Programa 02
Approx Subset-Sum

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Índice

1. INTRODUCCIÓN

Resolvi approx subsetsum según lo descrito en el libro *Introduction to Algorithms*.

En la carpeta *src* se encuentra el archivo *Readme.org* donde hay instrucciones para compilar y ejecutar el programa.

2. SAMPLE1

Es el ejemplo enunciado en el libro.

```
diegomm@Graciela:~/Ciencias/ComputerScience/7th/Complejidad/Programas/02/src$ make sample1
./approx_subsetsum < samples/sample1.txt
Introduce la longitud del conjunto: Introduce los 4 números distintos (Conjunto):
Introduce el númer objetivo t: Introduce el factor de error:

---------- Ejecución de Approx-SubseSum

Conjunto: {104,102,201,101}
Entero Objetivo: 308
Factor de error: 0.400000
----------


***** Iteración #1 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 2
|0|->|104|->
========
*****

***** Iteración #2 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 3
|0|->|102|->|206|->
========
*****

***** Iteración #3 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 4
|0|->|102|->|201|->|303|->
========
*****

***** Iteración #4 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 4
|0|->|101|->|201|->|302|->
========
*****

++++++++ Resultado::
Conjunto: {104,102,201,101}
Entero Objetivo: 308
Factor de error: 0.400000
Solución aproximada: 302
++++++++
```

3. SAMPLE2

Primera (1 de 2) captura de la ejecución.

```
diegomm@Graciela:~/Ciencias/ComputerScience/7th/Complejidad/Programas/02/src$ make sample2
./approx_subsetsum < samples/sample2.txt
Introduce la longitud del conjunto: Introduce los 10 números distintos (Conjunto):
Introduce el númer objetivo t: Introduce el factor de error:

---------- Ejecución de Approx-SubseSum

Conjunto: {31,2,20,8,12,99,22,5,13,98}
Entero Objetivo: 100
Factor de error: 0.300000
----------


***** Iteración #1 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 2
|0|->|31|->
========
*****


***** Iteración #2 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 4
|0|->|2|->|31|->|33|->
========
*****


***** Iteración #3 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 8
|0|->|2|->|20|->|22|->|31|->|33|->|51|->|53|->
========
*****


***** Iteración #4 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 15
|0|->|2|->|8|->|10|->|20|->|22|->|28|->|30|->|33|->|39|->|41|->|51|->|53|->|59|->|61|->
========
*****

***** Iteración #5 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 22
|0|->|2|->|8|->|10|->|12|->|14|->|20|->|22|->|28|->|30|->|32|->|34|->|39|->|41|->|45|->|51|
>|59|->|61|->|63|->|65|->|71|->
========
*****
```

Última (2 de 2) captura de la ejecución.

```
***** Iteración #6 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 23
|0|->|2|->|8|->|10|->|12|->|14|->|20|->|22|->|28|->|30|->|32|->|34|->|39|->|41|->|45|->|51|->|53|-
>|59|->|61|->|63|->|65|->|71|->|99|->
========
*****

***** Iteración #7 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 32
|0|->|2|->|8|->|10|->|12|->|14|->|20|->|22|->|24|->|28|->|30|->|32|->|34|->|36|->|39|->|41|->|44|-
>|50|->|52|->|54|->|56|->|59|->|61|->|63|->|65|->|67|->|71|->|75|->|81|->|85|->|93|->|99|->
========
*****

***** Iteración #8 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 36
|0|->|2|->|5|->|7|->|10|->|12|->|14|->|17|->|19|->|22|->|24|->|27|->|29|->|32|->|34|->|36|->|39|->
|41|->|44|->|46|->|49|->|52|->|54|->|56|->|59|->|61|->|63|->|65|->|67|->|70|->|75|->|80|->|85|->|9
0|->|93|->|98|->
========
*****

***** Iteración #9 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 36
|0|->|2|->|5|->|7|->|10|->|12|->|14|->|17|->|19|->|22|->|24|->|27|->|29|->|32|->|34|->|36|->|39|->
|41|->|44|->|46|->|49|->|52|->|54|->|56|->|59|->|61|->|63|->|65|->|67|->|70|->|74|->|78|->|83|->|8
8|->|93|->|98|->
========
*****

***** Iteración #10 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 36
|0|->|2|->|5|->|7|->|10|->|12|->|14|->|17|->|19|->|22|->|24|->|27|->|29|->|32|->|34|->|36|->|39|->
|41|->|44|->|46|->|49|->|52|->|54|->|56|->|59|->|61|->|63|->|65|->|67|->|70|->|74|->|78|->|83|->|8
8|->|93|->|98|->
========
*****

++++++++ Resultado::
Conjunto: {31,2,20,8,12,99,22,5,13,98}
Entero Objetivo: 100
Factor de error: 0.300000
Solución aproximada: 98
++++++++
```

