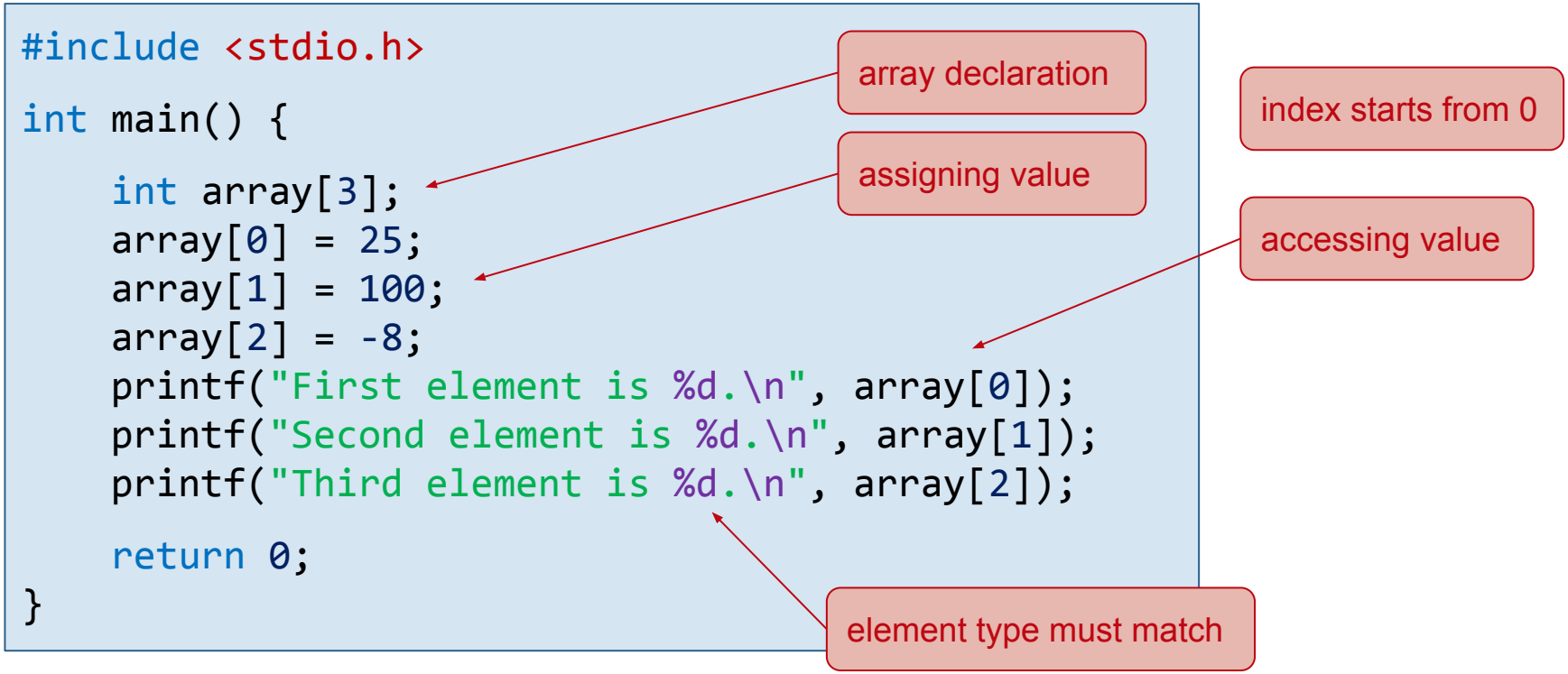
int main() {

    int array[3];
    array[0] = 25;
    array[1] = 100;
    array[2] = -8;
    printf("First element is %d.\n", array[0]);
    printf("Second element is %d.\n", array[1]);
    printf("Third element is %d.\n", array[2]);

    return 0;
}
```



Read and print array of integers

- Assign array elements from user input

