Debugging:
Manual Walkthrough

Step-by-Step Example

Manual Walkthrough or Tracing

- usually done with paper and pencil

- record and update variable values while working through the lines of code

- may also track conditional statements

  - if/else statements

  - loop enter & exit conditions

- can be done without running the program on a computer (e.g., written tests)

- does not depend on specific code language

Example Program - Pseudocode

```
var age : int
put "Your age? "
get age
loop
    exit when (age >=18)
    put "Next age: "
    get age
end loop
put "Can vote."
```

Example Program - Pseudocode

```
var age : int
put "Your age? "
get age
loop
    exit when (age >=18)
    put "Next age: "
    get age
end loop
put "Can vote."
```

- simple program with
  - one variable
  - one condition to exit loop
- create a table to track these two key elements
- step through code, noting any changes to key elements

Example Program - Pseudocode

```
var age : int
put "Your age? "
get age
loop
    exit when (age >=18)
    put "Next age: "
    get age
end loop
put "Can vote."
```

Variables & Conditions	
age	age>=18

Example Program - Pseudocode

```
var age : int
put "Your age? "
get age
loop
    exit when (age >=18)
    put "Next age: "
    get age
end loop
put "Can vote."
```

- first lines do not affect key elements

Variables & Conditions	
age	age>=18

Example Program - Pseudocode

```
var age : int
put "Your age? "
get age
loop
    exit when (age >=18)
    put "Next age: "
    get age
end loop
put "Can vote."
```

- user input

- could be anything

Variables & Conditions	
age	age>=18
15	

Example Program - Pseudocode

```
var age : int
put "Your age? "
get age
loop
    exit when (age >=18)
    put "Next age: "
    get age
end loop
put "Can vote."
```

- check exit condition on loop

Variables & Conditions	
age	age>=18
15	
	false

Example Program - Pseudocode

```
var age : int
put "Your age? "
get age
loop
    exit when (age >=18)
    put "Next age: "
    get age
end loop
put "Can vote."
```

- user input (from within loop this time)

Variables & Conditions	
age	age>=18
15	
	false
17	

Example Program - Pseudocode

```
var age : int
put "Your age? "
get age
loop
    exit when (age >=18)
    put "Next age: "
    get age
end loop
put "Can vote."
```

- check loop exit for second time

Variables & Conditions	
age	age>=18
15	
	false
17	
	false

Example Program - Pseudocode

```
var age : int
put "Your age? "
get age
loop
    exit when (age >=18)
    put "Next age: "
    get age
end loop
put "Can vote."
```

• user input

Variables & Conditions	
age	age>=18
15	
	false
17	
	false
21	

Example Program - Pseudocode

```
var age : int
put "Your age? "
get age
loop
    exit when (age >=18)
    put "Next age: "
    get age
end loop
put "Can vote."
```

- check loop exit for third time

Variables & Conditions	
age	age>=18
15	
	false
17	
	false
21	
	true

Example Program - Pseudocode

```
var age : int
put "Your age? "
get age
loop
    exit when (age >=18)
    put "Next age: "
    get age
end loop
put "Can vote."
```

- exit condition was true

- loop exits

Variables & Conditions	
age	age>=18
15	
	false
17	
	false
21	
	true
end of program	