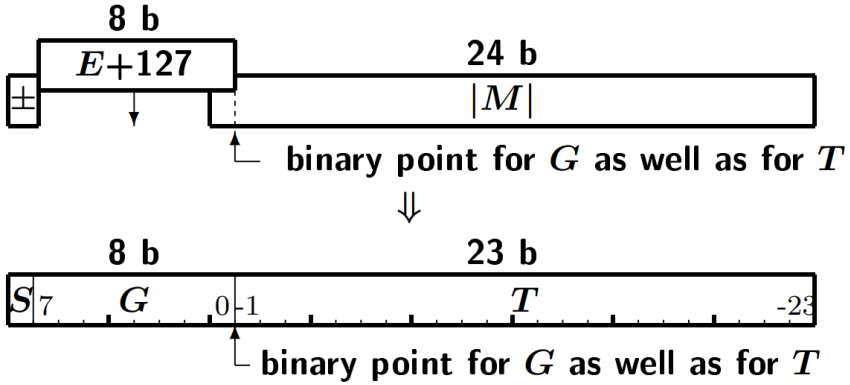
MIE-ARI
(Computer Arithmetic – Homework 5)
Floating point

Pavel Kubalík
Department of Digital Design
Faculty of Information Technology
Czech Technical University in Prague

https://courses.fit.cvut.cz/MIE-ARI/

Task 1 – IEEE Std 754-2008 - Example

Calculate image of 32-bits number represented in IEEE Std 754 format.



	A
$G = 0\ldots0_2$	$(-1)^S \cdot T \cdot 2^{-K+1}$
$G = 1\ldots1_2$ a $T = 0$	$(-1)^S \cdot \infty$
$G = 1\ldots1_2$ a $T \neq 0$	NaN
else (viz FP – 14)	$(-1)^S \cdot (1+T) \cdot 2^{G-K}$

a) 0000 0000 0100 0..0

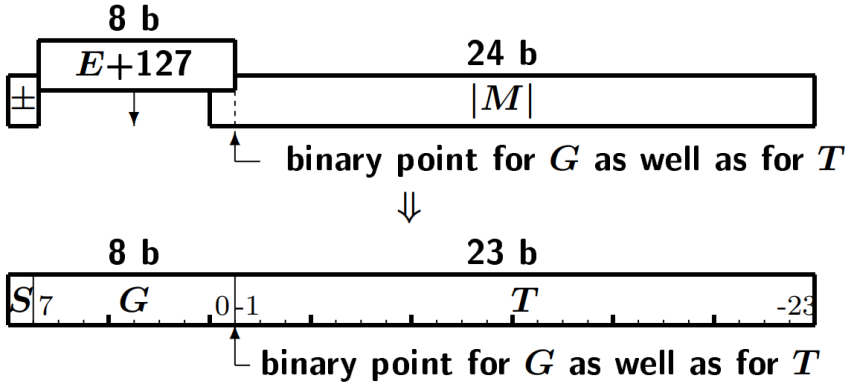
b) 0000 0000 1100 0..0

c) 1100 1000 0100 0..0

Advice: Use the information in lecture 6 (Floating point), in slides 14-16.

Task 2 –IEEE Std 754-2008

Calculate image of 32-bits number represented in IEEE Std 754 format.



	A
$G = 0\ldots0_2$	$(-1)^S \cdot T \cdot 2^{-K+1}$
$G = 1\ldots1_2$ a $T = 0$	$(-1)^S \cdot \infty$
$G = 1\ldots1_2$ a $T \neq 0$	NaN
else (viz FP – 14)	$(-1)^S \cdot (1+T) \cdot 2^{G-K}$

a) 0000 0000 0110 0..0

b) 0100 0000 1100 0..0

c) 1100 0001 0101 0..0

Advice: Use the information in lecture 6 (Floating point), in slides 14-16.

Task 2 – Addition - Example

a) Convert two decimal numbers to binnary system.
b) Add them using GRS bits.
c) Round the result to prefer greater value.
d) Round the result to prefer even value.

