

# Intermediate Programming

— Review of C programming (2) —

This course is the flipped classroom. Read "this document and HP of this course" carefully, and perform today's exercise respectively.

Waseda Univ.

## Today's exercise: Review of C programming (2)

- Review the contents of "Introduction to C programming: 8th–10th"
- 8th: Arrays, Macro (`#define`)
- 9th: Random numbers, Math libraries
- 10th: Functions, Global Variables
- KIKAN2: [http://www.oishi.info.waseda.ac.jp/~takayasu/classes/cp1\\_en.html](http://www.oishi.info.waseda.ac.jp/~takayasu/classes/cp1_en.html)
- KIKAN8:  
<http://www-it.sci.waseda.ac.jp/CPR1/class08/index.html>
- Answer today's exercise.

# Review1

## Review1: Write a program

- Declare arrays “A[row][col]” and “b[row]”, then each element of matrices by using global array:

$$A = \begin{pmatrix} 1 & 2 & 3 & 4 \\ 5 & 6 & 7 & 8 \\ 9 & 10 & 11 & 12 \end{pmatrix}, \quad b = \begin{pmatrix} 4 \\ 8 \\ 12 \\ 16 \end{pmatrix}$$

- Use `#define` for declaring row and column number:

```
#define row 3  
#define col 4
```

- Display  $A$ ,  $b$ , matrix vector product  $A \cdot b$ :

```
A=  
 1  2  3  4  
 5  6  7  8  
 9 10 11 12  
b=  
 4  
 8  
12  
16  
A*b=...
```

- Make sure that the program is compiled successfully.
- Copy your result on the terminal, paste it on CourseN@vi.

## Review2: Write a program

- Create the sin function (mysin) by using the Taylor series expansion. The number of terms is 7 ( $k=0,1,\dots,7$ ):

$$\begin{aligned}\sin(x) &= x - \frac{x^3}{3!} + \frac{x^5}{5!} - \frac{x^7}{7!} + \frac{x^9}{9!} - \dots \\ &= \sum_{n=1}^{\infty} (-1)^{n+1} \frac{x^{2n-1}}{(2n-1)!}\end{aligned}$$

- Create the factorial function (Factorial).
- Compare the value of using mysin with the value using sin in the Math. library.
- Output of this program is as follows:

*Input x:?? **【Enter】***

*sin(x)=??*

*my\_sin(x)=??*

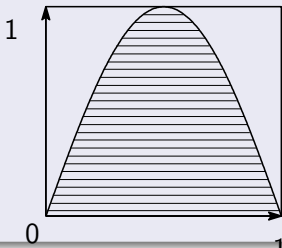
- Copy your result on the terminal, paste it on CourseN@vi.

## Review3: Write a program which obtain an approximate integration value by using random numbers

- Calculate the following by using `mysin`.
- Repeat generating of random numbers  $(x, y)$  which are "greater than or equal to 0 less than 1" depending on the inputted value.
- Calculate the ratio " $r$ " that satisfies  $y < \text{mysin}(x)$
- Display the value " $r$ " and Error for  $2/\pi$
- Copy your result on the terminal, paste it on CourseN@vi.
- Output of this program is as follows:

How many trials? **10000** **[Enter]**

Result is **??** (Error: **??**)



# How to submit today's exercise

- Title of the exercise should be "Review Part 2".
- Start your answer from the following form:  
"I would like to submit an answer of the Review Part 2.  
Student ID Your name . . . ."

Answers are the followings:

- ① Put your answer in review 1.
- ② Put your answer in review 2.
- ③ Put your answer in review 3.

Answer must be submitted by **23:59, Oct., 5th.**

Make sure that your answer is status of submitted after submitting.