

# Indefinite Loops

Algorithm to Code

# Using While Loops

- Build experience: indefinite/while loops
  - How many times to loop? Not sure.
  - When to stop looping? Very sure!
- Test a condition repeatedly
  - When time-to-stop, exit loop

```
while (true) {  
    if (time-to-stop?) {  
        break;  
    }  
}
```



# Simple Prime Testing

- Large prime numbers help make the Internet secure: https, secure transactions
  - 23 is prime, only divisors are 1 and 23
  - 27 is not prime, 3 and 9 divide it



# Simple Prime Testing

- Large prime numbers help make the Internet secure: https, secure transactions
  - 23 is prime, only divisors are 1 and 23
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- Finding large primes requires very sophisticated mathematics
  - People have figured this out! Java has BigInteger math libraries for this
- A simple method/loop: small numbers



# Prime Testing Code

- Find a divisor? Not prime!

```
public boolean isPrime(int num){  
    int div = 2;  
    if (num == 2){  
        return true;  
    }  
    while (true) {  
        if (num % div == 0) {  
            return false;  
        }  
        if (div > Math.sqrt(num)) {  
            break;  
        }  
        div = div + 1;  
    }  
    return true;  
}
```

# Prime Testing Code

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# Prime Testing Code

- Find a divisor? Not prime!
  - Boolean false
- Tried all divisors?
  - Boolean true
- Ensure loop breaks
  - **div** increases

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# Filtering Words or Phrases

- Find all words in the dictionary that ...
  - Have all five vowels in them? a,e,i,o,u
  - Are between 12 and 18 letters long



# Filtering Words or Phrases

- Find all words in the dictionary that ...
  - Have all five vowels in them? a,e,i,o,u
  - Are between 12 and 18 letters long
- Find all countries that ...
  - Export coffee from the Northern Hemisphere
  - Border Afghanistan
- Check all?
  - When to stop ...





# Loops and Break

- We want to find “wisdom” in Confucius
  - Download the copyright free .txt file
  - Loop and find one/all occurrences

```
public void findWisdom(){  
    FileResource fr = new FileResource("/data/confucius.txt");  
    for(String w : fr.lines()){  
        if (w.contains("wisdom")) {  
            System.out.println(w);  
            break;  
        }  
    }  
}
```

# Loops and Break

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empire was only held together by the strength and wisdom of the Duke

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