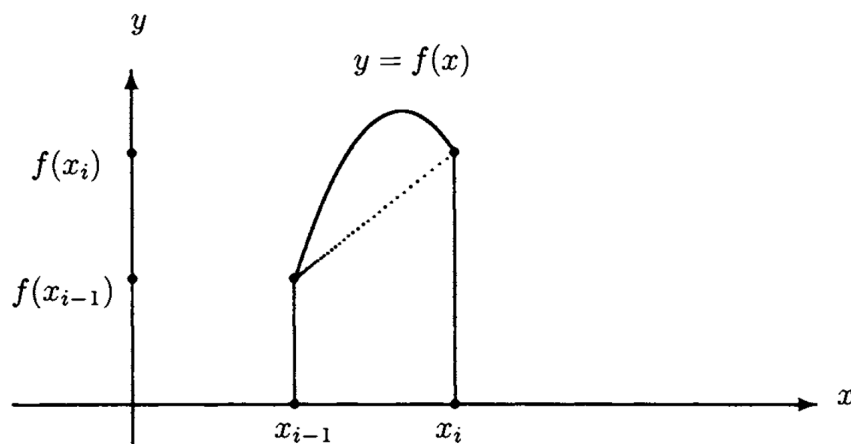




Les fichiers à rendre à l'issue de cette évaluation sont indiqués en rouge. merci de respecter la dénomination demandée. Certains fichiers headers sont fournis dans le dossier /CC1. Les fichiers à rendre à l'issue de cette évaluation seront placés dans un fichier zip qui sera déposé sur l'ENT.

**Exercice 1.** We aim at evaluating definite integrals of the form  $\int_a^b f(t) dt$  using the trapezoidal rule, based on partitioning the interval  $[a, b]$  into  $n$  subintervals, where  $n$  is a positive integer.

⇒ **define**, in a compilation unit called `trapezoidal.cpp`, a function called `trapezoidal`, that takes the integral bounds  $a$  and  $b$ , the integrand  $f$ , and the number of subintervals  $n$  as arguments, and return a value for the approximate integral. The declaration of such a function is provided in /CC1/Ex1.



The integral  $\int_{x_{i-1}}^{x_i} f(x) dx$ , representing the area of the region under curve  $y = f(x)$  and above subinterval  $[x_{i-1}, x_i]$ , is approximated by the area of a trapezoid (with one edge drawn in dotted line), which is  $[f(x_{i-1}) + f(x_i)]h/2$ .

We recall that for the trapezoidal rule:

$$\int_a^b f(t) dt = \sum_{i=1}^n \int_{x_{i-1}}^{x_i} f(t) dt$$

where

$$\int_{x_{i-1}}^{x_i} f(t) dt \approx (f(x_{i-1}) + f(x_i)) * h/2, \text{ with } h = x_i - x_{i-1}.$$

⇒ **test** your function by linking it with the provided main program. Provide in a separate file the full instructions to compile and link the different compilation units (either through a Makefile or a script file).