EECS 10: Computational Methods in Electrical and Computer Engineering Lecture 13

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Lecture 13: Overview

- Warm-up Quiz
 - Revisiting "difficult" midterm questions
- Course Administration
 - Midterm course evaluation
- Functions
 - Introduction
 - Terms and concepts
 - Example Square.c

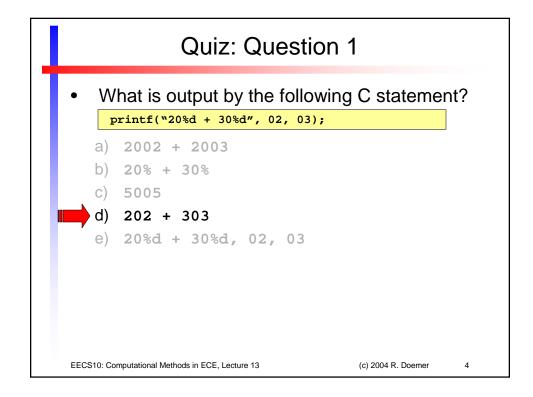
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Quiz: Question 1 What is output by the following C statement? printf("20%d + 30%d", 02, 03); a) 2002 + 2003 b) 20% + 30% c) 5005 d) 202 + 303 e) 20%d + 30%d, 02, 03 EECS10: Computational Methods in ECE, Lecture 13 (c) 2004 R. Doemer 3



 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 odd number?

(Check all that apply!)

- a) x % 2
- b) x / 2 * 2 == x
- c) x % 2 == 1
- d) $x==1 \mid | x==3 \mid | x==5 \mid | x==7 \mid | x==9$
- e) x % 2 == 0

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Quiz: Question 2

 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 odd number?

(Check all that apply!)

- 两 a) 🗴 % 2
 - b) x / 2 * 2 == x
 - c) x % 2 == 1
 - d) x==1 || x==3 || x==5 || x==7 || x==9
 - e) x % 2 == 0

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• What needs to be changed in the program below in order to have B printed when 85 is entered?

```
a) Change line 8 to printf("B");

b) Delete line 7

c) Change line 7 to if (x == 85)

bint x;

scanf("%d", &x);

if (x > 90)
{ printf("A"); }

if (x > 80)
{ printf("B"); }

if (x > 70)
{ printf("C"); }
```

d) Change line 5 to if (x > 80 && x <= 90)</p>

e) Change line 7 to if (x > 70 && x <= 80)</p>

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Quiz: Question 3

 What needs to be changed in the program below in order to have B printed when 85 is entered?

```
a) Change line 8 to
    printf("B");
b) Delete line 7
c) Change line 7 to
    if (x == 85)
    scanf("%d", &x);
    if (x > 90)
        { printf("A"); }
    if (x > 80)
    { printf("B"); }
    if (x > 70)
    { printf("C"); }
```

1 int x;

d) Change line 5 to if (x > 80 && x <= 90)</p>

e) Change line 7 to
if (x > 70 && x <= 80)

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 Which of the following expressions would be treated as a true condition when used with an if statement?

(Check all that apply!)

- a) (int)5.5 > 5
- b) 1 || 0 && 0
- c) 5 == 5
- d) (1 + 2 + 3) == (3 << 2 >> 1)
- e) 5 5

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Quiz: Question 4

 Which of the following expressions would be treated as a true condition when used with an if statement?

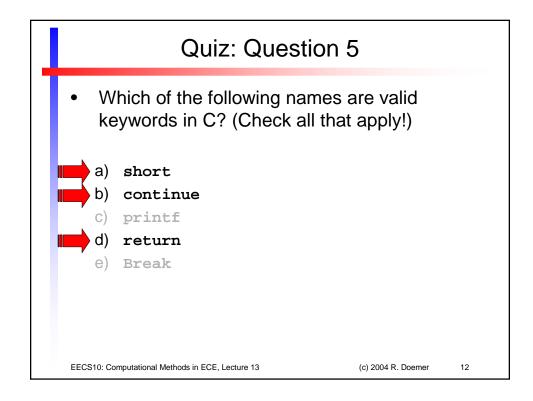
(Check all that apply!)

- a) (int)5.5 > 5
- b) 1 || 0 && 0
- d) (1 + 2 + 3) == (3 << 2 >> 1)
 - e) 5 5

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• Which of the following names are valid keywords in C? (Check all that apply!) a) short b) continue c) printf d) return e) Break



 If cnt is an integer counter, how could one update the value of cnt?
 (Check all that apply!)

```
a) cnt += 1;
b) ++cnt;
c) cnt++;
d) cnt += cnt;
e) cnt = cnt + 1;
```

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Quiz: Question 6

 If cnt is an integer counter, how could one update the value of cnt? (Check all that apply!)

```
a) cnt += 1;
b) ++cnt;
c) cnt++;
d) cnt += cnt;
e) cnt = cnt + 1;
```

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Course Administration

- Midterm Course Evaluation
 - One week, starting today!
 - Oct 27, 2004, 10am through Nov. 3, 2004, 10am
 - Online via EEE Evaluation application
- Feedback from students to instructors
 - Completely voluntary
 - Completely anonymous
 - Very valuable
 - · Help to improve this class!
- Final Course Evaluation
 - expected for week 10 (TBA)

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Functions

- Introduction
 - Programming concepts
 - · Hierarchy
 - Encapsulation
 - Information hiding
 - · Divide and conquer
 - Software reuse
 - Don't re-invent the wheel!
 - Program composition
 - C program = Set of functions
 - starting point: function named main
 - Libraries = Set of functions
 - predefined functions (possibly written by somebody else)

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Functions

- Terms and Concepts
 - Function declaration
 - function prototype with argument and return types
 - Function definition
 - · definition of function body
 - Function call
 - · expression invoking a function
 - Function arguments
 - arguments supplied in a function call
 - Function parameters
 - formal parameters holding the data supplied to a function
 - Return value
 - output data computed by the function
 - Local variables
 - variables used locally in a function (temporary variables)

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Functions • Program example: Square.c (part 1/2) /* Square.c: example demonstrating functions */ /* * */ /* author: Rainer Doemer */ /* * */ /* modifications: */ /* 10/27/04 RD initial version */ #include <stdio.h> /* function declaration */ double square(double a); /* function definition */ double square(double a) { return a * a; } /* end of square */ ... EECS10: Computational Methods in ECE, Lecture 13 (c) 2004 R. Doemer 18

Functions Program example: Square.c (part 2/2) /* main function */ int main(void) { /* variable definitions */ double x, y; /* input section */ printf("Please enter a value for x: "); scanf("%lf", &x); /* computation section */ y = square(x); /* output section */ printf("The square of %g is %g\n", x, y); /* exit */ return 0; } /* end of main */ /* EOF */ EECS10: Computational Methods in ECE, Lecture 13 (c) 2004 R. Doemer

Example Program • Example session: Square.c § vi Square.c § gcc Square.c -o Square -Wall -ansi § Square Please enter a value for x: 3 The square of 3 is 9 § Square Please enter a value for x: 5.5 The square of 5.5 is 30.25 § EECS10: Computational Methods in ECE, Lecture 13 (c) 2004 R. Doemer 20