# OPERATING SYSTEM LABORATORY WORK

## 1st PRACTICUM



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# INFORMATION TECHNOLOGY

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# 2019

1. The American Standard Code for Information Exchange or the American Standard Code for Information Interchange (ASCII) is an international standard in letter and symbol codes such as Hex and Unicode but ASCII is more universal. It is always used by computers and other communication tools to show texts.

| Characters | Unicode Value (hexadecimal) | ANSI ASCII Value (decimal) | Information |
|---|---|---|---|
| NUL | 0000 | 0 | Null (invisible) |
| SOH | 0001 | 1 | Start of heading (invisible) |
| STX | 0002 | 2 | Start of text (invisible) |
| ETX | 0003 | 3 | End of text (invisible) |
| EOT | 0004 | 4 | End of transmission (invisible) |
| ENQ | 0005 | 5 | Enquiry (invisible) |
| ACK | 0006 | 6 | Acknowledge (invisible) |
| BEL | 0007 | 7 | Bell (invisible) |
| BS | 0008 | 8 | Delete one character behind the cursor (Backspace) |
| HT | 0009 | 9 | Horizontal tabulation |
| LF | 000A | 10 | Line changes (Line feed) |
| VT | 000B | 11 | Vertical tabulation |
| FF | 000C | 12 | Line changes (Form feed) |
| CR | 000D | 13 | Line changes (carriage return) |
| SO | 000E | 14 | Shift out (invisible) |
| SI | 000F | 15 | Shift in (invisible) |
| DLE | 0010 | 16 | Data link escape (invisible) |
| DC1 | 0011 | 17 | Device control 1 (invisible) |
| DC2 | 0012 | 18 | Device control 2 (invisible) |
| DC3 | 0013 | 19 | Device control 3 (invisible) |
| DC4 | 0014 | 20 | Device control 4 (invisible) |
| NAK | 0015 | 21 | Negative acknowledge (invisible) |
| SYN | 0016 | 22 | Synchronous idle (invisible) |
| ETB | 0017 | 23 | End of transmission block (invisible) |
| CAN | 0018 | 24 | Cancel (invisible) |
| EM | 0019 | 25 | End of medium (invisible) |
| SUB | 001A | 26 | Substitute (invisible) |
| ESC | 001B | 27 | Escape (invisible) |
| FS | 001C | 28 | File separator |
| GS | 001D | 29 | Group separator |
| RS | 001E | 30 | Record separator |
| US | 001F | 31 | Unit separator |
| SP | 0020 | 32 | Space |
| ! | 0021 | 33 | Exclamation mark |
| " | 0022 | 34 | Double quotes |
| # | 0023 | 35 | Hash mark |
| $ | 0024 | 36 | Dollar sign |

| | | | |
|---|---|---|---|
| % | 0025 | 37 | Percent sign |
| & | 0026 | 38 | The ampersand character (&) |
| ' | 0027 | 39 | Apostrophe Character |
| ( | 0028 | 40 | Open parenthesis |
| ) | 0029 | 41 | Closed parenthesis |
| * | 002A | 42 | Asterisk character (star) |
| + | 002B | 43 | Plus sign |
| , | 002C | 44 | Comma character |
| − | 002D | 45 | Hyphen character (strip) |
| . | 002E | 46 | Dot |
| / | 002F | 47 | Slash |
| 0 | 0030 | 48 | Zero number |
| 1 | 0031 | 49 | Number one |
| 2 | 0032 | 50 | Number two |
| 3 | 0033 | 51 | Number three |
| 4 | 0034 | 52 | Number four |
| 5 | 0035 | 53 | Number five |
| 6 | 0036 | 54 | Number six |
| 7 | 0037 | 55 | Number seven |
| 8 | 0038 | 56 | Number eight |
| 9 | 0039 | 57 | Number nine |
| : | 003A | 58 | Colon |
| ; | 003B | 59 | Semicolon |
| < | 003C | 60 | Smaller sign |
| = | 003D | 61 | Sign equal to |
| > | 003E | 62 | Bigger sign |
| ? | 003F | 63 | Question mark |
| @ | 0040 | 64 | A snail (@) |
| A | 0041 | 65 | Latin capital letter A |
| B | 0042 | 66 | Latin capital letter B |
| C | 0043 | 67 | Latin capital letter C |
| D | 0044 | 68 | Latin capital letter D |
| E | 0045 | 69 | Latin capital letter E |
| F | 0046 | 70 | Latin capital letter F |
| G | 0047 | 71 | Latin capital letter G |
| H | 0048 | 72 | Latin capital letter H |
| I | 0049 | 73 | Latin capital letter I |
| J | 004A | 74 | Latin capital letter J |
| K | 004B | 75 | Latin capital letter K |
| L | 004C | 76 | Latin capital letter L |
| M | 004D | 77 | Latin capital letter M |
| N | 004E | 78 | Latin capital letter N |
| O | 004F | 79 | Latin capital letter O |
| P | 0050 | 80 | Latin capital letter P |
| Q | 0051 | 81 | Latin capital letter Q |
| R | 0052 | 82 | Latin capital letter R |
| S | 0053 | 83 | Latin capital letter S |

