# EECS 10: Computational Methods in Electrical and Computer Engineering Lecture 18

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# Lecture 18: Overview

- Review
  - Recursion
  - Structures, unions, enumerators
  - Binary data representation, memory
  - Pointers, pointer operations
  - String operations using pointers
  - File processing
  - Translation units
- Midterm Review Quiz
  - Top 5 "most difficult" questions
- Review Quiz

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### Midterm 2 Review Quiz Top 5 most "difficult" questions: In the program below, what is the result of calling grade (75)? 1 char grade(int x) { char g; if (x > 90)**\A**′ a) $\{g = A'; \}$ if (x > 80)b) **'B'** 6 $\{g = 'B'; \}$ 7 if (x > 70)c) 'C' 8 ${g = 'C';}$ 'D' 9 if (x > 60)10 ${ g = 'D'; }$ e) `F' 11 else $\{g = 'F'; \}$ 12 13 return g; 14 EECS10: Computational Methods in ECE, Lecture 18 (c) 2018 R. Doemer 3

# Midterm 2 Review Quiz Top 5 most "difficult" questions: In the program below, what is the result of calling grade (75)? char grade(int x) { char g; 3 if (x > 90)\A' $\{g = 'A'; \}$ 5 if (x > 80)b) **'B'** ${g = 'B';}$ 6 if (x > 70)7 8 ${g = 'C';}$ 'D' 9 if (x > 60)10 ${g = 'D';}$ \F' 11 $\{g = 'F'; \}$ 12 13 return g; 14 } EECS10: Computational Methods in ECE, Lecture 18 (c) 2018 R. Doemer 4

## Midterm 2 Review Quiz Top 5 most "difficult" questions: In the program below, what is the result of calling grade(80-90)? 1 char grade(int x) 2 { char g; 3 if (x > 90)**'A'** a) ${ g = 'A'; }$ 5 if (x > 80)b) **'B'** $\{ g = 'B'; \}$ 'C' c) 7 if (x > 70) ${g = 'C';}$ 8 'D' 9 if (x > 60) ${g = 'D';}$ 10 e) `F' 11 $\{g = 'F'; \}$ 12 13 return g; EECS10: Computational Methods in ECE, Lecture 18 (c) 2018 R. Doemer 5

# Midterm 2 Review Quiz Top 5 most "difficult" questions: In the program below, what is the result of calling grade (80-90)? char grade(int x) { char g; 3 if (x > 90)\A' $\{g = A'; \}$ if (x > 80)5 b) **'B** 6 $\{g = 'B'; \}$ 7 if (x > 70)8 ${g = 'C';}$ 'D' 9 if (x > 60) ${g = 'D';}$ 10 11 12 $\{g = 'F'; \}$ 13 return g; 14 } EECS10: Computational Methods in ECE, Lecture 18 (c) 2018 R. Doemer 6

# Midterm 2 Review Quiz

- Top 5 most "difficult" questions:
  - Which of the following are valid definitions of an integer array A of size 3? (Check all that apply!)

```
a) int A[3];
b) int A[3] = {1,2,3};
c) int A[3] = {};
d) int A[3] = {1, 2};
e) int A[] = {1,2,3};
```

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# Midterm 2 Review Quiz

- Top 5 most "difficult" questions:
  - Which of the following are valid definitions of an integer array A of size 3? (Check all that apply!)

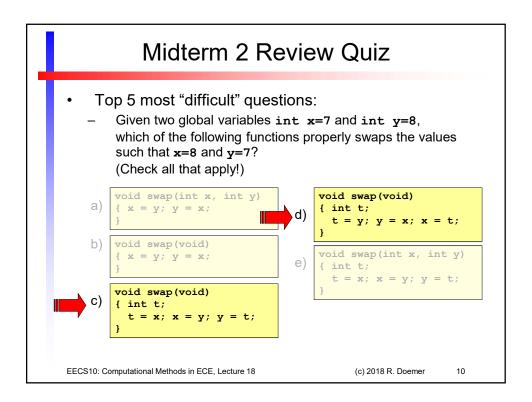
```
a) int A[3];
b) int A[3] = {1,2,3};
c) int A[3] = {};
d) int A[3] = {1, 2};
e) int A[] = {1,2,3};
```

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# Midterm 2 Review Quiz Top 5 most "difficult" questions: Given two global variables int x=7 and int y=8, which of the following functions properly swaps the values such that x=8 and y=7? (Check all that apply!) void swap(int x, int y) void swap (void) a) $\{ \mathbf{x} = \mathbf{y}; \mathbf{y} = \mathbf{x};$ { int t; d) t = y; y = x; x = t;b) void swap (void) void swap(int x, int y) $\{ \mathbf{x} = \mathbf{y}; \mathbf{y} = \mathbf{x};$ e) { int t; t = x; x = y; y = t; void swap (void) c) { int t; t = x; x = y; y = t;EECS10: Computational Methods in ECE, Lecture 18 (c) 2018 R. Doemer 9



# Midterm 2 Review Quiz

- Top 5 most "difficult" questions:
  - In the gdb debugger, which commands allow you to run your program step by step? (Check all that apply!)
  - a) step
  - b) cont
  - c) run
  - d) next
  - e) back

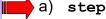
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# Midterm 2 Review Quiz

- Top 5 most "difficult" questions:
  - In the gdb debugger, which commands allow you to run your program step by step? (Check all that apply!)



