Programing basics on C

Lecture 3

Schedule

- Homework solve
- Conditional operators
- Arrays
- Loops

Homework

- Do you have any questions about the homework ?

Conditional operators

Conditional operators

- In programming you will have to check if something is true or not, and based on that to execute an action. This is done by the conditional operators.

Conditional operators - example

```
int main() {
    int myAge = 19;
    if(myAge < 18){
        printf("Alcohol consumption prohibited");
    }
    else {
        printf("Alcohol consumption permitted");
    }
    return 0;
}
```

Conditional operators

```
if(a statement that can be true or false){
      // if the condition is true
      printf("Execute an action");
 }
 else {
      // if is not true
      printf("Execute other action");
 }
```

Conditional operators

- > - larger
- < - lower
- >= - larger or equal
- <= - lower or equal
- == - equal
- != - not equal

Conditional operators

```
int main(int argc, const char * argv[]) {
    int mark = 5;
    if(mark < 3){
        printf("\n:(");
    }
    else if(mark == 3){
        printf("\n:|");
    }
    else if(mark == 4){
        printf("\n:)");
    }
    else if(mark >= 5){
        printf("\n^^");
    }
    return 0;
}
```

Conditional operators

```c
int main() {
    int mark = 5;
    // there are 2 types of people

    if (mark != 6){
        printf("Damn I could have done it better");
    }
    else {
        printf("Happy face");
    }

    if(mark > 2){
        printf("I am the best");
    }
    else {
        printf("whatever");
    }


    return 0;
}
```

Task

- Categorize a person based on it’s age.
- if age is lower than 10 - child
- if age is lower than 20 but higher than 10 - teenager
- if age is higher than 20 - adult

Conditional operators

- The difference between if, if, if statements and if, else if, else if, else statements is:
  - In the if if if, all the checks are performed and you can execute multiple if statements if they are true
  - In the if-else if-else only the first matching if is executed, the rest aren’t event tested.

Task

- Test if a number is even or odd.
- Use ‘%’ modulo operator.

Conditional operators

- What we should do if we must test if multiple conditions are true (for example if we must check if a person is male or female and if the age is higher than 18)

Conditional operators

- && - AND
- || - OR

Conditional operators

```
int main() {
    int isMale = 0;
    int age = 19;

    if (isMale == 0 && age >= 18){
        // Condition is matched
    }
    else if (isMale != 0){
        // it is male
    }
    else if (age < 18){
        // age lower
    }

    return 0;
}
```

Conditional operators

```
int main() {
    int isMale = 0;
    int age = 19;

    if (isMale == 1 || age < 18){
        // Some of the conditions is not matched
    }
    else {
        // all of the conditions are matched
    }

    return 0;
}
```

Questions ?

Arrays

Arrays

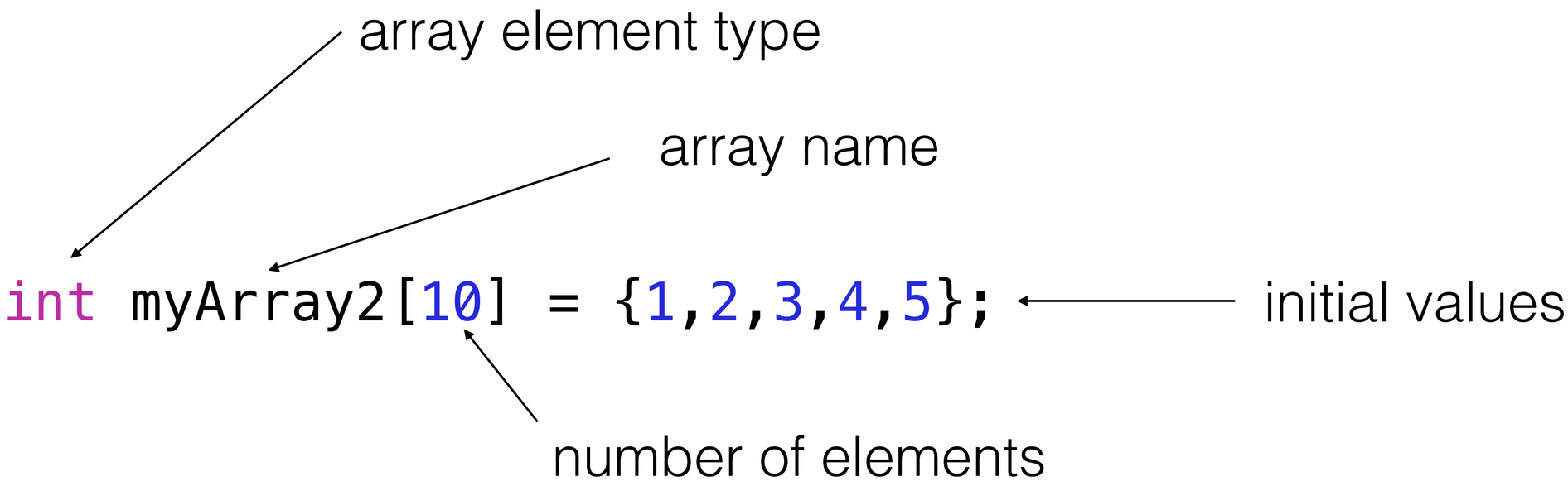
- In programming there are cases when you need to store sequence of data. For example if you have all the numbers from the lottery, you need to store them in an Array. Therefore the some collection of data in certain type is called Array.

