

Tugas Mata Kuliah
PRAKTEK MIKROPROSESOR DAN BAHASA RAKITAN

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TUGAS PRAKTIKUM 4
PENERAPAN STACK PADA MANIPULASI KARAKTER



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PROGRAM STUDI TEKNOLOGI INFORMASI 20
UNIVERSITAS DARMA PERSADA
BEKASI
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2. Output A1B1C1D1E1F1G1H1I1J1K1

Menggunakan CMP, JXX

```
DOS
BOX
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX
C:\>DEBUG .EXE
-A4000
073F:4000 MOV AH,2
073F:4002 MOV DL,41
073F:4004 INT 21
073F:4006 INC DL
073F:4008 CMP DL,4B
073F:400B PUSH DX
073F:400C MOV DL,31
073F:400E INT 21
073F:4010 POP DX
073F:4011 JNE 4004
073F:4013 MOV AX,4C00
073F:4016 INT 21
073F:4018
-G=100
A1B1C1D1E1F1G1H1I1J1
C:\>DEBUG
-A4008
073F:4008 CMP DL,4C
073F:400B
-G=100
A1B1C1D1E1F1G1H1I1J1K1
C:\>_
```

Listing program dengan U4000

```
C:\>DEBUG
-U4000
073F:4000 B402      MOV     AH,02
073F:4002 B241      MOV     DL,41
073F:4004 CD21      INT     21
073F:4006 FEC2      INC     DL
073F:4008 80FA4C    CMP     DL,4C
073F:400B 52        PUSH    DX
073F:400C B231      MOV     DL,31
073F:400E CD21      INT     21
073F:4010 5A        POP     DX
073F:4011 75F1      JNZ     4004
073F:4013 B8004C    MOV     AX,4C00
073F:4016 CD21      INT     21
073F:4018 0000      ADD     [BX+SI],AL
073F:401A 0000      ADD     [BX+SI],AL
073F:401C 0000      ADD     [BX+SI],AL
073F:401E 0000      ADD     [BX+SI],AL
```

Kode Program:

-A4000

MOV AH,2

MOV DL,41

INT 21

INC DL

CMP DL,4C

PUSH DX

MOV DL,31

INT 21

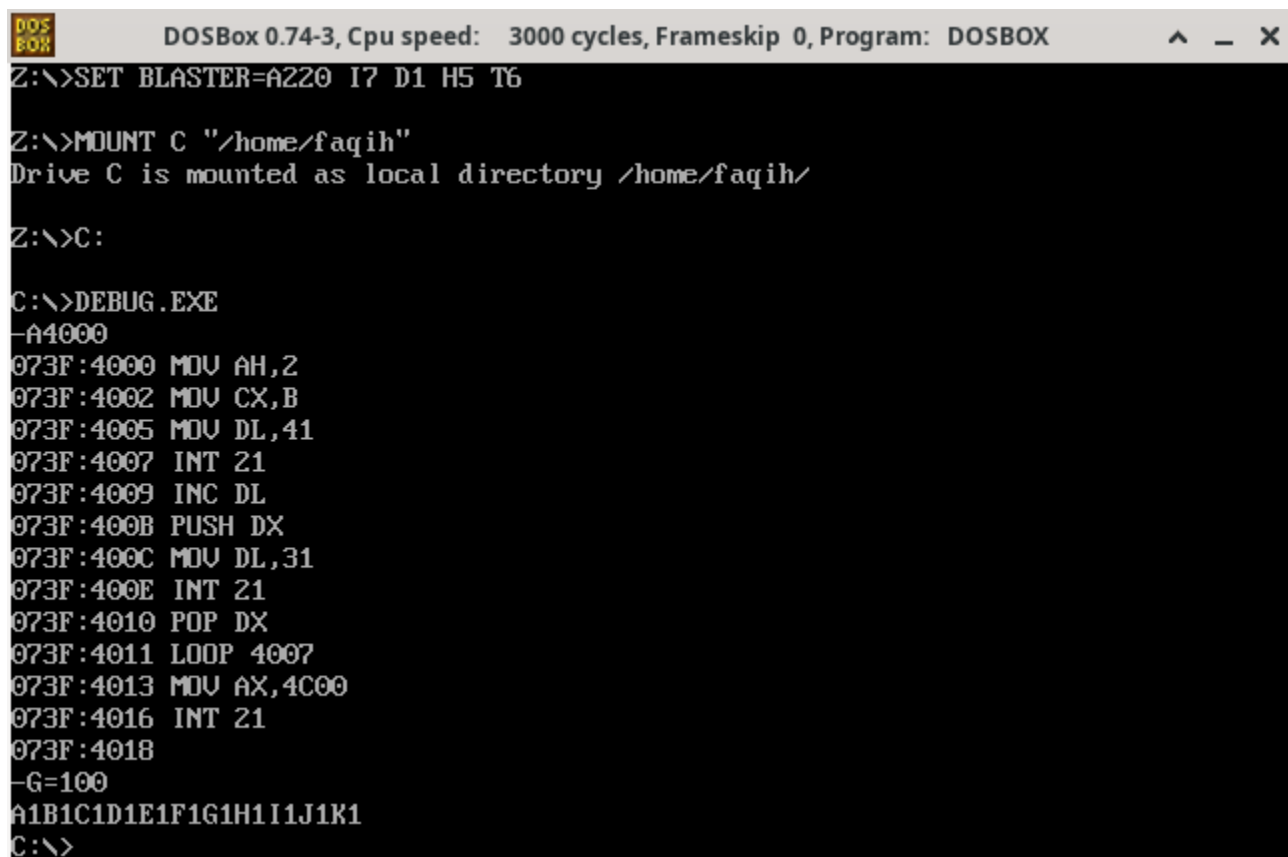
POP DX

JNE 4004

MOV AX,4C00

INT 21

Menggunakan Looping



```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX
Z:\>SET BLASTER=A220 I7 D1 H5 T6

Z:\>MOUNT C "/home/faqih"
Drive C is mounted as local directory /home/faqih/

Z:\>C:

C:\>DEBUG .EXE
-A4000
073F:4000 MOV AH,2
073F:4002 MOV CX,B
073F:4005 MOV DL,41
073F:4007 INT 21
073F:4009 INC DL
073F:400B PUSH DX
073F:400C MOV DL,31
073F:400E INT 21
073F:4010 POP DX
073F:4011 LOOP 4007
073F:4013 MOV AX,4C00
073F:4016 INT 21
073F:4018
-G=100
A1B1C1D1E1F1G1H1I1J1K1
C:\>
```

*Seharusnya G=4000 namun debug tetap berjalan walaupun kita memanggil G=100

Listing program dengan U4000

```
C:\>DEBUG
-U4000
073F:4000 B402      MOV     AH,02
073F:4002 B90B00    MOV     CX,000B
073F:4005 B241      MOV     DL,41
073F:4007 CD21      INT     21
073F:4009 FEC2      INC     DL
073F:400B 52        PUSH    DX
073F:400C B231      MOV     DL,31
073F:400E CD21      INT     21
073F:4010 5A        POP     DX
073F:4011 E2F4      LOOP    4007
073F:4013 B8004C    MOV     AX,4C00
073F:4016 CD21      INT     21
073F:4018 0000      ADD     [BX+SI],AL
073F:401A 0000      ADD     [BX+SI],AL
073F:401C 0000      ADD     [BX+SI],AL
073F:401E 0000      ADD     [BX+SI],AL
```

Kode program:

```
MOV AH,2
MOV CX,B
MOV DL,41
INT 21
INC DL
PUSH DX
MOV D,41
INT 21
POP DX
LOOP 4007
MOV AX,4C00
INT 21
```

4. Output AbCdEfGhIj

Menggunakan Looping

```
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX
C:\>DEBUG.EXE
-A4000
073F:4000 MOV AH,2
073F:4002 MOV CX,5
073F:4005 MOV DL,41
073F:4007 INT 21
073F:4009 ADD DL,2
073F:400C PUSH DX
073F:400D ADD DL,19
073F:4010 INT 21
073F:4012 POP DX
073F:4013 LOOP 4007
073F:4015 MOV AX,4C00
073F:4018 INT 21
073F:401A
-G=4000
A\C^E`GbId
C:\>DEBUG
-A073F:400D
073F:400D ADD DL,1F
073F:4010
-G=4000
AbCdEfGhIj
C:\>
```