| | | | |
|---|---|---|---|
| T | 0054 | 84 | Latin capital letter T |
| U | 0055 | 85 | Latin capital letter U |
| V | 0056 | 86 | Latin capital letter V |
| W | 0057 | 87 | Latin capital letter W |
| X | 0058 | 88 | Latin capital letter X |
| Y | 0059 | 89 | Latin capital letter Y |
| Z | 005A | 90 | Latin capital letter Z |
| [ | 005B | 91 | Left bracket |
| \ | 005C | 92 | Backslash |
| ] | 005D | 93 | Right brackets |
| ^ | 005E | 94 | Chancellor |
| _ | 005F | 95 | Underscore |
| ` | 0060 | 96 | Quotation mark one |
| a | 0061 | 97 | Latin letters a are small |
| b | 0062 | 98 | Latin letters b are small |
| c | 0063 | 99 | Latin letters c are small |
| d | 0064 | 100 | Latin letters d are small |
| e | 0065 | 101 | Latin letters e are small |
| f | 0066 | 102 | Latin letters f are small |
| g | 0067 | 103 | Latin letters g are small |
| h | 0068 | 104 | Latin letters h are small |
| i | 0069 | 105 | Latin letters i are small |
| j | 006A | 106 | Latin letters j are small |
| k | 006B | 107 | Latin letters k are small |
| l | 006C | 108 | Latin letters l are small |
| m | 006D | 109 | Latin letters m are small |
| n | 006E | 110 | Latin letters n are small |
| o | 006F | 111 | Latin letters o are small |
| p | 0070 | 112 | Latin letters p are small |
| q | 0071 | 113 | Latin letters q are small |
| r | 0072 | 114 | Latin letters r are small |
| s | 0073 | 115 | Latin letters s are small |
| t | 0074 | 116 | Latin letters t are small |
| u | 0075 | 117 | Latin letters u are small |
| v | 0076 | 118 | Latin letters v are small |
| w | 0077 | 119 | Latin letters w are small |
| x | 0078 | 120 | Latin letters x are small |
| y | 0079 | 121 | Latin letters y are small |
| z | 007A | 122 | Latin letters z are small |
| { | 007B | 123 | The curly braces are open |
| ¦ | 007C | 124 | Vertical line (pipe) |
| } | 007D | 125 | Curly braces closed |
| ~ | 007E | 126 | Tilde |
| DEL | 007F | 127 | Delete |
| | 0080 | 128 | Reserved |
| | 0081 | 129 | Reserved |
| | 0082 | 130 | Reserved |

| | 0083 | 131 | Reserved |
|---|---|---|---|
| IND | 0084 | 132 | Index |
| NEL | 0085 | 133 | Next line |
| SSA | 0086 | 134 | Start of selected area |
| ESA | 0087 | 135 | End of selected area |
| | 0088 | 136 | Character tabulation set |
| | 0089 | 137 | Character tabulation with justification |
| | 008A | 138 | Line tabulation set |
| PLD | 008B | 139 | Partial line down |
| PLU | 008C | 140 | Partial line up |
| | 008D | 141 | Reverse line feed |
| SS2 | 008E | 142 | Single shift two |
| SS3 | 008F | 143 | Single shift three |
| DCS | 0090 | 144 | Device control string |
| PU1 | 0091 | 145 | Private use one |
| PU2 | 0092 | 146 | Private use two |
| STS | 0093 | 147 | Set transmit state |
| CCH | 0094 | 148 | Cancel character |
| MW | 0095 | 149 | Message waiting |
| | 0096 | 150 | Start of guarded area |
| | 0097 | 151 | End of guarded area |
| | 0098 | 152 | Start of string |
| | 0099 | 153 | Dicadangkan |
| | 009A | 154 | Single character introducer |
| CSI | 009B | 155 | Control sequence introducer |
| ST | 009C | 156 | String terminator |
| OSC | 009D | 157 | Operating system command |
| PM | 009E | 158 | Privacy message |
| APC | 009F | 158 | Application program command |
| | 00A0 | 160 | Spaces that are not word separators |
| ¡ | 00A1 | 161 | Reverse exclamation mark |
| ¢ | 00A2 | 162 | Cent |
| £ | 00A3 | 163 | Pounds Sterling |
| ¤ | 00A4 | 164 | Currency |
| ¥ | 00A5 | 165 | Yen Sign |
| ¦ | 00A6 | 166 | Broken bar |
| § | 00A7 | 167 | Section sign |
| ¨ | 00A8 | 168 | Diaeresis |
| © | 00A9 | 169 | Copyright |
| ª | 00AA | 170 | Feminine ordinal indicator |
| « | 00AB | 171 | Left-pointing double angle quotation mark |
| ¬ | 00AC | 172 | Not sign |
| | 00AD | 173 | Hyphen |
| ® | 00AE | 174 | Tanda merk terdaftar |
| ¯ | 00AF | 175 | Macron |
| ° | 00B0 | 176 | Degree sign |
| ± | 00B1 | 177 | Plus-Minus |

