

MSD Pre-Enrollment

Problem Solving Exam Description

During this exam you will be asked to solve several problems by creating a solution containing only lines that specify an **assignment**, **selection**, or **iteration**. You can express your solution in English (like the examples shown below) or code if you already know a programming language.

Each problem that you're asked to solve will always specify what you **receive**, and what you're expected to **return**. Your solution should also always start with a **receive** line and end with **return** line.

Definition of Assignment:

An Assignment is where a value is stored for later use. For example:

set X to be 5

An assignment line may also contain a computation. For Example:

set Y to be what X is plus 3 (*say X equals 5, then Y in this example becomes 8*)

Definition of Selection:

Selection allows you to do something only if a condition is true.

if X is greater than 1000 then:

set X to be half of what it is now (divide X by 2)

Indent the part(s) that should happen when the condition is true.

if X is greater than 1000 then:

set X to be half of what it is now (divide X by 2)

add 1 to the value of Y

Optionally also specify what should happen when the condition is false.

if X is greater than 1000 then:

set X to be half of what it is now (divide X by 2)

add 1 to the value of Y

else:

add 1 to the value of X

Definition of Iteration

Iteration lets you specify things that should happen multiple times.

receive a list of numbers

set sum to be 0

for each number in the list: *(this line specifies iteration over the list)*

add the number to the sum *(this will happen for as many times as there are numbers in the list)*

Indent the part(s) that should happen multiple times.

set sum to be 0

set count to be 0

for each number in the list:

add one to count *(indented because it's part of the iteration)*

if the number is greater than 10: *(indented because it's part of the iteration)*

add the number to the sum *(double indented, by iteration and then selection)*

Example Problem and Solution

You **receive** a list of numbers and need to **return** the average value of the numbers that are above 10. For example, if you receive [4, 16, 25, 7, 13] you should return 18.

Example Solution:

This solution specifies if a line is an assignment, selection or iteration. This is for demonstrative purposes only, you do not need to do so for your solutions.

receive a list of numbers	<i>start with receive</i>
set sum to be 0	<i>assignment</i>
set count to be 0	<i>assignment</i>
for each number in the list:	<i>iteration</i>
if the number is greater than 10:	<i>selection</i>
add the number to the sum	<i>assignment</i>
add one to count	<i>assignment</i>
set average to be sum divided by count	<i>assignment</i>
return average	<i>end with return</i>