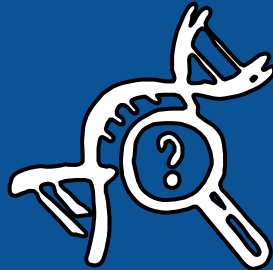


Архитектура ЭВМ и язык ассемблера

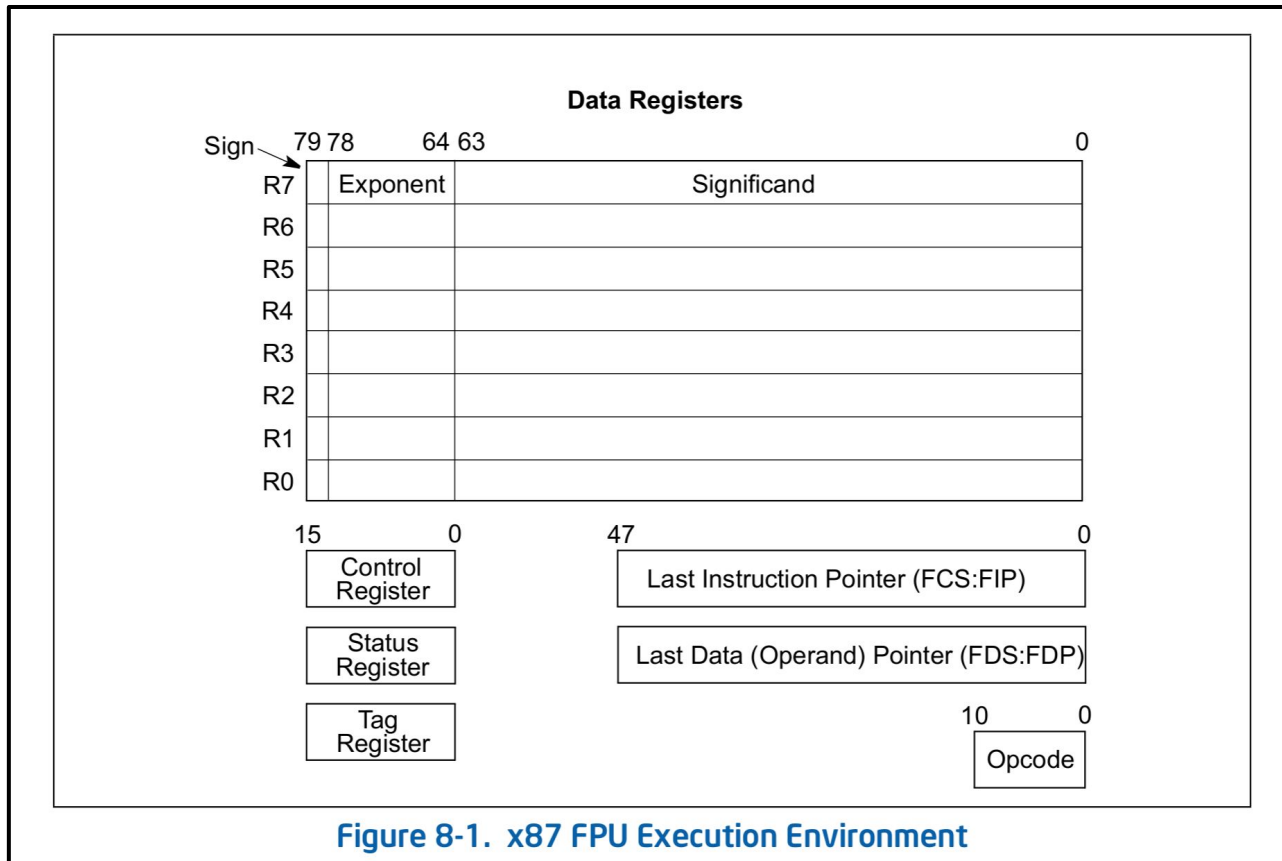
Семинар #37:

1. Устройство сопроцессора x87 FPU.
2. Инструкции x87 FPU.

