EECS 10: Computational Methods in Electrical and Computer Engineering

Quiz on Lectures 9-18

Rainer Dömer

doemer@uci.edu

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

Midterm 1 Review Quiz

- Top 5 most "difficult" questions:
  - Rank 5: Question 27 (35.3% incorrect answers)
- Prime number test: Iterate over $2 \le i < x$ to find a divisor of x. What should go into box in line 4? (1 pt.)
  a) `i = 0;`
  b) `i = 1;`
  c) `i = 2;`
  d) `i = x;`
  e) `x = 0;`

```
int x, i;
printf("Please input a number: ");
scanf("%d", &x);
initialize variable i
while(i < x)
{ if(x % i == 0)
  { printf("%d is not prime\n", x);
    break;
  }
  i++;
}
if( none of the i is a divisor of x )
  { printf("%d is prime\n", x);
  }
```

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  - a) `i = 0;`
  - b) `i = 1;`
  - c) **`i = 2;`**
  - d) `i = x;`
  - e) `x = 0;`

```
int x, i;
printf("Please input a number: ");
scanf("%d", &x);
initialize variable i
while(i < x)
{ if(x % i == 0)
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    break;
  }
  i++;
}
if( none of the i is a divisor of x )
  { printf("%d is prime\n", x);
  }
```


Midterm 1 Review Quiz

- Top 5 most "difficult" questions:
  - Rank 4: Question 25 (50.9% incorrect answers)
- Which of the following program fragments will *not* terminate? (Check all that apply! 2 pts.)

a)
```
int a = 1;
while(a < 1000000)
   { a++; }
```

b)
```
int a = 0;
while(a < 1000)
   { a = a * 3; }
```

c)
```
int a = 1;
while(a == 1)
   { a = a % 10; }
```

d)
```
int a = 10;
while(a > 0)
   { a = a / 3; }
```

e)
```
int a = 1;
while(a < 1000)
   { a = a << 1; }
```

Midterm 1 Review Quiz

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- Which of the following program fragments will *not* terminate? (Check all that apply! 2 pts.)

a)
```
int a = 1;
while(a < 1000000)
   { a++; }
```

d)
```
int a = 10;
while(a > 0)
   { a = a / 3; }
```

b)
```
int a = 0;
while(a < 1000)
   { a = a * 3; }
```

e)
```
int a = 1;
while(a < 1000)
   { a = a << 1; }
```

c)
```
int a = 1;
while(a == 1)
   { a = a % 10; }
```

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Midterm 1 Review Quiz

- Top 5 most "difficult" questions:
  - Rank 3: Question 12 (63.1% incorrect answers)
- Which of the following C expressions yield the same result?
  (Check all that apply! 2 pts.)

a) `4 << 8 % 5 / 2`
b) `(4 << 8) % 5 / 2`
c) `4 << 8 % (5 / 2)`
d) `(4 << 8 % 5) / 2`
e) `4 << (8 % 5) / 2`

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Midterm 1 Review Quiz

- Top 5 most "difficult" questions:
  - Rank 3: Question 12 (63.1% incorrect answers)
- Which of the following C expressions yield the same result?
  (Check all that apply! 2 pts.)

a) `4 << 8 % 5 / 2` **(8)**
b) `(4 << 8) % 5 / 2` **(2)**
c) `4 << 8 % (5 / 2)` **(4)**
d) `(4 << 8 % 5) / 2` **(16)**
e) `4 << (8 % 5) / 2` **(8)**

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Midterm 1 Review Quiz

- Top 5 most "difficult" questions:
  - Rank 2: Question 13 (64.3% incorrect answers)
- What is the output of the following C program fragment (1 pt.)

```
int i1 = 5, i2 = 2, i;
float f1 = 5, f2 = 2, f;
i = i1 / i2;
f = (int)(f1 / f2);
printf("i = %d, f = %f", i, f);
```

a) `i = 2, f = 2`
b) `i = 1, f = 2`
c) `i = 2, f = 2.00000`
d) `i = 2.00000, f = 2.50000`
e) `i = 2, f = 2.50000`