Array

```
int main() {

    int myArray1[] = {1,2,3,4,5,6,7,8,9,10}; // automatically calculate
size
    int myArray2[10] = {1,2,3,4,5,6,7,8,9,10}; // manually set the size
    int myArray3[10]; // set size, but don't set data
    printf("\n%d %d %d\n", myArray1[1], myArray2[1], myArray3[1]);
    return 0;
}
```

Array definition



String array

- In order to collect and use string data, there are string arrays.
- The string array is very similar to the standard array.

String array

```c
int main() {

    char myString[] = "Hello world";
    char myStringWithChars[] = {'H', 'e', 'l', 'l', 'o', ' ', 'w', 'o', 'r', 'l', 'd', '\0' };
    printf("%s\n", myString);
    return 0;
}
```

Questions ?

Loops

Loops

- In programming there are cases when you must repeat a certain action certain amount of times. This is done by the “for” loop.

For loop

Define a variable before the loop starts

At the beginning of execution check if this is true. If true execute the loop, else stop

```
for (int i = 0; i < 10; i++){
    printf("%d", i);
}
```

When a cycle is completed, increment ‘i’

Execute this once a cycle

Task

- Define an array with the numbers from the lottery. Print all the numbers using a for loop. The numbers are sorted ascending.
- Hint - define how many numbers are collected in the array.

While loop

- The for loop is useful when we must do something certain amount of times, but there are cases when we want to do something when a certain condition is met. For example if we are writing a controller that is working in a beverage dispenser we would use to following code:

While loop

condition to be checked

```
while (buttonPressed == 1){
    //pour beverage
}
// stop
```

If the condition is true, do this until it becomes false

Do-While loop

- The same as the while loop, but the check for a condition is performed after the execution of the loop. That means that a certain code will be performed at least once.

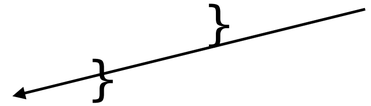
Loop special words

- There are 2 special words in the loops.
- break; - Stops and exits the loop
- continue; - signals the loop to stop current cycle and go to the next one

Software to check the lottery numbers

```
int main() {
    const int count = 6;
    int lotteryNumbers[count] = {46, 12, 33, 3, 18, 38};
    int winningNumbers[count] = {7, 46, 21, 28, 35, 42};
    int matches = 0;

    for(int i = 0; i < count - 1; i++){
        for (int j = 0; j < count - 1; j++){
            if (lotteryNumbers[i] == winningNumbers[j]){
                matches++;
                break; // we break the second cycle
            }
        }
    }
    printf("%d number are correct", matches);
    return 0;
}
```



Task

- Make a program for collection ages from 10 people. The input is made using the keyboard. The program must present the average age of the persons and the median.

- If the average age is equal or above 21, the program displays “The data collected is based on adults”

- If the average age is below 21, the program display “Data collected from non-adults”