Устройство сопроцессора x87 FPU



Состояние x87 FPU



Состояние x87 FPU

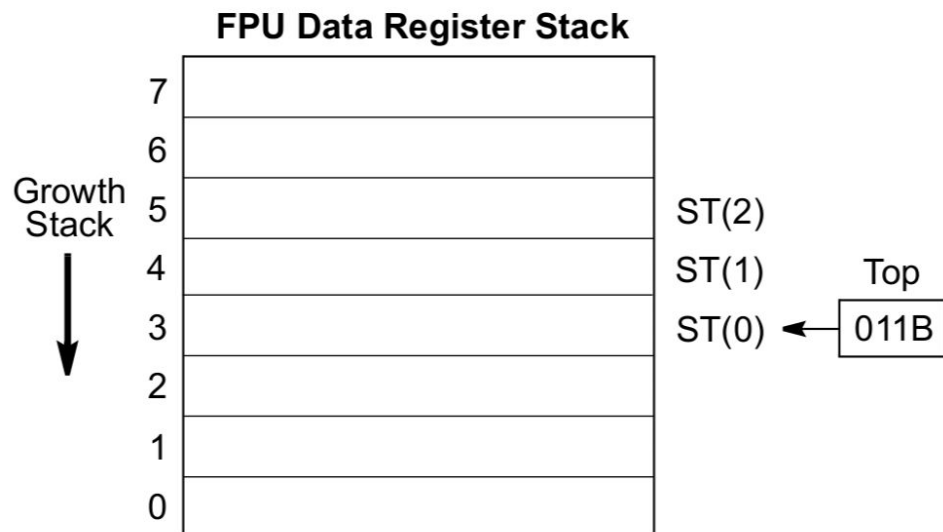


Figure 8-2. x87 FPU Data Register Stack

Состояние x87 FPU

Computation

Dot Product = $(5.6 \times 2.4) + (3.8 \times 10.3)$

Code:

```
FLD  value1 ; (a) value1 = 5.6  
FMUL value2 ; (b) value2 = 2.4  
FLD  value3 ; value3 = 3.8  
FMUL value4 ; (c) value4 = 10.3  
FADD ST(1) ; (d)
```

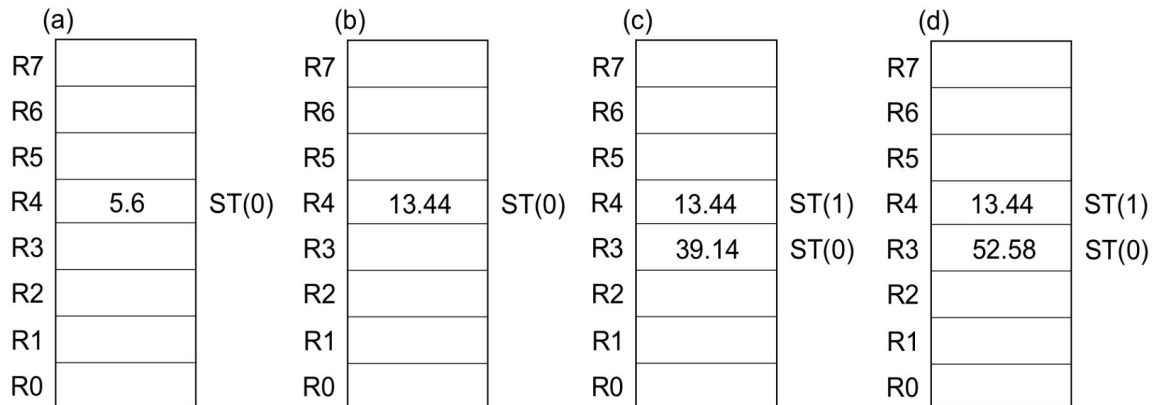
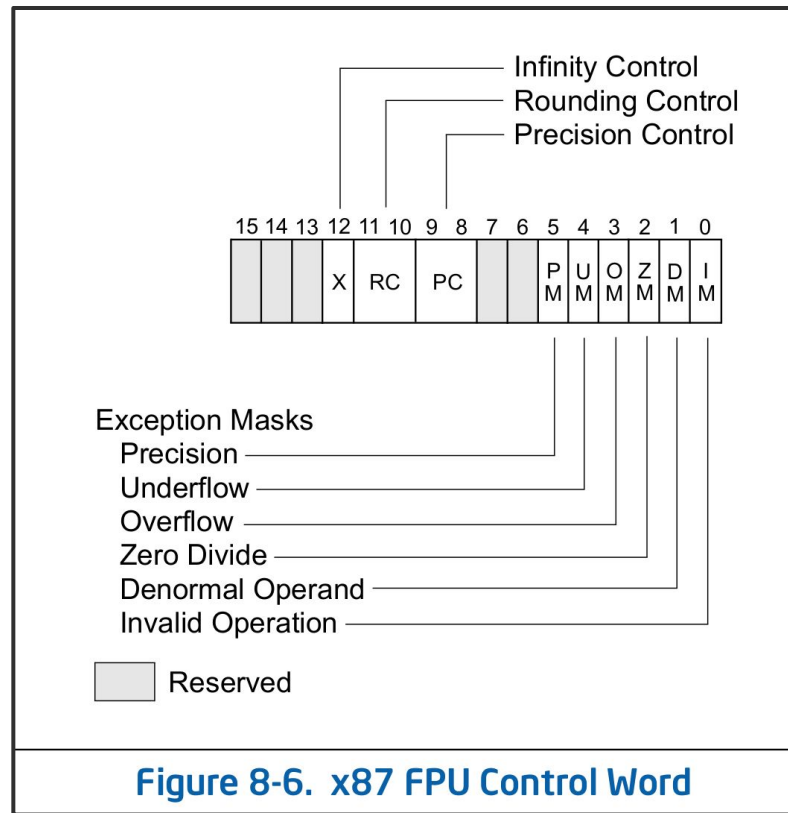
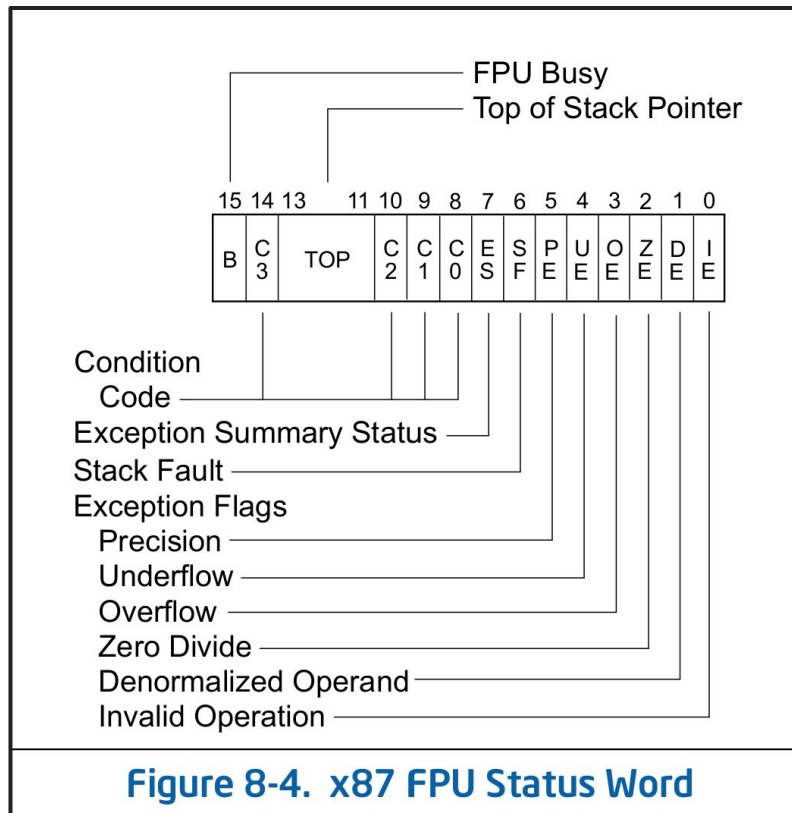
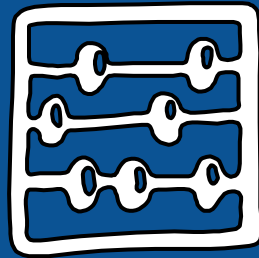