4. SAMPLE3

```
diegomm@Graciela:~/Ciencias/ComputerScience/7th/Complejidad/Programas/02/src$ make sample3
./approx_subsetsum < samples/sample3.txt
Introduce la longitud del conjunto: Introduce los 5 números distintos (Conjunto):
Introduce el númer objetivo t: Introduce el factor de error:

---------- Ejecución de Approx-SubseSum

Conjunto: {31,10,25,20,21}
Entero Objetivo: 90
Factor de error: 0.400000
----------


***** Iteración #1 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 2
|0|->|31|->
========
*****

***** Iteración #2 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 4
|0|->|10|->|31|->|41|->
========
*****

***** Iteración #3 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 8
|0|->|10|->|25|->|31|->|35|->|41|->|56|->|66|->
========
*****

***** Iteración #4 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 14
|0|->|10|->|20|->|25|->|30|->|35|->|41|->|45|->|51|->|55|->|61|->|66|->|76|->|86|->
========
*****

***** Iteración #5 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 16
|0|->|10|->|20|->|25|->|30|->|35|->|41|->|45|->|51|->|55|->|61|->|66|->|72|->|76|->|82|->|87|->
========
*****

++++++++ Resultado::
Conjunto: {31,10,25,20,21}
Entero Objetivo: 90
Factor de error: 0.400000
Solución aproximada: 87
```

5. Sample4

Primer (1 de 4) captura de la ejecución.

```
diegomm@Graciela:~/Ciencias/ComputerScience/7th/Complejidad/Programas/02/src$ make sample4
./approx_subsetsum < samples/sample4.txt
Introduce la longitud del conjunto: Introduce los 15 números distintos (Conjunto):
Introduce el númer objetivo t: Introduce el factor de error:

---------- Ejecución de Approx-SubseSum

Conjunto: {20,70,35,61,31,90,76,12,73,65,54,46,15,17,19}
Entero Objetivo: 650
Factor de error: 0.400000
----------


***** Iteración #1 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 2
|0|->|20|->
========
*****

***** Iteración #2 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 4
|0|->|20|->|70|->|90|->
========
*****

***** Iteración #3 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 8
|0|->|20|->|35|->|55|->|70|->|90|->|105|->|125|->
========
*****

***** Iteración #4 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 16
|0|->|20|->|35|->|55|->|61|->|70|->|81|->|90|->|96|->|105|->|116|->|125|->|131|->|151|->|166|->|18
6|->
========
*****

***** Iteración #5 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 30
|0|->|20|->|31|->|35|->|51|->|55|->|61|->|66|->|70|->|81|->|86|->|90|->|96|->|101|->|105|->|112|->
|116|->|121|->|125|->|131|->|136|->|147|->|151|->|156|->|162|->|166|->|182|->|186|->|197|->|217|->
========
*****
```

Segunda (2 de 4) captura de la ejecución.

```
***** Iteración #6 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 45
|0|->|20|->|31|->|35|->|51|->|55|->|61|->|66|->|70|->|81|->|86|->|90|->|96|->|101|->|105|->|110|->
|116|->|121|->|125|->|131|->|136|->|141|->|145|->|151|->|156|->|160|->|166|->|171|->|176|->|180|->
|186|->|191|->|195|->|202|->|206|->|211|->|215|->|221|->|226|->|237|->|246|->|252|->|272|->|287|->
|307|->
========
*****

***** Iteración #7 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 58
|0|->|20|->|31|->|35|->|51|->|55|->|61|->|66|->|70|->|76|->|81|->|86|->|90|->|96|->|101|->|105|->|
110|->|116|->|121|->|125|->|131|->|136|->|141|->|145|->|151|->|156|->|160|->|166|->|171|->|176|->|
180|->|186|->|191|->|195|->|201|->|206|->|211|->|215|->|221|->|226|->|232|->|237|->|242|->|247|->|
252|->|262|->|267|->|272|->|278|->|287|->|297|->|302|->|313|->|322|->|328|->|348|->|363|->|383|->
========
*****

***** Iteración #8 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 72
|0|->|12|->|20|->|31|->|35|->|43|->|47|->|51|->|55|->|61|->|63|->|66|->|70|->|73|->|76|->|81|->|86
|->|90|->|93|->|96|->|101|->|105|->|108|->|113|->|116|->|121|->|125|->|128|->|131|->|136|->|141|->
|145|->|148|->|151|->|156|->|160|->|166|->|171|->|176|->|180|->|186|->|191|->|195|->|201|->|206|->
|211|->|215|->|221|->|226|->|232|->|237|->|242|->|247|->|252|->|259|->|264|->|272|->|278|->|284|->
|290|->|297|->|302|->|309|->|322|->|328|->|334|->|340|->|348|->|360|->|375|->|383|->|395|->
========
*****

***** Iteración #9 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 80
|0|->|12|->|20|->|31|->|35|->|43|->|47|->|51|->|55|->|61|->|63|->|66|->|70|->|73|->|76|->|81|->|85
|->|90|->|93|->|96|->|101|->|104|->|108|->|113|->|116|->|120|->|124|->|128|->|131|->|134|->|139|->
|143|->|146|->|149|->|154|->|159|->|163|->|169|->|174|->|178|->|186|->|191|->|195|->|201|->|206|->
|211|->|215|->|221|->|226|->|232|->|237|->|242|->|247|->|252|->|259|->|264|->|272|->|278|->|284|->
|290|->|297|->|302|->|309|->|315|->|322|->|328|->|334|->|340|->|348|->|357|->|363|->|370|->|382|->
|395|->|407|->|421|->|433|->|448|->|456|->|468|->
========
*****
```

