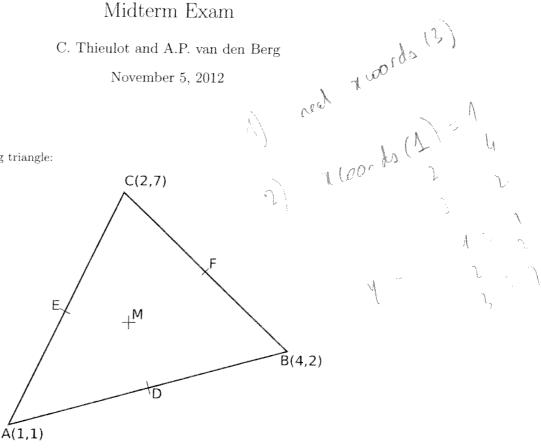Her 1

Midterm Exam

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1 Exercise 1

Let us consider the following triangle:

Write a fortran program according to the following specifications:

1. (1pt) Declare array `xcoord` which contains the 3 x-coordinates of points A, B, and C. Declare array `ycoord` which contains the 3 x-coordinates of points A, B, and C.

2. (1pt) Fill the array with the coordinates of the points as indicated on the figure.

3. (1pt) Compute the coordinates of the the barycenter $M(x_M, y_M)$ of the triangle:

$$x_M = \frac{x_A + x_B + x_C}{3}$$

$$y_M = \frac{y_A + y_B + y_C}{3}$$

4. (1pt) declare and fill the arrays `xcoordsmids` and `ycoordsmids` with the coordinates of the points D, E and F.

5. (1pt) compute the lengths AB, BC, AC of all three sides of the triangles

6. (1pt) compute the area with the following formula

$$A = \frac{1}{4}\sqrt{(AB + BC + AC)(BC + AC - AB)(BC + AB - AC)(AC + AB - BC)}$$

2 Exercise 2

Write a fortran program according to the following specifications:

1. (1pt) Let us now consider N=100 points. Declare the arrays `xcoords` and `ycoords` of the points.

2. (1pt) Fill these arrays with random numbers.

3. (1pt) Open a file and use a do-loop to write the coordinates of these points on two columns

4. (1pt) compute the barycenter coordinates of the points

$$x_M = \frac{1}{N} \sum_{i=1}^{N} x_i \qquad y_M = \frac{1}{N} \sum_{i=1}^{N} y_i$$

Recommendations:

- Every single used variable has to be defined.
- Comment your code appropriately.
- Points will be deduced for unclear/unreadable statements.
- Every single used variable has to be defined (I insist).