Listing program dengan U4000

```
C:\>DEBUG
-U4000
073F:4000 B402      MOV     AH,02
073F:4002 B90500    MOV     CX,0005
073F:4005 B241      MOV     DL,41
073F:4007 CD21      INT     21
073F:4009 80C202    ADD     DL,02
073F:400C 52        PUSH    DX
073F:400D 80C21F    ADD     DL,1F
073F:4010 CD21      INT     21
073F:4012 5A        POP     DX
073F:4013 E2F2      LOOP    4007
073F:4015 B8004C    MOV     AX,4C00
073F:4018 CD21      INT     21
073F:401A 0000      ADD     [BX+SI],AL
073F:401C 0000      ADD     [BX+SI],AL
073F:401E 0000      ADD     [BX+SI],AL
-
```

Kode program:

-A4000

MOV AH,2

MOV CX,5

MOV DL,41

INT 21

ADD DL,2

PUSH DX

ADD DL,1F

INT 21

POP DX

LOOP 4007

MOV AX,4C00

INT 21

6. Output A B C D E F G H I K L M N O P Q R S T V X Y Z

Menggunakan CMP dan Jxx

```
DOS
BOX
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX
Z:\>SET BLASTER=A220 I7 D1 H5 T6

Z:\>MOUNT C "/home/faqih"
Drive C is mounted as local directory /home/faqih/

Z:\>C:

C:\>DEBUG.EXE
-A4000
073F:4000 MOV AH,2
073F:4002 MOV DL,41
073F:4004 INT 21
073F:4006 INC DL
073F:4008 CMP DL,5B
073F:400B PUSH DX
073F:400C MOV DL,20
073F:400E INT 21
073F:4010 POP DX
073F:4011 JNE 4004
073F:4013 MOV AX,4C00
073F:4016 INT 21
073F:4018
-G=4000
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
C:\>
```

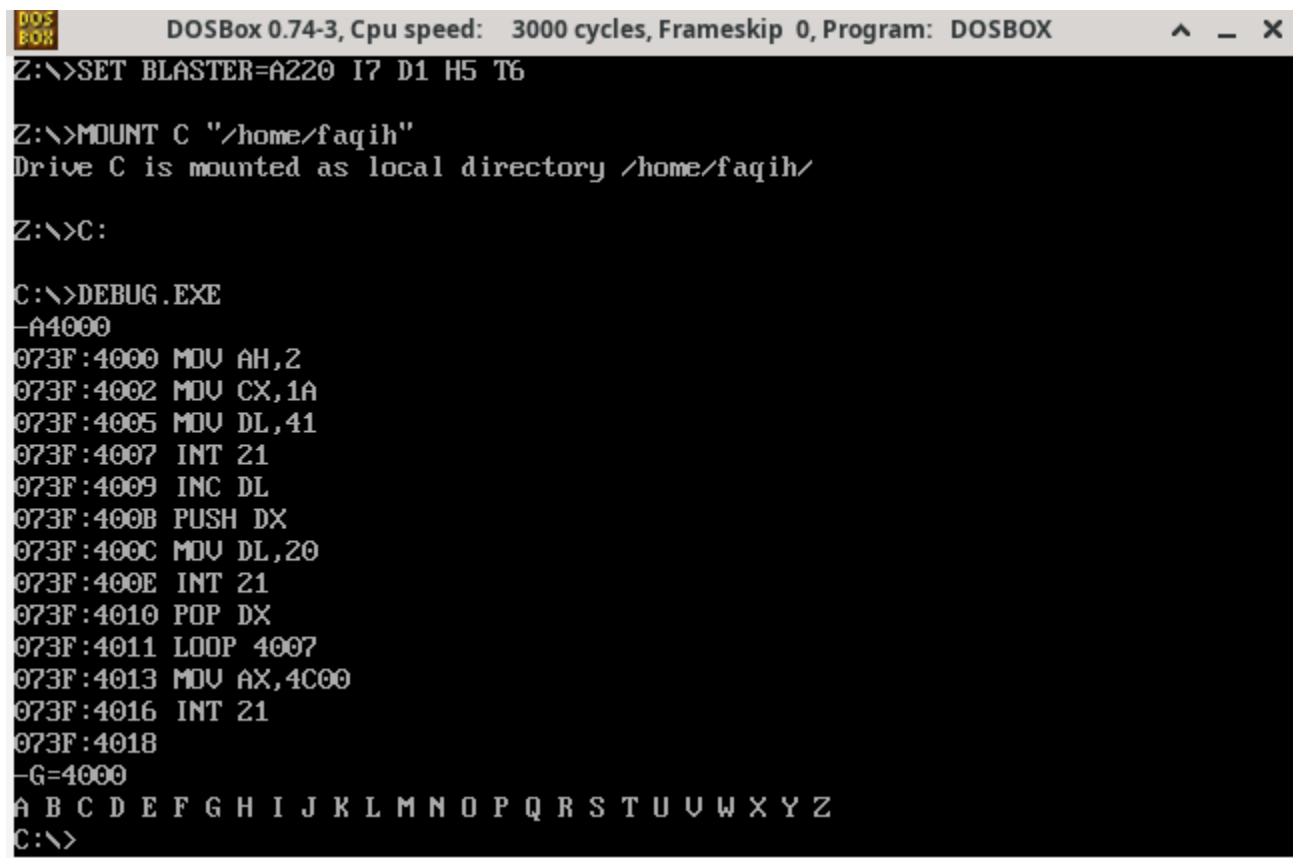
Listing Program

```
C:\>DEBUG
-U4000
073F:4000 B402      MOV     AH,02
073F:4002 B241      MOV     DL,41
073F:4004 CD21      INT     21
073F:4006 FEC2      INC     DL
073F:4008 80FA5B     CMP     DL,5B
073F:400B 52        PUSH    DX
073F:400C B220      MOV     DL,20
073F:400E CD21      INT     21
073F:4010 5A        POP     DX
073F:4011 75F1      JNZ     4004
073F:4013 B8004C     MOV     AX,4C00
073F:4016 CD21      INT     21
073F:4018 0000      ADD     [BX+SI],AL
073F:401A 0000      ADD     [BX+SI],AL
073F:401C 0000      ADD     [BX+SI],AL
073F:401E 0000      ADD     [BX+SI],AL
```