Tercer (3 de 4) captura de la ejecución.

```
***** Iteración #10 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 88
|0|->|12|->|20|->|31|->|35|->|43|->|47|->|51|->|55|->|61|->|63|->|65|->|70|->|73|->|76|->|81|->|85
|->|90|->|93|->|96|->|100|->|104|->|108|->|112|->|116|->|120|->|124|->|128|->|131|->|134|->|138|->
|141|->|146|->|149|->|154|->|158|->|163|->|169|->|173|->|178|->|185|->|189|->|193|->|199|->|204|->
|208|->|214|->|219|->|224|->|228|->|234|->|239|->|247|->|252|->|259|->|264|->|271|->|276|->|284|->
|290|->|297|->|302|->|309|->|315|->|322|->|328|->|334|->|340|->|348|->|355|->|362|->|370|->|380|->
|387|->|395|->|405|->|413|->|421|->|428|->|435|->|447|->|456|->|468|->|486|->|498|->|513|->|521|->
|533|->
========
*****

***** Iteración #11 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 95
|0|->|12|->|20|->|31|->|35|->|43|->|47|->|51|->|54|->|61|->|63|->|65|->|70|->|73|->|76|->|81|->|85
|->|89|->|93|->|96|->|100|->|104|->|108|->|112|->|115|->|119|->|124|->|127|->|130|->|134|->|138|->
|141|->|144|->|147|->|150|->|154|->|158|->|162|->|166|->|170|->|174|->|178|->|182|->|188|->|192|->
|199|->|203|->|208|->|212|->|217|->|223|->|227|->|232|->|239|->|247|->|252|->|258|->|264|->|271|->
|276|->|282|->|288|->|293|->|301|->|309|->|315|->|322|->|328|->|334|->|340|->|348|->|355|->|362|->
|369|->|376|->|387|->|394|->|402|->|409|->|416|->|424|->|434|->|441|->|449|->|456|->|467|->|475|->
|486|->|498|->|510|->|521|->|533|->|552|->|567|->|587|->
========
*****

***** Iteración #12 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 103
|0|->|12|->|20|->|31|->|35|->|43|->|46|->|51|->|54|->|58|->|61|->|63|->|65|->|70|->|73|->|76|->|81
|->|85|->|89|->|93|->|96|->|100|->|104|->|107|->|111|->|115|->|119|->|122|->|127|->|130|->|134|->|
138|->|141|->|144|->|147|->|150|->|154|->|158|->|162|->|166|->|170|->|174|->|178|->|182|->|187|->|
192|->|196|->|200|->|204|->|208|->|212|->|216|->|220|->|224|->|228|->|234|->|239|->|245|->|252|->|
258|->|263|->|269|->|276|->|282|->|288|->|293|->|298|->|304|->|310|->|317|->|328|->|334|->|340|->|
347|->|355|->|361|->|368|->|374|->|380|->|387|->|394|->|401|->|408|->|415|->|422|->|433|->|440|->|
448|->|455|->|467|->|475|->|486|->|495|->|510|->|521|->|532|->|544|->|556|->|567|->|579|->|598|->|
613|->|633|->
========
*****

***** Iteración #13 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 106
|0|->|12|->|15|->|20|->|27|->|31|->|35|->|43|->|46|->|50|->|54|->|58|->|61|->|63|->|65|->|69|->|73
|->|76|->|80|->|85|->|88|->|91|->|96|->|100|->|104|->|107|->|111|->|115|->|119|->|122|->|126|->|13
0|->|134|->|137|->|141|->|144|->|147|->|150|->|153|->|158|->|162|->|166|->|170|->|174|->|178|->|18
2|->|187|->|192|->|196|->|200|->|204|->|208|->|212|->|216|->|220|->|224|->|228|->|234|->|239|->|24
5|->|252|->|258|->|263|->|269|->|276|->|282|->|288|->|293|->|298|->|303|->|310|->|317|->|325|->|33
2|->|340|->|347|->|355|->|361|->|368|->|374|->|380|->|387|->|394|->|401|->|408|->|415|->|422|->|43
0|->|437|->|448|->|455|->|463|->|475|->|486|->|495|->|510|->|521|->|532|->|544|->|556|->|567|->|57
9|->|594|->|613|->|628|->|648|->
========
*****
```