$91{,}5_{10}+114{,}25_{10}=$

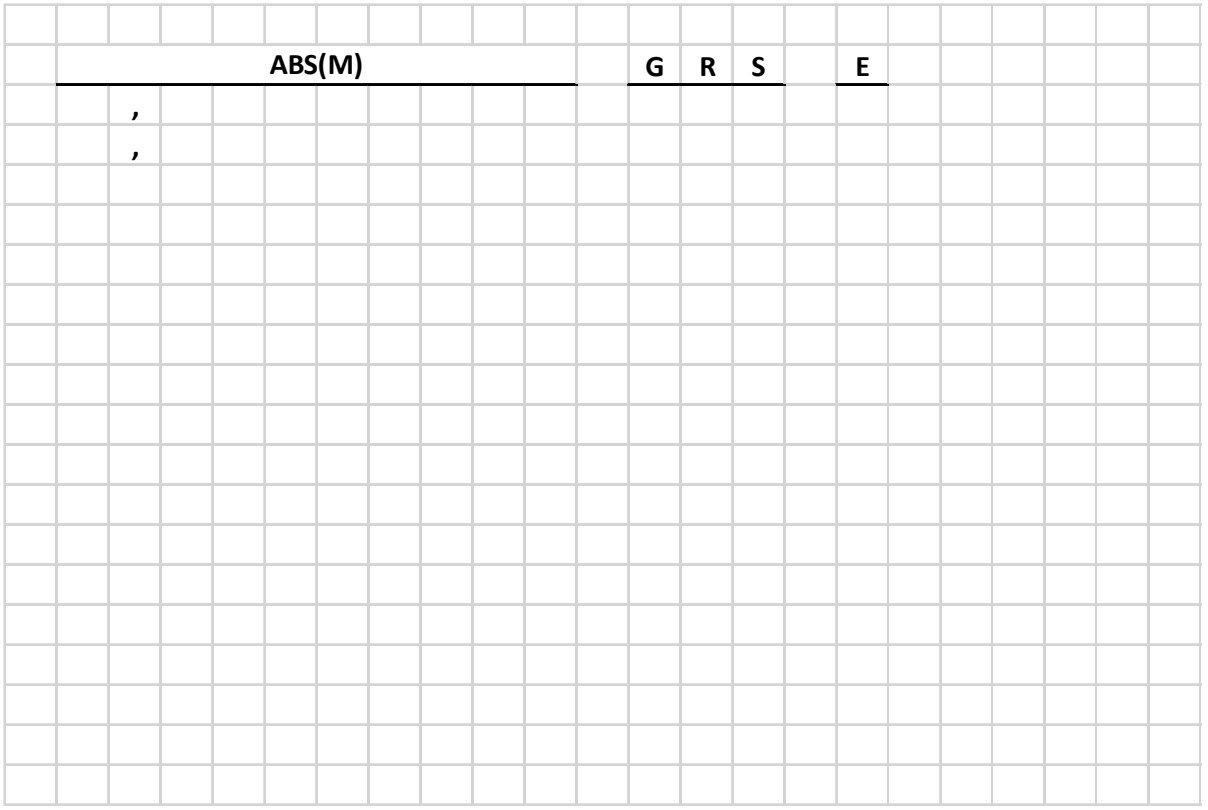
ABS(M)										G	R	S	E
1	,	0	1	1	0	1	1	1	0	0	0	0	6
1	,	1	1	0	0	1	0	0	1	0	0	0	6

Advice: Use the information in lecture 6 - Floating point.

Task 3 – Addition

a) Convert two decimal numbers to binnary system.
b) Add them using GRS bits.
c) Round the result to prefer greater value.
d) Round the result to prefer even value.

$45{,}75_{10}+3{,}5625_{10}=$



Advice: Use the information in lecture 6 - Floating point.

Task 4 – Addition

a) Convert two decimal numbers to binnary system.
b) Add them using GRS bits.
c) Round the result to prefer greater value.
d) Round the result to prefer even value.

ABS(M)										G	R	S	E
1	,	0	1	1	0	1	1	1	0	0	0	0	5
1	,	1	1	0	0	1	0	0	0	0	0	0	1

Advice: Use the information in lecture 6 - Floating point.

Notes

Notes