Kode program:

```
-A4000
MOV AH,2
MOV DL,41
INT 21
INC DL
CMP DL,5B
PUSH DX
MOV DL,20
INT 21
POP DX
JNE 4004
MOV AX,4C00
INT 21
```

Menggunakan Looping



The screenshot shows a DOSBox window titled "DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX". The command prompt shows the following sequence of commands and output:

```
Z:\>SET BLASTER=A220 I7 D1 H5 T6
Z:\>MOUNT C "/home/faqih"
Drive C is mounted as local directory /home/faqih/
Z:\>C:
C:\>DEBUG.EXE
-A4000
073F:4000 MOV AH,2
073F:4002 MOV CX,1A
073F:4005 MOV DL,41
073F:4007 INT 21
073F:4009 INC DL
073F:400B PUSH DX
073F:400C MOV DL,20
073F:400E INT 21
073F:4010 POP DX
073F:4011 LOOP 4007
073F:4013 MOV AX,4C00
073F:4016 INT 21
073F:4018
-G=4000
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
C:\>
```

The assembly code is being executed in a debugger (DEBUG.EXE). The code includes a loop instruction (LOOP 4007) at address 073F:4011. The output shows the memory addresses and the instructions being executed, along with the state of the program (G=4000) and the alphabet (A-Z) displayed at the bottom.

Listing program menggunakan U4000

```
C:\>DEBUG
-U4000
073F:4000 B402      MOV     AH,02
073F:4002 B91A00    MOV     CX,001A
073F:4005 B241      MOV     DL,41
073F:4007 CD21      INT     21
073F:4009 FEC2      INC     DL
073F:400B 52        PUSH    DX
073F:400C B220      MOV     DL,20
073F:400E CD21      INT     21
073F:4010 5A        POP     DX
073F:4011 E2F4      LOOP    4007
073F:4013 B8004C    MOV     AX,4C00
073F:4016 CD21      INT     21
073F:4018 0000      ADD     [BX+SI],AL
073F:401A 0000      ADD     [BX+SI],AL
073F:401C 0000      ADD     [BX+SI],AL
073F:401E 0000      ADD     [BX+SI],AL
```

