Course Logistics

- We are at a turning point
- We have got through C basics and programs are getting complicated
  - Are you able to follow?
  - How challenging was the exam?
  - Can you understand and write programs?
- This is the last chance to catch up
What you have to do?

- Attend lectures and browse it again
- Do your reading assignments
- Explore all examples - run, modify...
- Solve all problems (including exercises)
- Work with KnowledgeTree - quizzes, dissections, Expression Executor
- Try free C tutorials (KnowledgeSea)
- Ask questions in the forums
- Come and talk with us, use office hours

Outline

- If and If-else
- The use of if-else
- The use of if
- Simple nested ifs
- If inside a loop
- Conditional operator
- If-else vs. conditional operator
Conditional Statement \textit{if–else}

\begin{verbatim}
if (expression)
    statement-1
else
    statement-2
nextstatement
\end{verbatim}

- If expression is not 0 (true) - statement-1
- If expression is 0 (false) - statement-2
- In any case after that - nextstatement

Flowchart of \textit{if–else}

![Flowchart](image-url)
if-else with blocks

```java
if (expression) {
    statement-1
    ...
} else {
    statement-2
    ...
}
nextstatement
```

Conditional Statement if

```java
if (expression)
    statement-1
nextstatement
```

- If expression value isn’t 0 (true) - statement-1, after that - nextstatement
- If expression value is 0 (false) - nextstatement
Flowchart of `if`

```
if (expression) {
    statement-11
    ...
}
nextstatement
```
Example: Maximum with **if-else**

```c
#include <stdio.h>

void main () {  
    int a, b;
    printf("Enter two integers: ");
    scanf("%d %d", &a, &b);
    printf("Maximum of %d and %d ", a, b);
    if (a < b)
        printf("is %d
", b);
    else
        printf("is %d
", a);
}
```

Example: Maximum with **if**

```c
#include <stdio.h>

void main() {  
    int a, b, max;
    printf("Enter two integers: ");
    scanf("%d %d", &a, &b);
    max = a; /* pre-assignment */
    if(a < b)
        max = b; /* re-assignment */
    printf("Maximum of %d and %d is %d", a, b, max);
}
```
Example: Variable Rate (1)

```c
#define THRESHOLD 5000
#include <stdio.h>

void main () {
    float rate1, rate2, interest_rate; /* interest rates % */
    float capital; /* capital $$ */
    float annual_interest; /* annual interest $$ */

    /* read data */
    printf("Interest rates (%%xx.xx): ");
    scanf("%f %f", &rate1, &rate2);
    printf("Capital ($$.cc): ");
    scanf("%f", &capital);

    /* calculate the rate */
    if (capital < THRESHOLD) {
        interest_rate = rate1;
    } else {
        interest_rate = rate2;
    }
    printf("The rate for $%.2f is %.2f%%\n", capital, interest_rate);

    /* calculate capital */
    annual_interest = capital * interest_rate / 100;
    printf("Interest %6.2f; New capital %9.2f\n", annual_interest, capital + annual_interest);
}
```

Example: Variable Rate (2)
Example: Nested if - max3

```c
#include <stdio.h>
void main() {
    int a, b, c;

    printf("Enter three integers: ");
    scanf("%d %d %d", &a, &b, &c);
    printf("Maximum of %d, %d and %d is ", a, b, c);
    if (a > b) {
        if (a > c)
            printf("%d\n", a);
        else
            printf("%d\n", c);
    }
    else {
        if (b > c)
            printf("%d\n", b);
        else
            printf("%d\n", c);
    }
}
```

Example: Running Max

```c
#define SENTINEL -1
#include <stdio.h>
void main() {
    int max, nextnumber;

    printf("Number: ");
    scanf("%d", &nextnumber); /* read first number */
    max = nextnumber; /* pre-assignment */

    while (nextnumber != SENTINEL) {
        if (max < nextnumber)
            max = nextnumber;
        printf("Number: ");
        scanf("%d", &nextnumber);
    }

    printf("Max = %d\n", max);
}
```
Conditional Operator

Expr1 ? Expr2 : Expr3
- Conditional operator calculates the value from 3 arguments (expressions)
- First, Expr1 is evaluated
- If it is true (not zero), then Expr2 is calculated; it’s value is the result
- If it is false (zero), then Expr3 is calculated; its value is the result

Conditional Operator: Examples

- min = a < b ? a : b
- rate = capital < 3000 ? rate1 : rate 2
- printf("%c\n", (lower ? 'a' : 'A'));
- x = a + (b % 2 ? b - 1 : b)
Compare Conditionals

- Conditional statement
  - Controls the order of statement execution

  ```
  if (capital < THRESHOLD)
    interest_rate = rate1;
  else
    interest_rate = rate2;
  ```

- Conditional operator
  - Calculates a value

  ```
  interest_rate = capital < THRESHOLD ? rate1 : rate2;
  ```

Before next lecture:

- Do reading assignment
- Perry: Chapter 11; Chapter 13: Hello Conditional
- Run Classroom Examples
- Exercises: variable rate in a loop; calculating minimum of a sequence
- Check yourself by working with KnowledgeTree and its components