Midterm

- Monday, February 8
- In class
- Text book: Chapters 1-6, and 9-10
- Anything from slides
- Anything from readings and assignments

Midterm Topics

- Java syntax, data types
- Java control flow, expression evaluation
- Object Oriented concepts
- Classes and methods
- Constructors
- Objects and references
- Number base conversion
Midterm Question Format

- Multiple choice questions
- Programming questions
- Calculation questions

Example Questions

Of the following types, which one cannot store a numeric value?

- a) byte
- b) float
- c) boolean
- d) int
Which of the following are Object Oriented principles?

a) encapsulation  
b) data hiding  
c) abstraction  
d) all of the above

If $x$ is an int and $y$ is a float, which one of the following is not a legal assignment statement?

a) $y = x;$  
b) $x = y;$  
c) $y = (\text{float}) x;$  
d) $x = (\text{int}) y;$
Example Questions

Assume that \( x \), \( y \), and \( z \) are all ints equal to 50, 20, and 6. What is the value of \( x / y / z \) ?

a) 16
b) 12
c) 0
d) A syntax error as this is syntactically invalid
e) A run-time error since this is a division by 0

Example Questions

If we have the statement

```
String s = "Hello world";
```

What is returned by \( s.charAt(1) \) ?

a) ’H’
b) ’e’
c) ’l’
d) ”Hello”
Example Questions

Suppose you have three String variables \( a, b, c \). The statement \( c = a + b; \) can also be achieved by:

a) \( c = a.length() + b.length(); \)
b) \( c = (\text{int}) a + (\text{int}) b; \)
c) \( c = a.concat(b); \)
d) \( c = b.concat(a); \)
e) \( c = \text{String.concat}(a,b); \)

Example Questions

Assume that \( q, x, y, \) and \( z \) are int variables with \( x = 1, y = 10, z = -3 \). Which of the following is true after this statement is executed?
\[
q = (x++ * y--) + ++z;
\]
a) \( q == 7 \)
b) \( q == 16 \)
c) \( q == 22 \)
d) \( q == 8 \)
Example Questions

Assume that q, x, y, and z are int variables. Rewrite this statement as a sequence of simple statements without the increment and decrement operators, and with at most one operation in each statement.

\[ q = (x++ \times y--) + ++z; \]

Example Questions

What value will z have after the statement:

```c
int z = 5.0 / 10;
```

a) 0
b) 0.5
c) 5.0
d) 2.0
e) none of the above, a compile-time error arises because z is an int and 5.0 / 10 is a double
Example Questions

Assume that x is an int variable with x = 1. What will be the value of x after this loop terminates? \texttt{while (x < 100) x *= 2;}

a) 2
b) 101
c) 64
d) 128

Base Conversions

Convert from binary to octal:

01111010

Convert from binary to hexadecimal:

01111010
Example Questions

Fill in the code in a method to extract the first letter of each word in a String. A word consists just of letters. You may use the static method `Character.isLetter(ch)` which returns true if the character `ch` is a letter.

```java
String initials(String s) {
    // Code to extract first letter of each word
}
```

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Example Questions

Fill in the code for class `Rectangle` so that it works with this test driver code.

```java
public static void main(String[] args) {
    // Create two Rectangle objects
    Rectangle rect1 = new Rectangle(4, 11);
    Rectangle rect2 = new Rectangle(7, 7);
    System.out.println("area of rect1 is " + rect1.area());
    if (rect2.isSquare())
        System.out.println("rect2 is a square");
    System.out.println("rect1 isRectangle with dimensions 4 and 11");
    System.out.println("rect2 isRectangle with dimensions 7 and 7");
    rect1.growByFactor(2.5);
    System.out.println("rect1 isRectangle with dimensions 10 and 27");
}
```

Output:

```
area of rect1 is 44
rect2 is a square
rect1 isRectangle with dimensions 4 and 11
rect2 isRectangle with dimensions 7 and 7
rect1 isRectangle with dimensions 10 and 27
```
class Rectangle {
  public String toString() {
    return "Rectangle with dimensions " + length + " and " + width;  
  }
}

Exam Strategy

- Do the multiple choice first
  - Over half of the points
  - Probably easiest
- Pace yourself
- Leave time to check your work
- Relax