

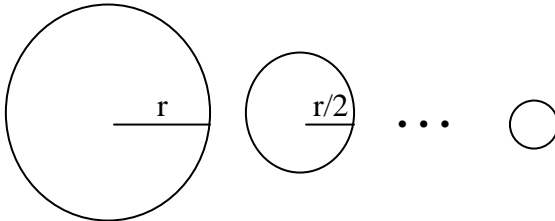
# BIL105E - Introduction to Scientific and Engineering Computing

## Midterm Exam - 01.04.2009

- Notes and books are closed
- Exam duration is 1.5 hours

### Question 1)

Assume that there are  $N$  circles. The radius of first circle is  $r$ , radius of second circle is  $r/2$ , radius of third circle is  $r/4$ , radius of fourth circle is  $r/8$ , and so on.



a) [15 points] Draw a **Flow Chart** to calculate and display the **total** circumference of all circles. User will enter the radius of only the first circle ( $r$ ), and also the number of circles ( $N$ ). Formula for the circumference of first circle is :  $2\pi r$

b) [20 points] Write a **C program** for the above.

### Question 2)

Assume that a library charges a fine (i.e. penalty) for every book returned late. For first 5 days the fine is 2 TL/day, for 6-10 days fine is 4 TL/day, and above 10 days fine is 8 TL/day. If a library member returns a borrowed book after 30 days, then his membership will also be cancelled.

a) [15 points] Draw a **Flow Chart** in which the user will enter number of late days. Flow chart should calculate and display the fine, and also the message of cancellation if necessary.

b) [20 points] Write a **C program** for the above.

### Question 3) [30 points]

Write a **C program** that reduces a fraction into its lowest possible terms. The user will enter a fraction in the form of  $P / Q$ . For example, if user enters  $15 / 20$ , then your program should display  $3 / 4$ .