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Midterm 1 Review Quiz

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```
int i1 = 5, i2 = 2, i;
float f1 = 5, f2 = 2, f;
i = i1 / i2;
f = (int)(f1 / f2);
printf("i = %d, f = %f", i, f);
```

a) `i = 2, f = 2`
b) `i = 1, f = 2`
c) **`i = 2, f = 2.00000`**
d) `i = 2.00000, f = 2.50000`
e) `i = 2, f = 2.50000`

Midterm 1 Review Quiz

- Top 5 most "difficult" questions:
  - Rank 1: Question 30 (75.1% incorrect answers)
- Prime number test: Iterate over $2 \le i < x$ to find a divisor of x. What should go into box in line 12? (1 pt.)
  a) `x / i == 0`
  b) `x < i`
  c) `i / x == 0`
  d) `i + 1 == x`
  e) `i == x`

```
int x, i;
printf("Please input a number: ");
scanf("%d", &x);
initialize variable i
while(i < x)
{ if(x % i == 0)
  { printf("%d is not prime\n", x);
    break;
  }
  i++;
}
if( none of the i is a divisor of x )
  { printf("%d is prime\n", x);
  }
```

Midterm 1 Review Quiz

- Top 5 most "difficult" questions:
  - Rank 1: Question 30 (75.1% incorrect answers)
- Prime number test: Iterate over $2 \le i < x$ to find a divisor of x. What should go into box in line 12? (1 pt.)
  - a) `x / i == 0`
  - b) `x < i`
  - c) `i / x == 0`
  - d) `i + 1 == x`
  - e) `i == x`

```
int x, i;
printf("Please input a number: ");
scanf("%d", &x);
initialize variable i
while(i < x)
{ if(x % i == 0)
  { printf("%d is not prime\n", x);
    break;
  }
  i++;
}
if( none of the i is a divisor of x )
  { printf("%d is prime\n", x);
  }
```

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Quiz: Question 1

- Which of the following expressions would be treated as a true condition when used with an **`if`** statement? (Check all that apply!)

  a) `(int)5.99 > 5`
  b) `1 || 0 && 1`
  c) `5 >= 5`
  d) `(1 + 2 + 3) == (3 << 2 >> 1)`
  e) `5 - 5`

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Quiz: Question 1

- Which of the following expressions would be treated as a true condition when used with an **`if`** statement?
  (Check all that apply!)

a) `(int)5.99 > 5`
b) `1 || 0 && 1`
c) `5 >= 5`
d) `(1 + 2 + 3) == (3 << 2 >> 1)`
e) `5 - 5`

Quiz: Question 2

- If **`cnt`** is an integer counter that counts upwards in steps of 1, how could one update the value of **`cnt`**?
  (Check all that apply!)

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

Quiz: Question 2

- If **`cnt`** is an integer counter that counts upwards in steps of 1, how could one update the value of **`cnt`**?
  (Check all that apply!)

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

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 15

Quiz: Question 3

- What is the value of **`x`** after the following code fragment is executed?

```
int x = 0;
for(x = 1; x <= 10; x++)
   {  }
```

a) **0**
b) **1**
c) **9**
d) **10**
e) **11**

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Quiz: Question 3

- What is the value of **x** after the following code fragment is executed?

```
int x = 0;
for(x = 1; x <= 10; x++)
   {  }
```

a) **0**
b) **1**
c) **9**
d) **10**
e) **11**

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Quiz: Question 4

- What is the value of **x** after the following code fragment is executed?

```
int x = 0;
do { x++;
    } while(x < 9);
```

a) **0**
b) **1**
c) **9**
d) **10**
e) **11**

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 18

Quiz: Question 4

- What is the value of **x** after the following code fragment is executed?

```
int x = 0;
do { x++;
    } while(x < 9);
```

a) 0
b) 1
c) **9**
d) 10
e) 11

Quiz: Question 5

- What is the value of **x** after the following code fragment is executed?

```
int x = 10;
while(x > 0)
   { x -= 2;
    }
```

a) **-2**
b) **-1**
c) **0**
d) **1**
e) **2**

Quiz: Question 5

- What is the value of **x** after the following code fragment is executed?

