Cheatography

Algorithm IGCSE Cheat Sheet

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Data Types & Structures

INTEGER (whole numbers)	1, 2, 45, 231, -2, -213
REAL (decimal numbers)	1.23, 938.232312, -23.233
STRING (words or sentences)	“Hello World”, “123 bipbop”
CHARACTER (one character or alphabet)	‘A’, ‘b’, ‘Y’, ‘o’, ‘1’, ‘8’, ‘d
BOOLEAN (true or false)	TRUE, FALSE, TRUE, TRUE
ARRAY (many words or numbers)	[“Hi”, “me not smart”, 174, 23, “12 bipbop”, -1234]

Rules:
INT and **REAL** are typed as numbers only
STR must be in double quotation marks i.e. "Hello"
CHAR must be in single quotation marks i.e. 'H'
BOOL must be in either TRUE or FALSE
Array can be assigned to variables and must be inside braces. i.e. names = ["Andy", "Cindy", "Bobby"]

Operators (Arithmetic)

Operators	Examples	It Will Give
+ (plus)	5 + 5	10
- (minus)	8 - 3	5
* (multiply)	6*2	12
/ (divide)	8/4	2
^ (power)	2^3	8

Operators (Arithmetic) (cont)

DIV (dividend)	12 DIV 5	2
MOD (modulo)	10 MOD 5	0

Note: MOD will give you the remainder of the number

Operators (Assignment)

Operators	Examples
> (greater than sign)	100 > 5
< (lesser than sign)	60 < 150
<> (not equal sign)	7 <> 25
= (equal sign)	12 = 12

The >= operator means greater than or equal to
The <= operator means lesser than or equal to

Operators (boolean)

Operators	Examples
AND	TRUE AND TRUE = TRUE
OR	TRUE OR FALSE = TRUE
NOT	NOT FALSE = TRUE

Boolean Operators are also called Logical Operators. AND means conjunction, OR means disjunction, NOT means negation

The FOR Loop

```
FOR LOOP
Use a FOR loop when you know how many times it'll run

The syntax:
FOR variable = something to something
    do something
```

The FOR Loop (cont)

```
NEXT
The example:
FOR number = 1 to 3:
    PRINT number
NEXT
```

Running this on raptor/ other engines will output:
1
2
3

REPEAT Loop

```
THE REPEAT LOOP
Use a REPEAT loop when you know how many times it'll run
The syntax:
REPEAT
    do something
UNTIL something
The example:
number = 1
REPEAT
    PRINT number
    number = number + 1
UNTIL number = 3
```

Running this on raptor/ other engines will output:
1
2
3

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WHILE Loop

THE WHILE LOOP

Use WHILE loop when you don't know how many times it'll run

The syntax:

```
WHILE something DO
    do something
ENDWHILE
```

The example:

```
number = 1
WHILE number < 3 DO
    PRINT number
    number = number + 1
ENDWHILE
```

If you put this in raptor/other engines they will output:
1
2
3

Writing An Algorithm Example

You are tasked to find out what is the 16th number in the Fibonacci sequence, how do you do it?

```
fib_0 = 0
fib_1 = 1
find_num = 16
FOR i = 0 to find_num
—— fib_2 = fib_0 + fib_1
—— fib_0 = fib_1
—— fib_1 = fib_2
PRINT "The 16th number is: ",
fib_2
```

Answer of Output = 987

Fibonacci Sequence is a sequence where each number is the sum of the two preceding ones. For example: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34

Conditional Statements (IF)

Syntax:

```
IF condition
    THEN do something
    ELSE do something else
ENDIF
```

Example:

```
khaisar_height = 100
IF khaisar_height < 120
    THEN PRINT “Please enter the
kids room”
    ELSE PRINT “Please enter the
teenagers room”
ENDIF
```

Description:
Conditional Statements are IF statements. The IF statement check if a condition is TRUE or FALSE.

In the English language, we say:
If you come to the party, I'll buy one pizza.

In the computer language. We say it like this:
IF answer = “YES” THEN pizza = 1 ENDIF
As simple as that!

Extended IF statement

```
IF grade > 90 AND behavior > 80
    THEN PRINT "Excellent"
ELIF grade > 80 AND behavior >
70
    THEN PRINT "Well Done"
ELIF grade > 70 AND behavior >
60
    THEN PRINT "Good Job"
ELSE PRINT "Improvement is
needed!"
ENDIF
```

IF and ELIF (else if) are used for a choice between several different values. You can either use ELIF or CASE, it is up to you.

CASE OF

Syntax:

```
CASE ... OF
    something
    OTHERWISE something
ENDCASE
```

Example:

```
CASE grade OF
    'A' : PRINT "Excellent"
    'B' : PRINT "Well Done"
    'C' : PRINT "Good Job"
    'D' : PRINT "Do Better"
    'F' : PRINT "Find Another
Answer"
    OTHERWISE PRINT "Improve
next time"
ENDCASE
```

CASE is another conditional statement that is use for several different values

Functions

The syntax:

```
FUNCTION do_something(Param-
eters)
    statements
    RETURN something
END PROCEDURE
```

Example:

```
FUNCTION count_pizza_slices(nu-
mber_of_pizza)
    number_of_pizza_slices = 0
    number_of_pizza_slices =
number_of_pizza * 8
    RETURN number_of_pizza-
_slices
END PROCEDURE
```

Running this on a engine/idle:
count_pizza_slices(5)

Output:
40