

# EECS 10: Computational Methods in Electrical and Computer Engineering

## Lecture 6

Rainer Dömer

doemer@uci.edu

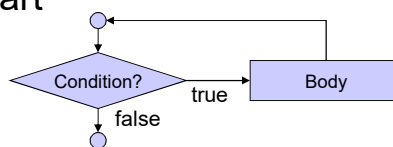
The Henry Samueli School of Engineering  
Electrical Engineering and Computer Science  
University of California, Irvine

## Lecture 6: Overview

- Repetition Statements
  - Example `Average2.c`
- Review
  - Lecture 1: Course administration, setup, Linux
  - Lecture 2: Introduction to C programming
  - Lecture 3: Program structure,  
basic types and operators
  - Lecture 4: Arithmetic expressions
  - Lecture 5: Conditional operators, statements
  - Lecture 6: Repetition statements
- Review Quiz

## Repetition Statements

- Repetition (aka. iteration, loop)
  - repeated execution of a block of statements
  - counter-controlled
    - counter determines number of repetitions (often predefined at compile time)
  - sentinel-controlled
    - sentinel condition determines number of repetitions (usually determined at run time)
- Control flow chart



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## Repetition Statements

- Explicit control flow in loops
  - **break** statement
    - exits the innermost loop
  - **continue** statement
    - jump back to the beginning of the innermost loop
- Example:

```

int i = 0;
int s = 0;
while (1)          /* "endless" loop */
{
    i++;
    if (i > 10)
    { break; }     /* exit the loop */
    if (i % 2 == 1)
    { continue; } /* next iteration */
    s += i;
} /* elihw */
printf("%d", s);
  
```

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## Example Program

- Average of values: **Average2.c** (part 1/3)

```

/* Average2.c: compute the average of a set of numbers */
/*
/* author: Rainer Doemer
/*
/*
/* modifications:
/* 10/10/04 RD sentinel controlled loop
/* 10/10/04 RD initial version

#include <stdio.h>

/* main function */

int main(void)
{
    /* variable definitions */
    int counter;
    double value;
    double total;
    double average;
    ...

```

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## Example Program

- Average of values: **Average2.c** (part 2/3)

```

...

/* input and computation section */
counter = 0;
total = 0.0;
while (1)
{ printf("Please enter a value (or -1 to quit): ");
  scanf("%lf", &value);
  if (value == -1.0)
  { break;
    } /* fi */
  total += value;
  counter++;
} /* elihw */

...

```

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## Example Program

- Average of values: **Average2.c** (part 3/3)

```

...

/* computation and output section */
printf("%d values entered.\n", counter);
if (counter >= 1)
    { average = total / (double)counter;
      printf("The average is %f.\n", average);
    } /* fi */

/* exit */
return 0;
} /* end of main */

/* EOF */

```

## Example Program

- Example session: **Average2.c**

```

% vi Average2.c
% gcc Average2.c -o Average2 -Wall -ansi
% Average2
Please enter a value (or -1 to quit): 2
Please enter a value (or -1 to quit): 3
Please enter a value (or -1 to quit): 4
Please enter a value (or -1 to quit): 5
Please enter a value (or -1 to quit): -1
4 values entered.
The average is 3.500000.
% Average2
Please enter a value (or -1 to quit): -1
0 values entered.
%

```

## Quiz: Question 16


- Today's computers run at which clock speed?
  - a) 85 MPH
  - b) 1 kHz
  - c) 1 ms
  - d) 1 GHz
  - e) 1 MHz

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## Quiz: Question 16

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## Quiz: Question 17



- Which of the following constructs are valid type names in C? (Check all that apply!)
  - a) `short char`
  - b) `long double`
  - c) `signed long int`
  - d) `unsigned float`
  - e) `signed integer`

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## Quiz: Question 17

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## Quiz: Question 18

- Assume `i` is a variable of type `int` and `d` is a variable of type `double`. Which statement is true for the following assignment? (Check all that apply!)



```
i = (int)d;
```

- a) The comparison checks whether `d` is an integer.
- b) The precision of `i` is doubled.
- c) The parentheses should go around `d`.
- d) The value in `d` is converted to an integer value and then assigned to `i`.
- e) Any fractional part in `d` is truncated off.

## Quiz: Question 18

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- b) The precision of `i` is doubled.
- c) The parentheses should go around `d`.
-  d) The value in `d` is converted to an integer value and then assigned to `i`.
-  e) Any fractional part in `d` is truncated off.