| | 00B2 | 178 | Quadratic (square) |
|---|---|---|---|
| **2** | | | |
| **3** | 00B3 | 179 | Cubic marks (cube) |
| ´ | 00B4 | 180 | Acute accent |
| µ | 00B5 | 181 | Micro sign |
| ¶ | 00B6 | 182 | Pilcrow sign |
| · | 00B7 | 183 | Middle dot |

2. - **Assembly Directive** (the code that directs the assembler / compiler to organize the

program)

- **Instruksi** (the code that must be executed by the microcontroller CPU by performing

certain operations according to a list that is already embedded in the CPU)

## List of Assembly Directives

| Assembly Directive | Information |
|---|---|
| EQU | Defining constants |
| DB | Defining data with 1 byte unit size |
| DW | Defining data with 1 word unit size |
| DBIT | Defining data with 1 bit unit size |
| DS | Reserving data storage in RAM |
| ORG | Initialize the program's start address |
| END | End of program marker |
| CSEG | Placement marker in the code segment |
| XSEG | Placement markers in the external data segment |
| DSEG | Placement markers in the internal direct data segment |
| ISEG | Placement markers in the internal indirect data segment |
| BSEG | Placement marker in the segment data bit |
| CODE | The marker starts defining the program |
| XDATA | Defining external data |
| DATA | Defining internal direct data |

| | |
|---|---|
| IDATA | Defining internal indirect data |
| BIT | Defining data bits |
| #INCLUDE | Include other program files |

## List of Instructions

| Instructions | Keterangan Singkatan |
|---|---|
| ACALL | Absolute Call |
| ADD | Add |
| ADDC | Add with Carry |
| AJMP | Absolute Jump |
| ANL | AND Logic |
| CJNE | Compare and Jump if Not Equal |
| CLR | Clear |
| CPL | Complement |
| DA | Decimal Adjust |
| DEC | Decrement |
| DIV | Divide |
| DJNZ | Decrement and Jump if Not Zero |
| INC | Increment |
| JB | Jump if Bit Set |
| JBC | Jump if Bit Set and Clear Bit |
| JC | Jump if Carry Set |
| JMP | Jump to Address |
| JNB | Jump if Not Bit Set |
| JNC | Jump if Carry Not Set |
| JNZ | Jump if Accumulator Not Zero |
| JZ | Jump if Accumulator Zero |
| LCALL | Long Call |
| LJMP | Long Jump |
| MOV | Move from Memory |
| MOVC | Move from Code Memory |
| MOVX | Move from Extended Memory |

| | |
|---|---|
| MUL | Multiply |
| NOP | No Operation |
| ORL | OR Logic |
| POP | Pop Value From Stack |
| PUSH | Push Value Onto Stack |
| RET | Return From Subroutine |
| RETI | Return From Interrupt |
| RL | Rotate Left |
| RLC | Rotate Left through Carry |
| RR | Rotate Right |
| RRC | Rotate Right through Carry |
| SETB | Set Bit |
| SJMP | Short Jump |
| SUBB | Subtract With Borrow |
| SWAP | Swap Nibbles |
| XCH | Exchange Bytes |
| XCHD | Exchange Digits |
| XRL | Exclusive OR Logic |

For more details and details:

**a. MOV**

MOV command is a command to fill, move, update the contents of a register, variable or memory location. The MOV command writing procedure is:

MOV [operand A], [Operand B]

Example :

MOV AH, 02

Operand A is the AH Register

Operand B is number 02

What the computer does for the above command is input 02 into the AH register.

**b. INT (Interrupt)**

If you have learned BASIC, then surely you are familiar with the GOSUB command. The INT command also works the same way as GOSUB, only the subroutine that is called has been provided by computer memory which consists of 2 types, namely:

- Bios Interrupt (interput provided by BIOS (INT 0 - INT 1F))

- Dos Interrupt (Interrupt provided by DOS (INT 1F - above))

**c. Push**

Is a command to enter the contents of a register on the stack, with its typing: POP [16-bit operand]

**d. Pop**

A useful command for extracting the contents of a register / variable from the stack, with the following writing arrangements: POP [16-bit operand]

**e. RIP (Register IP)**

This command is used to tell the computer to start processing programs from a certain point.

**f. A (Assembler)**

The Assembler command is useful for writing Assembler programs.

-A100

0FD8: 100

**g. RCX (Register CX)**

This command is used to find out and update the contents of the CX register which is a long shelter for the currently active program.