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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
```

```asm
            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
```

```asm
                    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:

```asm
ORG 100h

.DATA

    SFLAG   DB  0
    AFLAG   DB  0

.CODE

MAIN PROC

            MOV BX, 0
            MOV ES, BX
```

```asm
                    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
```

```asm
        NAMEPRINT:  MOV AL, 'A'
                    MOV ES:SI, AX
                    ADD SI, 2

RET
APROC ENDP
```