- b) cont
- c) run
- d) next
  - e) back

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- In the program below, what is printed by the function call g (1)?
  - a) 1 2
  - b) 2 3
  - c) 1 1
  - d) 2
  - e) 1

```
1 int f(int x)
2 { printf("%d ", x);
3    return x + 1;
4 }
5 int g(int x)
6 { printf("%d ", f(x));
7    return x + 2;
8 }
```

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# Quiz: Question 1

 In the program below, what is printed by the function call g (1)?



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

```
1 int f(int x)
2 { printf("%d ", x);
3   return x + 1;
4 }
5 int g(int x)
6 { printf("%d ", f(x));
7   return x + 2;
8 }
```

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- What is recursion? (Check all that apply!)
  - a) A function that does not terminate.
  - b) A function that calls itself.
  - c) A function that contains a loop.
  - d) A function f that calls a function g which calls f.
  - e) A function that returns no value.

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# Quiz: Question 2

- What is recursion? (Check all that apply!)
  - a) A function that does not terminate.
- b) A function that calls itself.
  - c) A function that contains a loop.
- d) A function **f** that calls a function **g** which calls **f**.
  - e) A function that returns no value.

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 Given the function definition below, what is printed for the function call £ (3)?

```
a) 1 2 3
```

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

```
void f(int x)

f

printf("%d ", x);

if (x > 0)

f(x-1);
}
```

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# Quiz: Question 3

 Given the function definition below, what is printed for the function call £ (3)?

```
a) 1 2 3
b) 1 2 3 4
```

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

```
1 void f(int x)
2 {
3    printf("%d ", x);
4    if (x > 0)
5    { f(x-1); }
6 }
```

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Given the following definition of the vectors v1, v2 and v3, what is a correct way to perform a vector addition of v1 and v2?

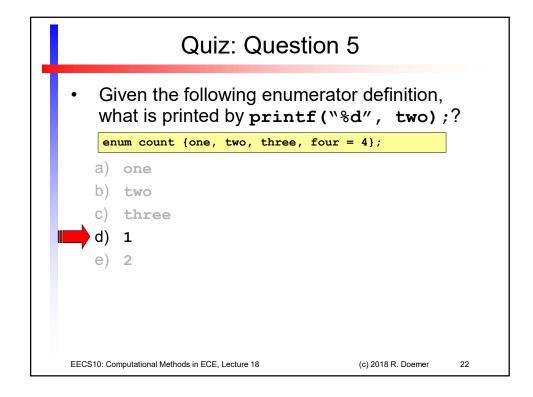
```
struct v {int x, y;} v1, v2, v3;
   a) v3 = v1 + v2;
   b) v3 = v1[x]*v2[y] + v1[y]*v2[x]
   c) v3[0] = v1[0] + v2[0];
      v3[1] = v1[1] + v2[1];
   d) v3.x = v1.x + v2.x;
      v3.y = v1.y + v2.y;
   e) v3->x = v1->x + v2->x;
      v3->y = v1->y + v2->y;
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                                                  19
```

# Quiz: Question 4

Given the following definition of the vectors v1, v2 and v3, what is a correct way to

```
perform a vector addition of v1 and v2?
    struct v {int x, y;} v1, v2, v3;
   a) v3 = v1 + v2;
   b) v3 = v1[x]*v2[y] + v1[y]*v2[x]
   c) v3[0] = v1[0] + v2[0];
      v3[1] = v1[1] + v2[1];
  d) v3.x = v1.x + v2.x;
      v3.y = v1.y + v2.y;
   e) v3->x = v1->x + v2->x;
      v3->y = v1->y + v2->y;
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                                                  20
```

# Quiz: Question 5 • Given the following enumerator definition, what is printed by printf("%d", two);? enum count {one, two, three, four = 4}; a) one b) two c) three d) 1 e) 2 EECS10: Computational Methods in ECE, Lecture 18 (c) 2018 R. Doemer 21



- Which of the following components do you find in every computer? (Check all that apply!)
  - a) ROM
  - b) RUM
  - c) BUG
  - d) CPU
  - e) IBM

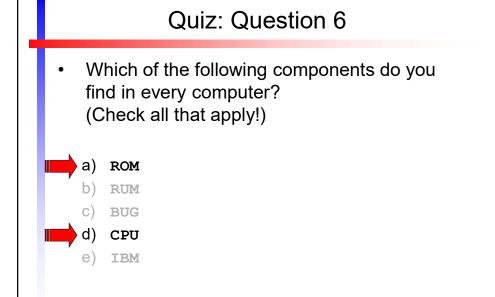
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- What is the decimal value of the (unsigned) binary number 01010101<sub>2</sub>?
  - a) 01010101
  - b) 85
  - c) 101
  - d) 170
  - e) 255

