

Structure

```
void setup()
void loop()
```

Control Structures

```
if (x<5) {}
for (int i = 0; i < 255 i++ ) {}
while ((x < 6 ) {}
```

Further Syntax

```
//          Single line comment
/* .. */    Multi line comment
#define ANSWER 42
#include <myLib.h>
```

General Operators

=	assignment
+, -	addition, substraction
*, /	multiplication, division
%	modulo
==	equal to
!=	not equal to
<	less than
<=	less than or equal to

Pointer Access

&	reference operator
*	dereference operator

Bitwise Operators

&	bitwise AND
	bitwise OR
^	bitwise XOR
~	bitwise NOT

Compound Operators

++	Increment
--	Decrement
+=	Compound addition
&=	Compound bitwise AND

Constants

HIGH, LOW
INPUT, OUTPUT
true, false
53 : Decimal
B11010101 : Binary
0x5BA4 : Hexadecimal

Data Types

void	
boolean	0, 1, false, true
char	e.g. 'a' -128 → 127
unsigned char	0 → 255
int	-32.768 → 32.767
unsigned int	0 → 65535
long	-2.147.483.648 → 2.147.483.647
float	-3,4028235E+38 → 3.402835E+38
sizeof (myint)	returns 2 bytes

Arrays

```
int myInts[6];
int myPins[]=2,4,8,5,6;
int myVals[6]=2,-4,9,3,5;
```

Strings

```
char S1[15];
char S2[8]='A','r','d','u','i','n','o';
char S3[8]='A','r','d','u','i','n','o','\0';
char S4[]="Arduino";
char S5[8] = "Arduino";
char S6[15] = "Arduino";
```

Conversion

char()	int()	long()
byte()	word()	float()

Qualifiers

static	Persist between calls
volatile	Use RAM (nice for ISR)
const	Mark read-only
PROGMEM	Use flash memory

Interrupts

```
attachInterrupt(interrupt, function, type)
detachInterrupt(interrupt)
boolean(interrupt)
interrupts()
noInterrupts()
```

Advanced I/O

```
tone(pin, freqhz)
tone(pin, freqhz, duration_ms)
noTone(pin)
shiftOut (dataPin, clockPin, how, value)
unsigned long pulseIn(pin, [HIGH,LOW])
```

Time

unsigned long millis()	50 days overflow
unsigned long micros()	70 min overflow
delay(ms)	
delayMicroseconds(us)	

Math

min(x,y)	max(x,y)	abs(x)
sin(rad)	cos(rad)	tan(rad)
pow(base, exponent)		
map(val, fromL, fromH, toL, toH)		
constrain(val, fromL, toH)		

Pseudo Random Numbers

```
randomSeed(seed)
long random(max)
long random(min, max)
```

ATmega328 Pinout