Kode program:

-A4000

MOV AH,2

MOV CX,1A

MOV DL,41

INT 21

INC DL

PUSH DX

MOV DL,20

INT 21

POP DX

LOOP 4007

MOV AX,4C00

INT 21

8. Output Aa1 Bb2 Cc3 Dd4 Ee5 Ff6 Gg7 Hh8 Ii9 menggunakan looping

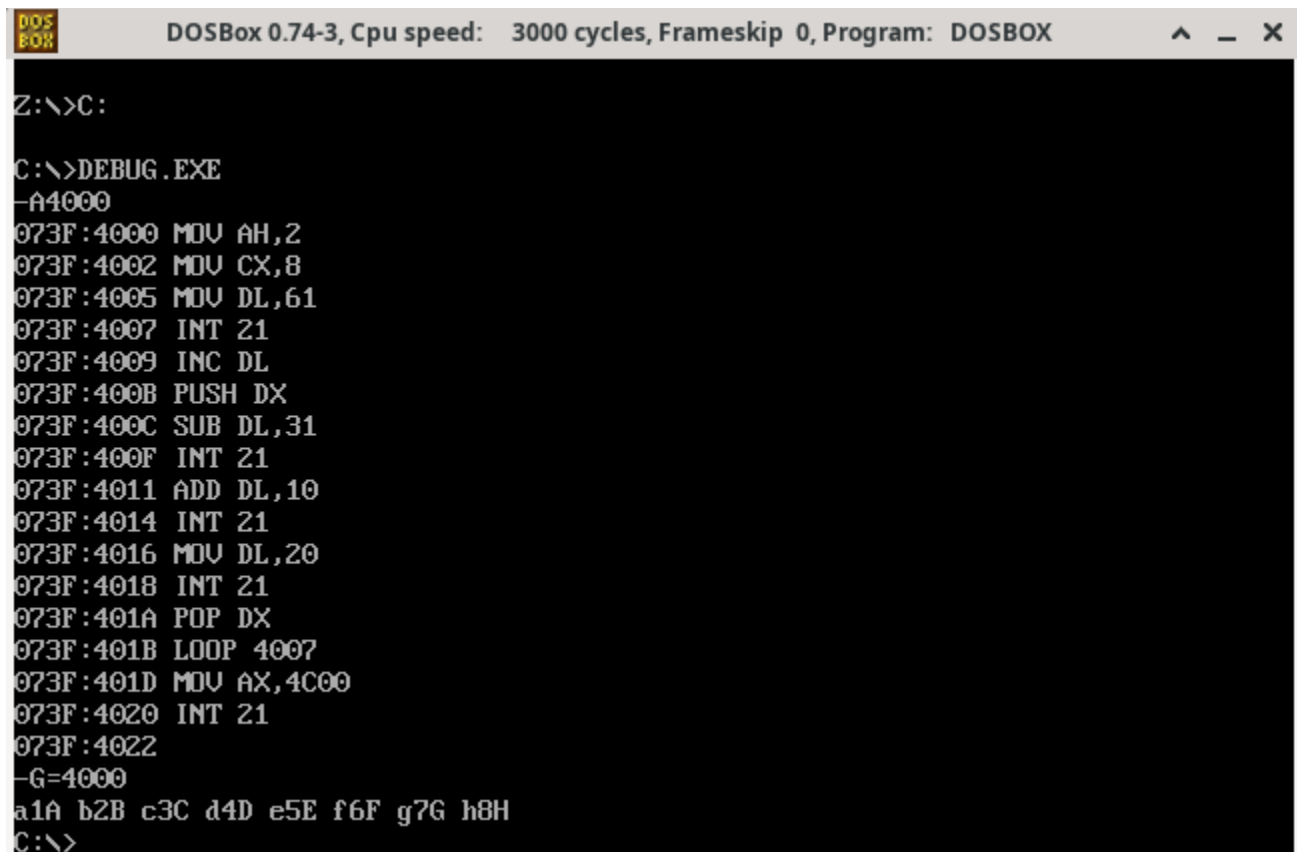
```
DOS
BOX
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX
Z:\>C:
C:\>DEBUG.EXE
-A4000
073F:4000 MOV AH,2
073F:4002 MOV DL,41
073F:4004 MOV CX,9
073F:4007 INT 21
073F:4009 INC DL
073F:400B PUSH DX
073F:400C ADD DL,1F
073F:400F INT 21
073F:4011 SUB DL,30
073F:4014 INT 21
073F:4016 MOV DL,20
073F:4018 INT 21
073F:401A POP DX
073F:401B LOOP 4007
073F:401D MOV AX,4C00
073F:4020 INT 21
073F:4022
-G=4000
Aa1 Bb2 Cc3 Dd4 Ee5 Ff6 Gg7 Hh8 Ii9
C:\>
```

```
C:\>DEBUG
-U4000
073F:4000 B402      MOV     AH,02
073F:4002 B241      MOV     DL,41
073F:4004 B90900    MOV     CX,0009
073F:4007 CD21      INT     21
073F:4009 FEC2      INC     DL
073F:400B 52        PUSH    DX
073F:400C 80C21F    ADD     DL,1F
073F:400F CD21      INT     21
073F:4011 80EA30    SUB     DL,30
073F:4014 CD21      INT     21
073F:4016 B220      MOV     DL,20
073F:4018 CD21      INT     21
073F:401A 5A        POP     DX
073F:401B E2EA      LOOP   4007
073F:401D B8004C    MOV     AX,4C00
```

