Ex.
ArrayExample.java

Ex. Echo.java

Ex. ArrayFunction.java

\[
\begin{array}{c}
\text{A} \\
\text{B} \\
\text{C}
\end{array}
\quad \begin{array}{cccc}
D & 1 & 2 & \ldots \\
1 & 2 & 3 & \ldots & 19 \\
0 & 1 & 2 & \ldots & 19 \\
1 & 2 & 3 & \ldots & 20 \\
0 & 1 & 2 & \ldots & 20
\end{array}
\]

Note: \( a, a+1, a+2, \ldots, a+n-1 \) 
\[ a \text{ set of index} \]
Poly(s):

\[ 2 + 3x^1 + 2x^2 - 4x^3 \]

<table>
<thead>
<tr>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>2</td>
</tr>
</tbody>
</table>

\[ \text{diff}(s) = 3 + 4x - 12x^2 \]

<table>
<thead>
<tr>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

\[ D[i] = (i+1) \times C[i+1] \quad (0 \leq i \leq 2) \]
find Root()\

\[ a \]
\[ b \]
\[ m = \frac{a+b}{2} \]

Stop when
\[ b - a < \text{tolerance} \]

Input: \( a, b, \text{tolerance}, C \)

Output: value at root to within tolerance.
FileI0.java

introduce exception

Recall every Program has a

data stream attached

data from file "junk"

create a Scanner
to read this stream.
In Java there are two kinds of Exceptions:

- **unchecked Exceptions**
  - detects in programs that are programs fault, foreseeable.
  - subclasses of `Runtime Exception`
  - methods are not obliged to handle these.

Ex. `ArrayIndexOutOfBoundsException`
- checked Exceptions
  - not programmer fault, unforeseeable.
  - subclasses of Exception
    - not of RuntimeException
  - methods are required by Java to handle these.

  Ex: FileNotFoudException

how to handle exceptions?

Two ways of that a method handles an exception
(1) throw exception to the calling function, using a 'throws' clause in function header.

(2) 'catch' exception locally and handle problem.

```java
try {
    // stuff that might throw an exception
    try {
        // code that handles problem
    }
} catch (NameOfException e) {
    // code that handles problem
}
```