Homework 12-13

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December 4^{th}, 2018

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12.6.1

1. Given the binary floating-point value 1101.01101, how can it be expressed as a sum of decimal fractions?

Lets break this up into two parts, the part before the decimal and the part after the decimal.

Before the decimal: 1101
$1101 = 2^3 + 2^2 + 2^0 = 8 + 4 + 1 = 13$

After the decimal: 01101 $01101 = \frac{1}{4} + \frac{1}{8} + \frac{1}{32} = \frac{13}{32}$ or 0.40625

Answer: When we put the two parts together we get $13\frac{13}{32}$ or 13.40625

3. Given the binary value 11011.01011, what is its normalized value?

in order to normalize the number by shifting it until there is a single 1 on the left side of the binary point.

ex: 1.101101011

After this your exponent it based on how many position moved. Due to 4 movements left the normalized number is 2^4

Answer: $1.101101011x2^4$

5. What are the two types of NaNs?

The two types of NaN's are the quiet NaN and the signaling NaN.

6. What is the largest data type permitted by the FLD instruction, and how many bits does it contain?

The largest data type permitted by the FLD instruction is REAL10, which contains 80 bits, or 10 bytes.

7. How is the FSTP instruction different from FST?

FST will copy a floating-point operand from the top of the FPU stack, FSTP will copy and pop.

10. How is the FISUB instruction different from FSUB?

FSUB will subtract with pop, so it pops that stack after performing subtraction. FISUB instruction converts the source operand to a floating point format before subtracting.

13. Which field in the FPU control word lets you change the processor's rounding mode?

The RC field

12.6.2

10. Write instructions that implement the following C++ code:

```
int B = 7;
double N = 7.1;
double P = sqrt(N) + B;
```

Answer:

```
.data
B dword 7
N real8 7.1
P real8 ?

.code
main proc
fld N
fsqrt
fild B
fadd
fstp P
```

```
INVOKE ExitProcess,0
main ENDP
```

13.6

1. When a procedure written in assembly language is called by a high-level language program, must the calling program and the procedure use the same memory model?

Yes the memory model determines if the call made is near or far.

3. Does a language's calling convention include the preserving of certain registers by procedures?

Yes, languages specify certain registers are preserved.

6. (Yes/No): Can variables be defined with both the DW and the DUP operator in inline assembly code?

Yes

8. Rather than using the OFFSET operator, is there another way to move a variable's offset into an index register?

Yes, you can use LEA instead.

11. What is a valid assembly language PROTO declaration for the standard C printf( ) function?

```
printf PROTO C, pString:PTR BYTE, args:VARARG
```

13. What is the purpose of the "C" specifier in the extern declaration in procedures called from C++?

The 'C' specifier allows for C++ functions to be called from assembly language code.