Kode program:

```
-A4000
MOV AH,2
MOV DL,41
MOV CX,9
INT 21
INC DL
PUSH DX
ADD DL,1F
INT 21
SUB DL,30
INT 21
MOV DL,20
INT 21
POP DX
LOOP 4007
MOV AX,4C00
INT 21
```

10. Output a1A b2B c3C d4D e5E f6F g7G h8H

The image shows a DOSBox 0.74-3 window. The title bar reads "DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX". The main window has a black background with white text. It shows the command prompt "Z:\>C:" followed by "C:\>DEBUG.EXE". Below this, the assembly code from the previous block is displayed with memory addresses in the format "073F:4000". The code ends with "INT 21" at address 073F:4020. After the code, the prompt "C:\>" is shown, and the output "a1A b2B c3C d4D e5E f6F g7G h8H" is displayed on the next line. The window also shows a small "DOS BOX" logo in the top left corner of the title bar area.

```
DOS
BOX
DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Program: DOSBOX
Z:\>C:
C:\>DEBUG.EXE
-A4000
073F:4000 MOV AH,2
073F:4002 MOV CX,8
073F:4005 MOV DL,61
073F:4007 INT 21
073F:4009 INC DL
073F:400B PUSH DX
073F:400C SUB DL,31
073F:400F INT 21
073F:4011 ADD DL,10
073F:4014 INT 21
073F:4016 MOV DL,20
073F:4018 INT 21
073F:401A POP DX
073F:401B LOOP 4007
073F:401D MOV AX,4C00
073F:4020 INT 21
073F:4022
-G=4000
a1A b2B c3C d4D e5E f6F g7G h8H
C:\>
```

Listing program dengan U4000

```
C:\>DEBUG
-U4000
073F:4000 B402      MOV     AH,02
073F:4002 B90800    MOV     CX,0008
073F:4005 B261      MOV     DL,61
073F:4007 CD21      INT     21
073F:4009 FEC2      INC     DL
073F:400B 52        PUSH    DX
073F:400C 80EA31    SUB     DL,31
073F:400F CD21      INT     21
073F:4011 80C210    ADD     DL,10
073F:4014 CD21      INT     21
073F:4016 B220      MOV     DL,20
073F:4018 CD21      INT     21
073F:401A 5A        POP     DX
073F:401B E2EA      LOOP    4007
073F:401D B8004C    MOV     AX,4C00
```

Kode program:

```
-A4000
MOV AH,2
MOV CX,8
MOV DL,61
INT 21
INC DL
PUSH DX
SUB DL,31
INT 21
ADD DL,10
INT 21
MOV DL,20
INT 21
POP DX
LOOP 4007
MOV AX,4C00
INT 21
```