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# Keyboard Interrupts

# Question 1:

# 1. A vertically printed string is scrolled horizontally, as long as ‘p’ is pressed on keyboard.

# Answer:

|  |
| --- |
| ORG 100h |
|  |
| .DATA |
|  |
| STR1    *DB*  'MAIZ NADEEM' |
| SIZE    *DW*  11 |
| KFLAG   *DB*  0 |
|  |
| .CODE |
|  |
| MAIN PROC |
|  |
|  |
|  |
| MOV BX, 0 |
| MOV ES, BX |
|  |
| CLI |
| MOV ES:[0x9\*4], OFFSET [KBISR] |
| MOV ES:[0x9\*4+2], CS |
| STI |
|  |
| MOV AH, 0 |
| MOV AL, 3 |
| INT 10h |
|  |
| MOV AX, 0xB800 |
| MOV ES, AX |
| MOV SI, (13-5-1)\*160 + (40-1)\*2 |
|  |
| MOV CX, SIZE |
| MOV AH, 0x07 |
| XOR BX, BX |
|  |
| NAMEPRINT:  MOV AL, [STR1 + BX] |
| MOV ES:SI, AX |
| ADD SI, 80\*2 |
| INC BX |
| LOOP NAMEPRINT |
|  |
|  |
| PROCCALL:   CMP KFLAG, 1 |
| JNE SKIP |
| CALL RIGHT |
|  |
| SKIP:   JMP PROCCALL |
|  |
|  |
| RET |
| MAIN ENDP |
|  |
|  |
| KBISR:  PUSH AX |
| IN  AL, 0x60 |
| CMP AL, 0x19 |
| JNE KNEXTCOMP |
| MOV KFLAG, 1 |
|  |
|  |
| KNEXTCOMP:  CMP AL, 0x99 |
| JNE KEXIT |
| MOV KFLAG, 0 |
|  |
| KEXIT:  MOV AL, 0x020 |
| OUT 0x20, AL |
| POP AX |
| IRET |
|  |
|  |
| RIGHT PROC |
|  |
| MOV CX, SIZE |
|  |
| ERASE:      SUB SI, 80\*2 |
| MOV ES:SI, 0X0720 |
| LOOP ERASE |
|  |
| MOV CX, SIZE |
| MOV BX, 0 |
| ADD SI, 2 |
| CMP SI, 1280 |
| JGE SHIFTLEFT |
|  |
| NAMEPRINT2: MOV AL, [STR1 + BX] |
| MOV ES:SI, AX |
| ADD SI, 80\*2 |
| INC BX |
| LOOP NAMEPRINT2 |
| RET |
|  |
| SHIFTLEFT:  MOV SI, (13-5-1)\*160 |
|  |
| NAMEPRINT3: MOV AL, [STR1 + BX] |
| MOV ES:SI, AX |
| INC BX |
| ADD SI, 80\*2 |
| LOOP NAMEPRINT3 |
|  |
| RET |
| RIGHT ENDP |

# Question 2:

# 2. When shift key and ‘A’ key is pressed capital A is printed on screen.

# Answer:

|  |
| --- |
| ORG 100h |
|  |
| .DATA |
|  |
| SFLAG   *DB*  0 |
| AFLAG   *DB*  0 |
|  |
| .CODE |
|  |
| MAIN PROC |
|  |
| MOV BX, 0 |
| MOV ES, BX |
|  |
| CLI |
| MOV ES:[0x9\*4], OFFSET [KBISR] |
| MOV ES:[0x9\*4+2], CS |
| STI |
|  |
| MOV AH, 0 |
| MOV AL, 3 |
| INT 10h |
|  |
| PROCCALL:   JMP PROCCALL |
|  |
|  |
| RET |
| MAIN ENDP |
|  |
|  |
| KBISR:  PUSH AX |
| IN  AL, 0x60 |
| CMP AL, 0x2A |
| JNE CHECK\_RELEASE |
| MOV SFLAG,1 |
| JMP KEXIT |
|  |
| CHECK\_RELEASE:  CMP AL, 0xAA |
| JNE CHECK\_A |
| MOV SFLAG, 0 |
| JMP KEXIT |
|  |
| CHECK\_A:  CMP AL, 0x1E |
| JNE KEXIT |
| CMP SFLAG, 1 |
| JNE KEXIT |
| CALL APROC |
|  |
| KEXIT:  MOV AL, 0x020 |
| OUT 0x20, AL |
| POP AX |
| IRET |
|  |
|  |
| APROC PROC |
|  |
| MOV AX, 0xB800 |
| MOV ES, AX |
| MOV SI, 0 |
| MOV AH, 0x07 |
|  |
| NAMEPRINT:  MOV AL, 'A' |
| MOV ES:SI, AX |
| ADD SI, 2 |
|  |
| RET |
| APROC ENDP |