```
int x = 10;
while(x > 0)
   { x -= 2;
    }
```

a) -2
b) -1
c) **0**
d) 1
e) 2

Quiz: Question 6

- Given the following function **g**, what is the result of **g(85)**?

a) **'A'**
b) **'B'**
c) **'C'**
d) **'D'**
e) **'F'**

```
char g(int n)
{
  switch(n/10)
  { case 10:
    case  9: return('A');
    case  8: return('B');
    case  7: return('C');
    case  6: return('D');
    default: return('F');
   }
}
```

Quiz: Question 6

- Given the following function **g**, what is the result of **g(85)**?

a) 'A'
b) **'B'**
c) 'C'
d) 'D'
e) 'F'

```
char g(int n)
{
  switch(n/10)
  { case 10:
    case  9: return('A');
    case  8: return('B');
    case  7: return('C');
    case  6: return('D');
    default: return('F');
   }
}
```


Quiz: Question 7

- What is output by the following C statement?

```
printf("x = %03d", 3 + 4);
```

a) **x = 034**
b) **x = 037**
c) **x = 007**
d) **x = 7**
e) **x = 347**

Quiz: Question 7

- What is output by the following C statement?

```
printf("x = %03d", 3 + 4);
```

a) `x = 034`
b) `x = 037`
c) **`x = 007`**
d) `x = 7`
e) `x = 347`

Quiz: Question 8

- In the **`gdb`** debugger, what does **`next`** do?

a) It moves to the next argument of the function.
b) It calls the next function in the program.
c) It executes the next statement in the program.
d) It prints the value of the next variable.
e) It loads the next program into the debugger.

Quiz: Question 8

- In the **gdb** debugger, what does **`next`** do?

a) It moves to the next argument of the function.
b) It calls the next function in the program.
c) It executes the next statement in the program.
d) It prints the value of the next variable.
e) It loads the next program into the debugger.

Quiz: Question 9

- Given the following code fragment, which of the following statements are true? (Check all that apply!)

```
double f(int x);
void g(int x, int y)
{
  int z;

  z = f(x) + 2*y;
  return z;
}
```

a) Function **f** is declared.
b) Function **g** calls function **f**
c) Variable **z** is a local variable of function **g**
d) Function **g** is declared and defined.
e) **y** is a parameter of function **g**.

Quiz: Question 9

- Given the following code fragment, which of the following statements are true? (Check all that apply!)

```
double f(int x);
void g(int x, int y)
{
  int z;

  z = f(x) + 2*y;
  return z;
}
```

a) Function **f** is declared.
b) Function **g** calls function **f**
c) Variable **z** is a local variable of function **g**
d) Function **g** is declared and defined.
e) **y** is a parameter of function **g**.

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Quiz: Question 10

- Given that the C standard math library is included, which of the following expressions results in the value **4.0**? (Check all that apply!)

a) `pow(16.0, .5)`
b) `4.0 * cos(0.0)`
c) `3 + sin(0.0)`
d) `log10(10000.00)`
e) `sqrt(15.0) + 1`

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 30

Quiz: Question 10

- Given that the C standard math library is included, which of the following expressions results in the value **`4.0`**?
  (Check all that apply!)

a) **`pow(16.0, .5)`**
b) **`4.0 * cos(0.0)`**
c) **`3 + sin(0.0)`**
d) **`log10(10000.00)`**
e) **`sqrt(15.0) + 1`**

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 31

Quiz: Question 11

- Given the following program fragment, what is the value of **`g(2,f(3,4))`**?

a) **8**
b) **9**
c) **10**
d) **11**
e) **12**

```
int x = 7;

int f(int x, int y)
{
  return x + y;
}

int g(int x, int y)
{
  return f(y, x);
}
```

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 32

Quiz: Question 11

- Given the following program fragment, what is the value of **`g(2,f(3,4))`**?

a) 8
b) **9**
c) 10
d) 11
e) 12

```
int x = 7;

int f(int x, int y)
{
  return x + y;
}

int g(int x, int y)
{
  return f(y, x);
}
```


Quiz: Question 12

- What is output by the following program fragment?

a) **EECS00 1**
b) **EEC 10 0**
c) **E E**
d) **EECS C**
e) **EEC C**

```
char s[] = "EECS10";

s[4] = 0;
printf("%s %c", s, s[2]);
```

Quiz: Question 12

- What is output by the following program fragment?

