DOCUMENTATION

1. **MACHINE ARCHITECTURE**

16 Registers - 0 to F

5 flags: zero, carry, sign, parity, overflow

Address space 16 bit: 0000H to FFFFH

Data length - 16 bit word addressable

Offset - 12 bit

Immediate value - 16 bit

Base Register (F) contains Base address of that module which will be used while linking

3 addressing modes:

0 - register - register

1 - Immediate

2 - Base + offset

1. **INSTRUCTIONS SUPPORTED**

Our assembler supports 25 instructions which are as follows:

|  |  |  |
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| **INSTRUCTION** | **HEX**  **EQUIVALENT** | **DESCRIPTION** |
| ADDRR | 0000 | Add register to register |
| ADCRR | 1000 | Add register to register with carry |
| ADDIV | 0100 | Add immediate value to register |
| ADCIV | 1100 | Add immediate value to register with carry |
| ADDBO | 0200 | Add data[address] to register |
| ADCBO | 1200 | Add data[address] to register with carry |
| SUBRR | 2000 | Subtract register from register |
| SBBRR | 3000 | Subtract register from register with borrow |
| SUBIV | 2100 | Subtract immediate value from register |
| SBBIV | 3100 | Subtract immediate value from register with borrow |
| SUBBO | 2200 | Subtract data[address] from register |
| SBBBO | 3200 | Subtract data[address] from register with borrow |
| MOVRR | 4000 | Move register to register |
| MOVIV | 4100 | Move immediate data to register |
| MOVST | 4201 | Move data from register to memory (Store) |
| MOVLD | 4200 | Move data from memory to register (Load) |
| JMPBO | 5200 | Jump unconditional |
| JZRBO | 6200 | Jump on zero |
| JNZBO | 7200 | Jump on not zero |
| JCRBO | 8200 | Jump on carry |
| JNCBO | 9200 | Jump on not carry |
| JPOBO | A200 | Jump on positive |
| JNEBO | B200 | Jump on negative |
| JEPBO | C200 | Jump on even parity |
| JOPBO | D200 | Jump on odd parity |

1. **Data structures used:**

* Machine Operation-code Table
* Pseudo Operation-code Table
* Symbol Table
* Literal Table
* Location Counter