```c
#include <stdio.h>

int main() {

    int array[3];
    int i;
    for(i=0; i<3; i++) {
        scanf("%d", &array[i]);
    }
    for(i=0; i<3; i++) {
        printf("array[%d] is %d.\n", i, array[i]);
    }

    return 0;
}
```

think of array[i] just as an integer variable, so scanf needs & before it

Read and print array of integers

- Assign array elements from user input

```c
#include <stdio.h>

int main() {

    int array[3];
    int i;
    for(i=0; i<3; i++) {
        scanf("%d", &array[i]);
    }
    for(i=0; i<3; i++) {
        printf("array[%d] is %d.\n", i, array[i]);
    }

    return 0;
}
```

think of array[i] just as an integer variable, so scanf needs & before it

note that we don't initialize the array here, because we just want to overwrite the previous value, which can be anything Codecast initializes int to zero, but in C in general, you have initialize it yourself

Read and print array of doubles

- Storing doubles in an array

```c
#include <stdio.h>

int main() {

    double array[3];
    int i;
    for(i=0; i<3; i++) {
        scanf("%lf", &array[i]);
    }
    for(i=0; i<3; i++) {
        printf("array[%d] is %.2lf.\n", i, array[i]);
    }

    return 0;
}
```

Find the largest array element

- Given an array of ages, find the maximum age!