## Quiz: Question 19

- Which of the following statements correctly computes the polynomial  $p = 2x^2 - 3x + 4$  ?  
(Check all that apply!)
  - a)  $p = 2x^2 - 3x + 4;$
  - b)  $p = 2xx - 3x + 4;$
  - c)  $p = x*x*2 - 3*x + 4.0;$
  - d)  $p = 2*(x*x + 3)*x + 4;$
  - e)  $p = (2*x - 3)*x + 4;$

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## Quiz: Question 19

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  - d)  $p = 2*(x*x + 3)*x + 4;$
  - e)  $p = (2*x - 3)*x + 4;$

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## Quiz: Question 20

- Which of the following names are valid keywords in C? (Check all that apply!)
- a) `do`
  - b) `when`
  - c) `void`
  - d) `main`
  - e) `Int`

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## Quiz: Question 20

- Which of the following names are valid keywords in C? (Check all that apply!)
- a) `do`
  - b) `when`
  - c) `void`
  - d) `main`
  - e) `Int`

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## Quiz: Question 21

- Which of the following names are valid identifiers in C? (Check all that apply!)
  - a) `xyz123`
  - b) `IBM`
  - c) `dollar amount`
  - d) `My_Very_Long_Variable_Name`
  - e) `2fast4you`

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## Quiz: Question 21

- Which of the following names are valid identifiers in C? (Check all that apply!)
  - a) `xyz123`
  - b) `IBM`
  - c) `dollar amount`
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  - e) `2fast4you`

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## Quiz: Question 22

- What is the result of the evaluation of the following expression?


```
1 == 2 || 3 < 4 && 5 > 6
```

- a) 123456
- b) true
- c) false
- d) 1
- e) 0

## Quiz: Question 22

- What is the result of the evaluation of the following expression?

```
1 == 2 || 3 < 4 && 5 > 6
```

- a) 123456
- b) true
- c) false
- d) 1
-  e) 0

## Quiz: Question 23

- What is the result of the evaluation of the following expression?


```
17 < 42 ? 17 : 42
```

- a) 1742
- b) 17
- c) 42
- d) true
- e) false

## Quiz: Question 23

- What is the result of the evaluation of the following expression?

```
17 < 42 ? 17 : 42
```

- a) 1742
-  b) 17
- c) 42
- d) true
- e) false

## Quiz: Question 24

- For integer  $x = 1$  at the beginning, what is the value of  $x$  after the following statement?


```
x += x + 1;
```

- a) 0
- b) 1
- c) 2
- d) 3
- e) 4

## Quiz: Question 24

- For integer  $x = 1$  at the beginning, what is the value of  $x$  after the following statement?

```
x += x + 1;
```

- a) 0
- b) 1
- c) 2
-  d) 3
- e) 4

## Quiz: Question 25

- Assuming that  $x$  is a variable of type `int`, which values of  $x$  satisfy the following condition?


```
x % 2 == 1
```

- a) no value
- b) any value
- c) any value less than 2
- d) any odd value
- e) any even value

## Quiz: Question 25

- Assuming that  $x$  is a variable of type `int`, which values of  $x$  satisfy the following condition?

```
x % 2 == 1
```

- a) no value
- b) any value
- c) any value less than 2
-  d) any odd value
- e) any even value

## Quiz: Question 26

- Assume that  $x$  is an integer in the range of 1 through 10 inclusively. Which of the following expressions can be used as a test for  $x$  being an even number?  
(Check all that apply!)
  - $x \% 2 == 0$
  - $x / 2 > 1$
  - $x \% 2 == 1$
  - $x / 2 * 2 == x$
  - $x==2 \ || \ x==4 \ || \ x==6 \ || \ x==8 \ || \ x==10$

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## Quiz: Question 26

- Assume that  $x$  is an integer in the range of 1 through 10 inclusively. Which of the following expressions can be used as a test for  $x$  being an even number?  
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  - c)  $x \% 2 == 1$
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## Quiz: Question 27


- Given the following program fragment, what is printed when it gets executed?

- a) nothing
- b) 0
- c) 10
- d) 20
- e) 30

```
int i = 1;
int s = 0;
while (1)
{ i++;
  if (i >= 10)
    { break; }
  if (i % 2 == 1)
    { continue; }
  s += i;
}
printf("%d", s);
```

## Quiz: Question 27

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- a) nothing
- b) 0
- c) 10
-  d) 20
- e) 30

```
int i = 1;
int s = 0;
while (1)
{ i++;
  if (i >= 10)
    { break; }
  if (i % 2 == 1)
    { continue; }
  s += i;
}
printf("%d", s);
```



## Quiz: Question 28

- Which of the following variable declarations is valid in ANSI-C?  
(Check all that apply!)
  - a) `double xyz;`
  - b) `double xy, z;`
  - c) `double x = .1;`
  - d) `double x = 1.1, y = 2.2, z = 3.3;`
  - e) `double x,y,z = 1.0,2.0,3.0;`

## Quiz: Question 28

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
- Which of the following data types has the largest range of representable numbers?
  - a) `char`
  - b) `short int`
  - c) `long long int`
  - d) `unsigned int`
  - e) `signed long int`

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## Quiz: Question 30


- Which of the following data types can store the greatest value?
  - a) `long int`
  - b) `long long int`
  - c) `unsigned long long int`
  - d) `float`
  - e) `double`

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  - a) `long int`
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  - d) `float`
  -  e) `double`

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