```
char s[] = "EECS10";

s[4] = 0;
printf("%s %c", s, s[2]);
```

a) `EECS00 1`
b) `EEC 10 0`
c) `E E`
d) **`EECS C`**
e) `EEC C`

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 35

Quiz: Question 13

- Given the definition **`double p=0.0125;`** which of the following C statements will print out **`p = 1.25%`** ?
  (Check all that apply!)

a) `printf("p = %d.25%%", (int)(p*100.0));`
b) `printf("p = %p", 100.0*p);`
c) `printf("p = %.2f%%", p*100.0);`
d) `printf("p = %.2f%c", p*100.0, '%');`
e) `printf("p = ", 100.0 * p, "%%");`

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 36

Quiz: Question 13

- Given the definition **`double p=0.0125;`** which of the following C statements will print out **`p = 1.25%`** ?
  (Check all that apply!)

a) **`printf("p = %d.25%%", (int)(p*100.0));`**
b) `printf("p = %p", 100.0*p);`
c) **`printf("p = %.2f%%", p*100.0);`**
d) **`printf("p = %.2f%c", p*100.0, '%');`**
e) `printf("p = ", 100.0 * p, "%%");`

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 37

Quiz: Question 14

- Which of the following statements is true for an *algorithm*?
  (Check all that apply!)

a) An algorithm must be indeterministic.
b) An algorithm solves a problem quickly.
c) An algorithm is historically based on Al Gore's rythm.
d) An algorithm executes a program using pseudo code.
e) An algorithm must terminate after a finite number of steps.

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 38

Quiz: Question 14

- Which of the following statements is true for an *algorithm*?
(Check all that apply!)

a) An algorithm must be indeterministic.
b) An algorithm solves a problem quickly.
c) An algorithm is historically based on Al Gore's rythm.
d) An algorithm executes a program using pseudo code.
e) An algorithm must terminate after a finite number of steps.

Quiz: Question 15

- Which of the following declarations can be added to the program in line 8 without creating a compilation error?
(Check all that apply!)

```
1 int x = 2;
2 int f(int v, double w);
3 int g(int x, int y)
4 { int z;
5   z = 2*x + 5*y - 42;
6   return z;
7 }
8
```

a) `int f(int v, double w);`
b) `int g = 0;`
c) `int g(int x, int y);`
d) `int x = 2;`
e) `int f(double v, double w);`

Quiz: Question 15

- Which of the following declarations can be added to the program in line 8 without creating a compilation error?
  (Check all that apply!)

```
1  int x = 2;
2  int f(int v, double w);
3  int g(int x, int y)
4  { int z;
5    z = 2*x + 5*y - 42;
6    return z;
7  }
8
```

a) `int f(int v, double w);`
b) `int g = 0;`
c) `int g(int x, int y);`
d) `int x = 2;`
e) `int f(double v, double w);`

Quiz: Question 16

- The following function **`issorted`** is supposed to return true if and only if the given array **`L`** is sorted in increasing order.
- What should go into *Box1* in line 3?

a) `i=1; i<10; i++`
b) `i=0; i<10; i++`
c) `i=0; i<9; i++`
d) `i=10; i>0; i--`
e) `i=9; i>=0; i--`

```
1  int issorted(int L[10])
2  { int i;
3    for( Box1 )
4    { if(L[i] >= L[i+1])
5      { Box2; }
6    }
7    Box3;
8  }
```

Quiz: Question 16

- The following function **`issorted`** is supposed to return true if and only if the given array **`L`** is sorted in increasing order.
- What should go into *Box1* in line 3?

a) `i=1; i<10; i++`
b) `i=0; i<10; i++`
c) **`i=0; i<9; i++`**
d) `i=10; i>0; i--`
e) `i=9; i>=0; i--`