```c
#include <stdio.h>
int main() {
    //! showArray(ages, cursors=[i])
    int ages[10];
    int i, max = 0;
    for(i=0; i<10; i++) {
        scanf("%d", &ages[i]);
        if(ages[i] > max) {
            max = ages[i];
        }
    }
    printf("The max age is %d.\n", max);
    return 0;
}
```

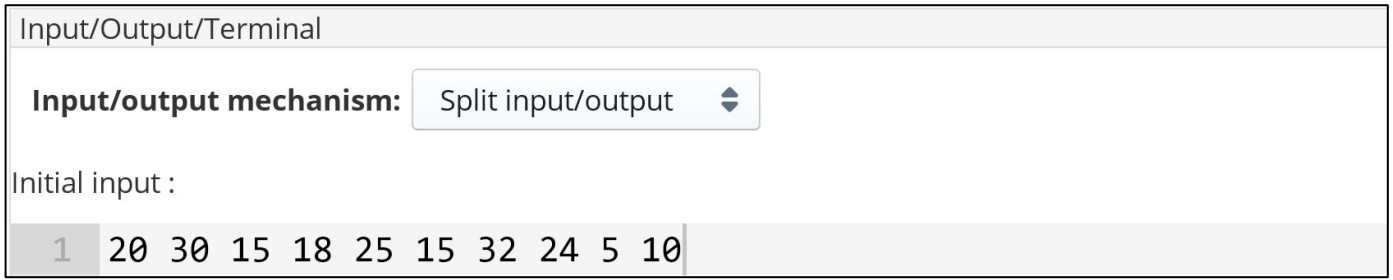
copy paste code into Codecast

we will try to use Codecast Visualizer with this special command

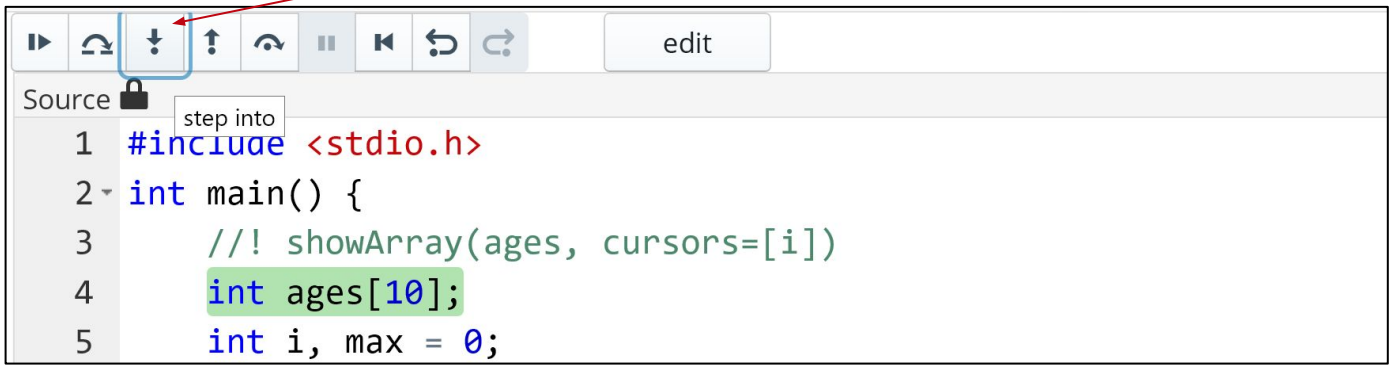
note that for other C compiler, this is just a useless comment

Visualizing Array Operation

- Select the Split input/output, and fill in some 10 numbers:

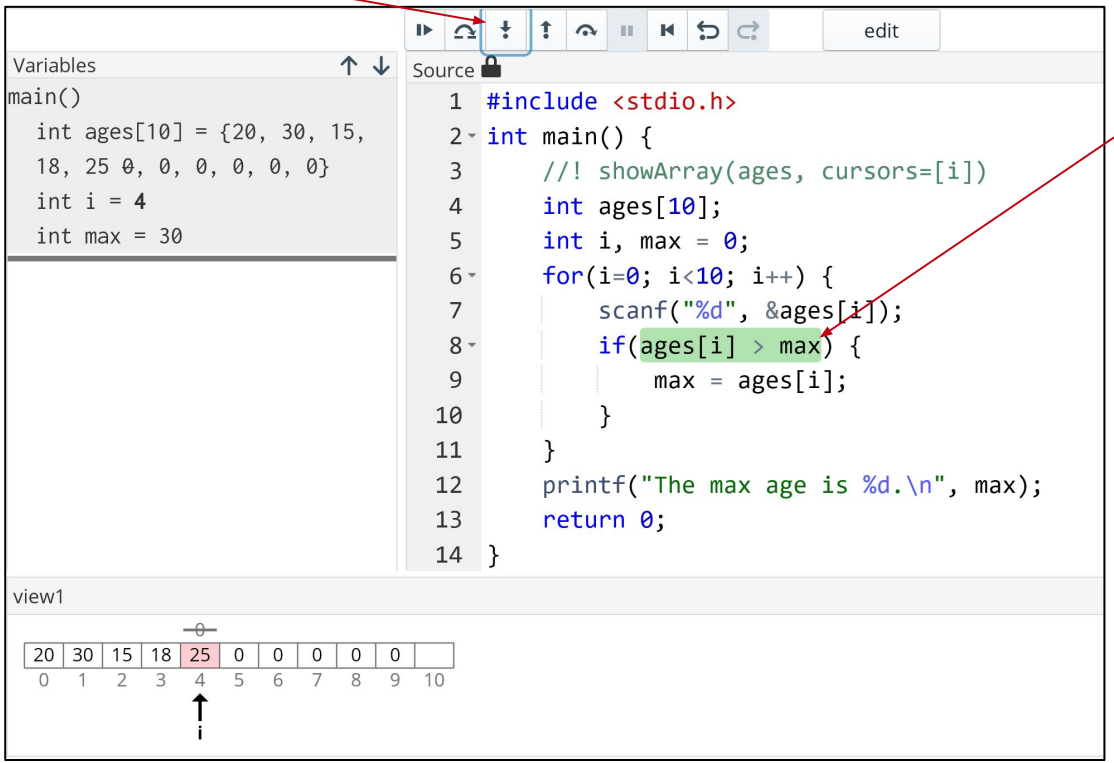


- Compile, and click step into



Visualizing Array Operation

- Click step into repeatedly, and you will see how your program progresses



the highlighted line is the line **about to be executed next** if you click step into

use this Codecast features to **debug** your C program!

Thank you for your attention !

- In this lab, you have learned:
  - Array of integers, doubles
  - Assigning and accessing array elements
  - Looping while checking elements in an array

- Reference book: chapter 1, section 1.6