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ICS2014 : Computer Organization and Architecture

Assignment #2: Computer Organization and Architecture

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Question A

If the user wants a complete conversion table, the result is as follows:

Decimal (base 10)	Binary (base 2)	Hexadecimal (base 16)
0	0	0
1	1	1
2	10	2
3	11	3
4	100	4
5	101	5
6	110	6
7	111	7
8	1000	8
9	1001	9
10	1010	A
11	1011	B
12	1100	C
13	1101	D
14	1110	E
15	1111	F
16	10000	10
17	10001	11
18	10010	12
31	11111	1F
100	1100100	64
255	11111111	FF
256	100000000	100

If the user keys in a specific decimal number, the result is as follows:

For example, let us say the decimal number keyed in is 109. The output is as follows:

- Decimal Number: 109
- Binary Number: 1101101
- Hexadecimal Number: 6D

Snapshots of the working program

```
run:
*** Welcome to the number system conversion program ***

Enter 1 to get a complete conversion table
Enter 2 to get a corresponding binary and hexadecimal number for a specific decimal number
Enter 3 to end the program
Choice: 1
decimal                  Binary                  hexadecimal
0                        0                       0
1                        1                       1
2                        10                      2
3                        11                      3
4                        100                     4
5                        101                     5
6                        110                     6
7                        111                     7
8                        1000                    8
9                        1001                    9
10                       1010                    a
11                       1011                    b
12                       1100                    c
13                       1101                    d
14                       1110                    e
15                       1111                    f
16                       10000                   10
17                       10001                   11
18                       10010                   12
31                       11111                   1F
100                      1100100                 64
255                      11111111                FF
256                      100000000               100

Enter 1 to get a complete conversion table
Enter 2 to get a corresponding binary and hexadecimal number for a specific decimal number
Enter 3 to end the program



 7                       111                     7
 8                       1000                    8
 9                       1001                    9
 10                      1010                    a
 11                      1011                    b
 12                      1100                    c
 13                      1101                    d
 14                      1110                    e
 15                      1111                    f
 16                      10000                   10
 17                      10001                   11
 18                      10010                   12
 31                      11111                   1F
 100                     1100100                 64
 255                     11111111                FF
 256                     100000000               100

 Enter 1 to get a complete conversion table
 Enter 2 to get a corresponding binary and hexadecimal number for a specific decimal number
 Enter 3 to end the program
 Choice: 2
 Enter the decimal number you want to convert
 Number: 109
 Decimal Number: 109
 Binary Number: 1101101
 HexaDecimal Number: 6D

 Enter 1 to get a complete conversion table
 Enter 2 to get a corresponding binary and hexadecimal number for a specific decimal number
 Enter 3 to end the program
 Choice: 3
 Thank you for using the program!
  Bye!

 BUILD SUCCESSFUL (total time: 18 minutes 41 seconds)
```

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Question B

If the user wants a complete conversion table, the result is as follows:

S/No.	Decimal Number	Binary	Remarks
1	250.03	11111010.00000	Approximate
2	44.943	101100.11110	Approximate
3	29.75	11101.11	Exact
4	25.383	11001.01100	Approximate
5	95.714	1011111.10110	Approximate
6	12.821	1100.11010	Approximate
7	63.307	111111.01001	Approximate
8	43.584	101011.10010	Approximate
9	598.4	1001010110.01100	Approximate
10	23.92	10111.11101	Approximate
11	11.07	1011.00010	Approximate
12	689.31	1010110001.01001	Approximate
13	83.173	1010011.00101	Approximate
14	370.91	101110010.11101	Approximate
15	65.862	1000001.11011	Approximate
16	55.873	110111.11011	Approximate
17	74.629	1001010.10100	Approximate
18	6.342	110.01010	Approximate
19	350.23	101011110.00111	Approximate
20	1.368	1.01011	Approximate
21	34.77	100010.11000	Approximate
22	861.74	1101011101.10111	Approximate
23	776.09	1100001000.00010	Approximate
24	761.7	1011111001.10110	Approximate
25	75.651	1001011.10100	Approximate
26	617.02	1001101001.00000	Approximate
27	62.165	111110.00101	Approximate
28	971.2	1111001011.00110	Approximate
29	76.431	1001100.01101	Approximate
30	663.23	1010010111.00111	Approximate

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If the user keys in a specific decimal number, the result is as follows:

- If the decimal number keyed in is 234.34. The output is as follows:
  - Decimal Number: 234.34
  - Binary Number: 11101010.01010
  - Remark : Approximate
- If the decimal number keyed in is 34.5. The output is as follows:
  - Decimal Number: 34.5
  - Binary Number: 100010.1
  - Remark : Exact

Snapshots of the working program

```
run:
*** Welcome to the decimal floating numbers to binary numbers conversion program ***

Enter 1 to get a complete conversion table
Enter 2 to get a corresponding binary number for a specific floating decimal number
Enter 3 to end the program
Choice: 1
                    decimal             Binary                  Remark
1                   250.03              11111010.00000                  Approximate
2                   44.943              101100.11110                    Approximate
3                   29.75               11101.11                        Exact
4                   25.383              11001.01100                     Approximate
5                   95.714              1011111.10110                   Approximate
6                   12.821              1100.11010                      Approximate
7                   63.307              111111.01001                    Approximate
8                   43.584              101011.10010                    Approximate
9                   598.4               1001010110.01100                        Approximate
10                  23.92               10111.11101                     Approximate
11                  11.07               1011.00010                      Approximate
12                  689.31              1010110001.01001                        Approximate
13                  83.173              1010011.00101                   Approximate
14                  370.91              101110010.11101                 Approximate
15                  65.862              1000001.11011                   Approximate
16                  55.873              110111.11011                    Approximate
17                  74.629              1001010.10100                   Approximate
18                  6.342               110.01010                       Approximate
19                  350.23              101011110.00111                 Approximate
20                  1.368               1.01011                 Approximate
21                  34.77               100010.11000                    Approximate
22                  861.74              1101011101.10111                        Approximate
23                  776.09              1100001000.00010                        Approximate
24                  761.7               1011111001.10110                        Approximate
25                  75.651              1001011.10100                   Approximate
26                  617.02              1001101001.00000                        Approximate
27                  62.165              111110.00101                    Approximate
28                  971.2               1111001011.00110                        Approximate
29                  76.431              1001100.01101                   Approximate
30                  663.23              1010010111.00111                        Approximate
                                                                                Approximate
24                  761.7               1011111001.10110                        Approximate
25                  75.651              1001011.10100                   Approximate
26                  617.02              1001101001.00000                        Approximate
27                  62.165              111110.00101                    Approximate
28                  971.2               1111001011.00110                        Approximate
29                  76.431              1001100.01101                   Approximate
30                  663.23              1010010111.00111                        Approximate

Enter 1 to get a complete conversion table
Enter 2 to get a corresponding binary number for a specific floating decimal number
Enter 3 to end the program
Choice: 2
Enter the floating decimal number you want to convert
Number: 234.34
Decimal Number: 234.34
Binary Number: 11101010.01010
Remark: Approximate

Enter 1 to get a complete conversion table
Enter 2 to get a corresponding binary number for a specific floating decimal number
Enter 3 to end the program
Choice: 2
Enter the floating decimal number you want to convert
Number: 34.5
Decimal Number: 34.5
Binary Number: 100010.1
Remark: Exact

Enter 1 to get a complete conversion table
Enter 2 to get a corresponding binary number for a specific floating decimal number
Enter 3 to end the program
Choice: 3
Thank you for using the program1
 Bye!
```