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# Quiz: Question 7

- What is the decimal value of the (unsigned) binary number 01010101<sub>2</sub>?
  - a) 01010101

- o) **85**
- c) 101
- d) 170
- e) 255

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- What is the binary value of the hexadecimal number FF<sub>16</sub>?
  - a) 01010101
  - b) 10001000
  - c) 01110111
  - d) 00010001
  - e) 11111111

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# Quiz: Question 8

- What is the binary value of the hexadecimal number FF<sub>16</sub>?
  - a) 01010101
  - b) 10001000
  - c) 01110111
  - d) 00010001
- 🛑 e) 11111111

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- How many bits do you need to represent one hexadecimal digit?
  - a) 1
  - b) 2
  - c) 4
  - d) 8
  - e) 16

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# Quiz: Question 9

- How many bits do you need to represent one hexadecimal digit?
  - a) 1
  - b) 2



c) 4

- d) 8
- e) 16

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- What could cause a bus error?
   (Check all that apply!)
  - a) Waking up late and missing the bus.
  - b) Calling a recursive function.
  - c) Accessing an array with an index out of range.
  - d) Referencing a pointer variable with invalid value.
  - e) Accessing an integer variable with invalid value.

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# Quiz: Question 10

- What could cause a bus error? (Check all that apply!)
  - a) Waking up late and missing the bus.
  - b) Calling a recursive function.
  - c) Accessing an array with an index out of range.
  - d) Referencing a pointer variable with invalid value.
  - e) Accessing an integer variable with invalid value.

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- In C, which properties does every object have?
   (Check all that apply!)
  - a) A size.
  - b) A value.
  - c) A weight.
  - d) A type.
  - e) A location.

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# Quiz: Question 11

- In C, which properties does every object have?
   (Check all that apply!)
- 📥 a) A size.
- b) A value.
  - c) A weight.
- d) A type.
- e) A location.

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- Given the program segment below, what is the value of \*p at the end?
  - a) 1
  - b) 2
  - c) 3
  - d) 4
  - e) 5

```
int x[] = {1,2,3,4,5};
int *p = &x[2];

p++;
p -= 2;
```

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# Quiz: Question 12

- Given the program segment below, what is the value of \*p at the end?
  - a) 1
  - b) 2
  - c) 3
  - d) 4
  - e) 5

int x[] = {1,2,3,4,5};
int \*p = &x[2];

p++;
p -= 2;

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 Given the function and variable definitions shown below, which function call is valid? (Check all that apply!)

```
1 int StrLen(
                        2
                                const char *s)
a) StrLen(cp);
                        3
                          { int 1 = 0;
                             while(*s)
b) StrLen(ca);
                        5
                             { s++;
                        6
                               1++;
c) StrLen(c);
d) StrLen(i);
                        8
                             return 1;
                        9 }
  StrLen("abc");
                       10 char *cp = "hello";
                       11 char ca[] = "world";
                       12 char c = \c';
                       13 int i = 42;
```

# Given the function and variable definitions shown below, which function call is valid? (Check all that apply!)

Quiz: Question 13

```
a) StrLen(cp);
b) StrLen(ca);
c) StrLen(c);
d) StrLen(i);
e) StrLen("abc");
```

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- Which of the following are functions declared in stdio.h?
   (Check all that apply!)
  - a) printf
  - b) printd
  - c) fprintf
  - d) sprint
  - e) fputs

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# Quiz: Question 14

- Which of the following are functions declared in stdio.h?
   (Check all that apply!)
- ा a) printf
  - b) printd
- c) fprintf
  - d) sprint
- e) fputs

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What does the following code segment print?

```
char s[] = "Hppe!Mvdl!boe!Ibqqz!Ipmjebzt";
char *p;
p = &s[0];
while(*p)
f printf("%c", *p - 1);
p++;
}
```

- a) Hppe!Mvdl!boe!Ibqqz!Ipmjebzt
- b) Happy Holidays and Good Luck
- C) Happy Luck and Good Holidays
- d) Good Holidays and Happy Luck
- e) Good Luck and Happy Holidays

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# Quiz: Question 15

What does the following code segment print?

```
char s[] = "Hppe!Mvdl!boe!Ibqqz!Ipmjebzt";
char *p;
p = &s[0];
while(*p)
f printf("%c", *p - 1);
p++;
}
```

- a) Hppe!Mvdl!boe!Ibqqz!Ipmjebzt
- b) Happy Holidays and Good Luck
- C) Happy Luck and Good Holidays
- d) Good Holidays and Happy Luck

e) Good Luck and Happy Holidays

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