```
1 int issorted(int L[10])
2 { int i;
3   for( Box1 )
4   { if(L[i] >= L[i+1])
5     { Box2; }
6   }
7   Box3;
8 }
```


Quiz: Question 17

- The following function **`issorted`** is supposed to return true if and only if the given array **`L`** is sorted in increasing order.
- What should go into *Box2* in line 5?

a) **`return 0`**
b) **`return 1`**
c) **`continue`**
d) **`break`**
e) **`return`**

```
1 int issorted(int L[10])
2 { int i;
3   for( Box1 )
4   { if(L[i] >= L[i+1])
5     { Box2; }
6   }
7   Box3;
8 }
```

Quiz: Question 17

- The following function **`issorted`** is supposed to return true if and only if the given array **`L`** is sorted in increasing order.
- What should go into *Box2* in line 5?

a) **`return 0`**
b) **`return 1`**
c) **`continue`**
d) **`break`**
e) **`return`**

```
1 int issorted(int L[10])
2 { int i;
3   for( Box1 )
4   { if(L[i] >= L[i+1])
5     { Box2; }
6   }
7   Box3;
8 }
```

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 45

Quiz: Question 18

- The following function **`issorted`** is supposed to return true if and only if the given array **`L`** is sorted in increasing order.
- What should go into *Box3* in line 7?

a) **`return 0`**
b) **`return 1`**
c) **`continue`**
d) **`break`**
e) **`return`**

```
1 int issorted(int L[10])
2 { int i;
3   for( Box1 )
4   { if(L[i] >= L[i+1])
5     { Box2; }
6   }
7   Box3;
8 }
```

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 46

Quiz: Question 18

- The following function **`issorted`** is supposed to return true if and only if the given array **`L`** is sorted in increasing order.
- What should go into *Box3* in line 7?

a) `return 0`
b) **`return 1`**
c) `continue`
d) `break`
e) `return`

```
1 int issorted(int L[10])
2 { int i;
3   for( Box1 )
4   { if(L[i] >= L[i+1])
5     { Box2; }
6   }
7   Box3;
8 }
```

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 47

Quiz: Question 19

- Consider the following program fragment:

```
unsigned int x=0, y=0;
scanf("%d", &x);
while((x>>=1) != 0)
   {y += 1;}
printf("%d", y);
```

- When running the program, which of the following is correct? (Check all that apply!)
  a) If the user enters **6**, it will print **2**.
  b) If the user enters **6**, it will print **3**.
  c) If the user enters **4**, it will print **2**.
  d) If the user enters **4**, it will print **1**.
  e) If the user enters **4**, it will print **4**.

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 48

Quiz: Question 19

- Consider the following program fragment:

```
unsigned int x=0, y=0;
scanf("%d", &x);
while((x>>=1) != 0)
   {y += 1;}
printf("%d", y);
```

- When running the program, which of the following is correct? (Check all that apply!)

a) If the user enters **6**, it will print **2**.
b) If the user enters **6**, it will print **3**.
c) If the user enters **4**, it will print **2**.
d) If the user enters **4**, it will print **1**.
e) If the user enters **4**, it will print **4**.

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 49

Quiz: Question 20

- Consider the following program fragment:

```
unsigned int x=0, y=0;
scanf("%d", &x);
while((x>>=1) != 0)
   {y += 1;}
printf("%d", y);
```

- Which of the following statements are true about the program? (Check all that apply!)

a) **y** will be the integer part of $\log_2(x)$
b) **y** will be equal to **x**
c) It computes the product of **x** and **y**
d) It sets **y** to the sum of **x** and **y**
e) The condition in line 3 is equivalent to **`(x/=2)!=0`**

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 50

Quiz: Question 20

- Consider the following program fragment:

```
unsigned int x=0, y=0;
scanf("%d", &x);
while((x>>=1) != 0)
   {y += 1;}
printf("%d", y);
```

- Which of the following statements are true about the program? (Check all that apply!)

a) **y** will be the integer part of $\log_2(x)$

b) **y** will be equal to **x**

c) It computes the product of **x** and **y**

d) It sets **y** to the sum of **x** and **y**

e) The condition in line 3 is equivalent to **`(x/=2)!=0`**

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 51

Quiz: Question 21

- Which of the following expressions yield a result type of **`double`**? (Check all that apply!)

a) **`5 * 100000`**

b) **`5 * 100.00`**

c) **`(int)5.3 > 3.0`**

d) **`10 / 3`**

e) **`5.0 / 5`**

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 52

Quiz: Question 21

- Which of the following expressions yield a result type of **`double`**? (Check all that apply!)

a) `5 * 100000`
b) **`5 * 100.00`**
c) `(int)5.3 > 3.0`
d) `10 / 3`
e) **`5.0 / 5`**

Quiz: Question 22

- What is output by the following C statement?

