

# Opcodes

**Notation** : opcode

**Description** : The EVM has several opcodes which function as an assembly language:

<sup>12</sup> Memory Register	Opcode	Gas	Ins	Outs
0x00	STOP	0	0	0
0x01	ADD	3	2	1
0x02	MUL	5	2	1
0x03	SUB	3	2	1
0x04	DIV	5	2	1
0x05	SDIV	5	2	1
0x06	MOD	5	2	1
0x07	SMOD	5	2	1
0x08	ADDMOD	8	3	1
0x09	MULMOD	8	3	1
0x0a	EXP	10	2	1
0x0b	SIGNEXTEND	5	2	1
0x10	LT	3	2	1
0x11	GT	3	2	1
0x12	SLT	3	2	1
0x13	SGT	3	2	1
0x14	EQ	3	2	1
0x15	ISZERO	3	1	1
0x16	AND	3	2	1
0x17	OR	3	2	1
0x18	XOR	3	2	1
0x19	NOT	3	1	1
0x1a	BYTE	3	2	1
0x20	SHA3	30	2	1
0x30	ADDRESS	2	0	1
0x31	BALANCE	400	1	1
0x32	ORIGIN	2	0	1
0x33	CALLER	2	0	1

0x34	CALLVALUE	2	0	1
0x35	CALLDATALOAD	3	1	1
0x36	CALLDATASIZE	2	0	1
0x37	CALLDATACOPY	3	3	0
0x38	CODESIZE	2	0	1
0x39	CODECOPY	3	3	0
0x3a	GASPRICE	2	0	1
0x3b	EXTCODESIZE	700	1	1
0x3c	EXTCODECOPY	700	4	0
0x3d	RETURNDATASIZE	2	0	1
0x3e	RETURNDATACOPY	3	3	0
0x40	BLOCKHASH	20	1	1
0x41	COINBASE	2	0	1
0x42	TIMESTAMP	2	0	1
0x43	NUMBER	2	0	1
0x44	DIFFICULTY	2	0	1
0x45	GASLIMIT	2	0	1
0x50	POP	2	1	0
0x51	MLOAD	3	1	1
0x52	MSTORE	3	2	0
0x53	MSTORE8	3	2	0
0x54	SLOAD	200	1	1
0x55	SSTORE	0	2	0
0x56	JUMP	8	1	0
0x57	JUMPI	10	2	0
0x58	PC	2	0	1
0x59	MSIZE	2	0	1
0x5a	GAS	2	0	1
0x5b	JUMPDEST	1	0	0
0xa0	LOG0	375	2	0
0xa1	LOG1	750	3	0
0xa2	LOG2	1125	4	0
0xa3	LOG3	1500	5	0
0xa4	LOG4	1875	6	0
0xf0	CREATE	32000	3	1
0xf1	CALL	700	7	1
0xf2	CALLCODE	700	7	1
0xf3	RETURN	0	2	0
0xf4	DELEGATECALL	700	6	1
0xf5	CALLBLACKBOX	40	7	1
0xfa	STATICCALL	40	6	1
0xfd	REVERT	0	2	0
0xff	SUICIDE	5000	1	1

## References

- [1] V. Buterin, *Pyethereum source*, <https://www.github.com/ethereum/pyethereum/ethereum/opcodes.py>, 2017.
- [2] D. G. Wood, *Ethereum: A secure decentralised generalised transaction ledger*, <https://github.com/ethereum/yellowpaper>, 2017.