Psuedocode


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Planning

- So far the programs we've been creating have been relatively simple.

- As we start to solve more complex problems we will need to take a bit more time to plan out the solutions

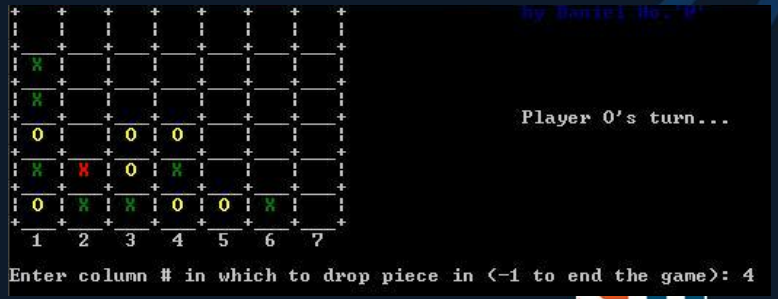
Representing programs without code

- We need a way to represent the solutions to problems without just writing out the code.
- Doing this helps you find issues in your solution before you begin to program.
- And it is a good way to communicate the solution to non-programmers, other team mates and other programmers.

Representing Programs

- Structured English

1. Ask player for column
2. Read column
3. If column full, go back to step 1
4. Check height of highest marker in selected column.
5. Place new marker above current highest.
6. Check for a winner
7. If no winner, repeat steps 1 – 6 for other player.



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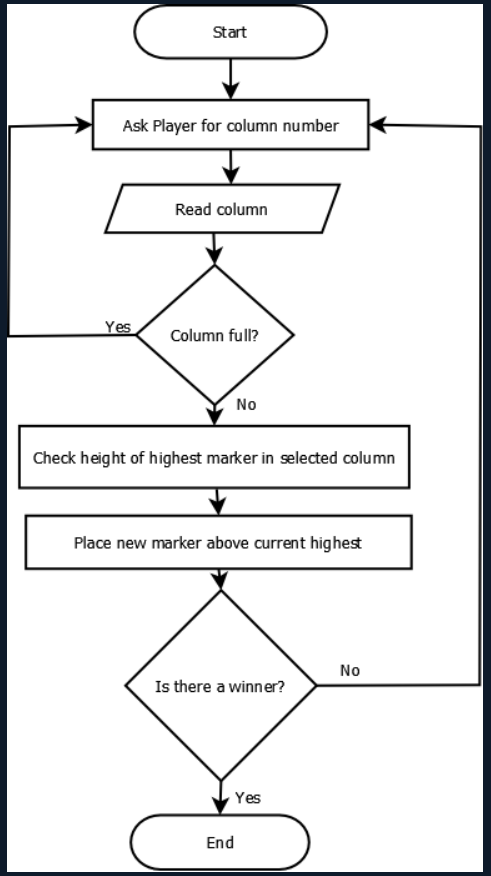
Representing Algorithms

- Flowcharts



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Pseudocode

- Half way between structured English and code
- Not specific to any programming language
- Similar to writing code, but simpler and informal
- No need to worry about syntax, focus on logic

Pseudocode Example

```
SET won to false
WHILE not won
        SET columnNumber to 0
        WHILE columnNumber is full
                PRINT "Enter column # in which to drop piece"
                READ columnNumber
        ENDWHILE
        Find highest existing marker
        Place marker in columnNumber
        WRITE board to screen
        Check for winner
        IF there is a winner THEN
                SET won to true
        ENDIF
ENDWHILE
```

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Pseudocode keywords

- Though there is no official syntax or standard, there are some common words that are used:

- Input: READ, OBTAIN, GET
- Output: PRINT, DISPLAY, SHOW
- Initialise: SET, INIT
- Add one: INCREMENT
- Mathematical and logical operators: ADD, SUBTRACT, AND, OR, NOT, etc.

Conditional statements

- IF condition THEN
  sequence1
  ELSEIF otherCondition THEN
  sequence2
  ELSE
  sequence3
  ENDIF

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Loops

- WHILE condition
  sequence
  ENDWHILE

- FOR iteration bounds
  sequence
  ENDFOR

- REPEAT
  sequence
  UNTIL condition

Variables

- It isn’t necessary to specify the data type of a variable in pseudocode
- And you don’t need to define every single variable you would use in the code

Example

```
BEGIN FindLargest
Get list of integers
Set largestNum to 0
WHILE more integers
        get currentInteger
        IF currentInteger > largestNum THEN
                set largestNum to currentInteger
        ENDIF
ENDWHILE
Output largestNum
END FindLargest
```

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Code comments

- Most programming languages have the ability to leave comments – these are pieces of text that are not compiled to make up the executable.
- Comments increase the readability of the code
- Comments should be placed on any piece of code that is remotely complex or unclear.
- Comments are really useful when you're working with other programmers, or even if you're reviewing some old code of your own.

Code comments

- A single line comment is preceded with //
- For a large comment block, use /* */

```
// compute the sum of squares of two input numbers
std::cout << a*a + b*b;
```

```
/*********************************************
 ** File name: Circle.cpp                    **
 ** Purpose: Draws a circle to the screen    **
 ** Author: Rebecca Fernandez                **
 ** Modified: January 2015                   **
 *********************************************/
```

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File header block comments

- As you begin to read more and more code you will come across blocks of comments at the beginning of a file.
- These are often called header blocks or header comments. They are often used to list copyright and author information, and a brief description of what the code does.
- They are not necessary, but can be useful when sharing your code online.

Code comments

- The great thing about pseudocode is that it can easily turn into code comments

```
//BEGIN FindLargest
int FindLargest()
{
		//Get list of integers
		int numbers[10];
		std::cout << "Enter 10 whole numbers, separated by spaces: ";
		for (int i = 0; i < 10; ++i)
		{
			std::cin >> numbers[i];
		}
		//Set largestNum to 0
		int largestNum = 0;
		//WHILE more integers
		//get currentInteger
		for (int i = 0; i < 10; ++i)
		{
			//IF currentInteger > largestNum THEN
			if (numbers[i] > largestNum)
			{
				//set largestNum to currentInteger
				largestNum = numbers[i];
				//ENDIF
			}
			//ENDWHILE
		}
		//Output largestNum
		std::cout << largestNum << std::endl;
		//END FindLargest
}
```

Good code comments

- Ask yourself what is most confusing about the program and how can you best explain it to a non-programmer.
- Write the comments while you're coding since everything will still be fresh in your mind
- When you stop coding for the night make sure to leave yourself some detailed comments about what you were up to before you went to bed. You'd be amazed how much you can forget in a short period of time.

Summary

- Pseudocode is an important tool in the programming process
- From now on in lectures we will be demonstrating concepts in Pseudocode, so make sure you become familiar with it.
- Comments are also an important tool – and also necessary in the code for your assignments.

References

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