```
printf("%d + %d + %d", 1, 2, 1+2);
```

a) **`1 + 2 + 1+2`**
b) **`%d + %d + %d, 1, 2, 1+2`**
c) **`6`**
d) **`%1 + %2 + %3`**
e) **`1 + 2 + 3`**

Quiz: Question 22

- What is output by the following C statement?

```
printf("%d + %d + %d", 1, 2, 1+2);
```

a) `1 + 2 + 1+2`
b) `%d + %d + %d, 1, 2, 1+2`
c) `6`
d) `%1 + %2 + %3`
e) **`1 + 2 + 3`**

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 55

Quiz: Question 23

- What is output by the following C statement?

```
int x = 0, y = 5;
x = y++;
printf("x = %d, y = %d", x, y);
```

a) **`x = 0, y = 5`**
b) **`x = 5, y = 5`**
c) **`x = 5, y = 6`**
d) **`x = 6, y = 5`**
e) **`x = 6, y = 6`**

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 56

Quiz: Question 23

- What is output by the following C statement?

```
int x = 0, y = 5;
x = y++;
printf("x = %d, y = %d", x, y);
```

a) `x = 0, y = 5`
b) `x = 5, y = 5`
c) **`x = 5, y = 6`**
d) `x = 6, y = 5`
e) `x = 6, y = 6`

Quiz: Question 24

- Consider the following C program fragment regarding systolic blood pressure (line numbers are not part of the code):
- Which of the following changes, if applied individually, would be required in order to have **`HighNormal`** printed when **`125`** is entered? (Check all that apply!)

```
 1 int x;
 2 scanf("%d", &x);
 3 if (x >= 140)
 4    { printf("High"); }
 5 if (x >= 120)
 6    { printf("HighNormal"); }
 7 if (x > 90)
 8    { printf("Normal"); }
 9 if (x < 90)
10    { printf("Low"); }
```

a) Change line 8 to **`printf("High");`**
b) Change line 7 to **`if (x > 90 && x < 120)`**
c) Change line 7 to **`if (x > 90 || x < 120)`**
d) Change line 6 to **`printf("High");`**
e) Change line 8 to **`printf("HighNormal");`**

Quiz: Question 24

- Consider the following C program fragment regarding systolic blood pressure (line numbers are not part of the code):
- Which of the following changes, if applied individually, would be required in order to have **`HighNormal`** printed when **`125`** is entered? (Check all that apply!)

```
 1 int x;
 2 scanf("%d", &x);
 3 if (x >= 140)
 4    { printf("High"); }
 5 if (x >= 120)
 6    { printf("HighNormal"); }
 7 if (x > 90)
 8    { printf("Normal"); }
 9 if (x < 90)
10    { printf("Low"); }
```

a) Change line 8 to **`printf("High");`**
b) Change line 7 to **`if (x > 90 && x < 120)`**
c) Change line 7 to **`if (x > 90 || x < 120)`**
d) Change line 6 to **`printf("High");`**
e) Change line 8 to **`printf("HighNormal");`**

Quiz: Question 25

- What is the result of the following expression?

```
!((4 - 5%4) < 5 && (7/6 > 4))
```

a) **`true`**
b) **`false`**
c) **`1`**
d) **`0`**
e) invalid expression

Quiz: Question 25

- What is the result of the following expression?

```
!((4 - 5%4) < 5 && (7/6 > 4))
```

a) `true`
b) `false`
c) **`1`**
d) `0`
e) invalid expression

EECS10: Computational Methods in ECE, Quiz 9-18 (c) 2010 R. Doemer 61