Ho Chi Minh University of Technology
Department of Computer Science and Engineering

Programming Technique

Test 1

Duration: 120 minutes.

Note: Do not copy. If any hint of plagiarism is found, both students will receive 0.

Problem 1 (2 points). Allow user to enter a string. Check if the string is symmetric.

Examples:

- Symmetric strings: “aba”, “2c3c2”
- Not symmetric strings: “abb”, “2c3cc”

Problem 2 (2 points).

Using rand() to:

a) Generate a random integer from 0 to 15. **(1.0)**
b) Generate a random integer from 7 to 20. **(0.5)**
c) Generate a random float value from -1 to 1. **(0.5)**

Problem 3 (2 points). Write a program to convert USD to other currency units.

a) Let user enters a **positive** amount of money. **(0.5 points)**
b) Ask the user to choose which currency unit he/she wants to convert. The currency unit must be one of these four: JPY, CAD, EUR and VND. **(0.5 points)**
c) Do the conversion from USD to the chosen unit given that 1USD equals to
   - 113.23 JPY
   - 1.27 CAD
   - 0.88 EUR
   - 22732.50 VND

Print the conversion result using the format:

```
[Amount in USD] USD = [Amount in X] X
```

Where X is the chosen currency unit. Here:

`[Amount in USD]`: has a width of 15, right aligned, floating point printing with fixed precision of 3.

`[Amount in X]`: has a width of 15, right aligned, floating point printing with fixed precision of 3.

Problem 4 (1 points). Calculate the following product:

$$P = \frac{1}{4} \times \frac{4}{9} \times \frac{9}{16} \ldots \times \frac{a_{N-1}}{a_N}$$

Where N was entered by user. For clarity, $a_1 = 1$, $a_2 = 4$, etc..

Problem 5 (2 points). Print a binary representation of a decimal number.

Example:

- Input: 3. Output: 11.
- Input: 12. Output: 1100.

Problem 6 (1 points). Print an upside down pyramid of the following shape:

```
*******
 *****
  ***
   *
```

The height of the pyramid (or the number of lines) is entered by user.