Figure 8-3. Example x87 FPU Dot Product Computation

Регистры флагов x87 FPU



Инструкции x87 FPU



Инструкции x87 FPU

Table 8-4. Data Transfer Instructions

Floating-Point		Integer		Packed Decimal	
FLD	Load Floating-Point	FILD	Load Integer	FBLD	Load Packed Decimal
FST	Store Floating-Point	FIST	Store Integer	FBSTP	Store Packed Decimal and Pop
FSTP	Store Floating-Point and Pop	FISTP	Store Integer and Pop		
FXCH	Exchange Register Contents				
FCMOVcc	Conditional Move				

Инструкции x87 FPU

Table 8-5. Floating-Point Conditional Move Instructions

Instruction Mnemonic	Status Flag States	Condition Description
FCMOVB	CF=1	Below
FCMOVNB	CF=0	Not below
FCMOVE	ZF=1	Equal
FCMOVNE	ZF=0	Not equal

Table 8-5. Floating-Point Conditional Move Instructions (Contd.)

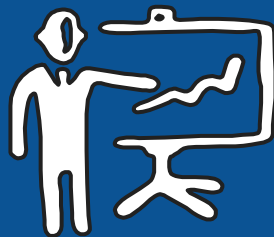
Instruction Mnemonic	Status Flag States	Condition Description
FCMOVBE	CF=1 or ZF=1	Below or equal
FCMOVNBE	CF=0 or ZF=0	Not below nor equal
FCMOVU	PF=1	Unordered
FCMOVNU	PF=0	Not unordered

Инструкции x87 FPU

FADD/FADDP	Add floating-point.
FIADD	Add integer to floating-point.
FSUB/FSUBP	Subtract floating-point.
FISUB	Subtract integer from floating-point.
FSUBR/FSUBRP	Reverse subtract floating-point.
FISUBR	Reverse subtract floating-point from integer.
FMUL/FMULP	Multiply floating-point.
FIMUL	Multiply integer by floating-point.
FDIV/FDIVP	Divide floating-point.
FIDIV	Divide floating-point by integer.
FDIVR/FDIVRP	Reverse divide.
FIDIVR	Reverse divide integer by floating-point.
FABS	Absolute value.
FCHS	Change sign.

FLDZ	Load +0.0.
FLD1	Load +1.0.
FLDPI	Load π .
FLDL2T	Load $\log_2 10$.
FLDL2E	Load $\log_2 e$.
FLDLG2	Load $\log_{10} 2$.
FLDLN2	Load $\log_e 2$.

Вопросы?



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