Última (4 de 4) captura de la ejecución.

```
***** Iteración #14 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 115
|0|->|12|->|15|->|17|->|20|->|27|->|29|->|31|->|35|->|37|->|43|->|46|->|48|->|50|->|52|->|54|->|58
|->|60|->|63|->|65|->|67|->|69|->|71|->|73|->|75|->|78|->|82|->|85|->|88|->|91|->|96|->|100|->|104
|->|107|->|111|->|115|->|119|->|122|->|126|->|130|->|134|->|137|->|141|->|144|->|147|->|150|->|153
|->|158|->|162|->|166|->|170|->|174|->|178|->|182|->|187|->|191|->|195|->|199|->|204|->|208|->|212
|->|216|->|220|->|224|->|228|->|233|->|239|->|245|->|251|->|256|->|262|->|269|->|275|->|280|->|286
|->|293|->|298|->|303|->|310|->|317|->|325|->|332|->|340|->|347|->|355|->|361|->|368|->|374|->|380
|->|387|->|394|->|401|->|408|->|415|->|422|->|430|->|437|->|447|->|454|->|463|->|472|->|480|->|492
|->|503|->|512|->|521|->|532|->|544|->|556|->|567|->|579|->|594|->|611|->|628|->|645|->
========
*****

***** Iteración #15 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 119
|0|->|12|->|15|->|17|->|19|->|27|->|29|->|31|->|34|->|36|->|39|->|43|->|46|->|48|->|50|->|52|->|54
|->|56|->|58|->|60|->|62|->|65|->|67|->|69|->|71|->|73|->|75|->|77|->|82|->|85|->|88|->|91|->|94|-
|>|97|->|100|->|104|->|107|->|110|->|115|->|119|->|122|->|126|->|130|->|134|->|137|->|141|->|144|->
|147|->|150|->|153|->|158|->|162|->|166|->|170|->|174|->|178|->|182|->|187|->|191|->|195|->|199|->
|204|->|208|->|212|->|216|->|220|->|224|->|228|->|233|->|239|->|245|->|251|->|256|->|262|->|269|->
|275|->|280|->|286|->|293|->|298|->|303|->|310|->|317|->|325|->|332|->|340|->|347|->|355|->|361|->
|368|->|374|->|380|->|387|->|394|->|401|->|408|->|415|->|422|->|430|->|437|->|447|->|454|->|463|->
|472|->|480|->|491|->|499|->|511|->|521|->|531|->|540|->|551|->|563|->|575|->|586|->|598|->|611|->
|628|->|645|->
========
*****

++++++++ Resultado::
Conjunto: {20,70,35,61,31,90,76,12,73,65,54,46,15,17,19}
Entero Objetivo: 650
Factor de error: 0.400000
Solución aproximada: 645
++++++++
```

6. SAMPLE5

Primer (1 de 2) captura de la ejecución.

```
diegomm@Graciela:~/Ciencias/ComputerScience/7th/Complejidad/Programas/02/src$ make sample5
./approx_subsetsum < samples/sample5.txt
Introduce la longitud del conjunto: Introduce los 10 números distintos (Conjunto):
Introduce el númer objetivo t: Introduce el factor de error:

---------- Ejecución de Approx-SubseSum

Conjunto: {15,18,23,27,31,3,17,51,9,19}
Entero Objetivo: 165
Factor de error: 0.500000
----------


***** Iteración #1 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 2
|0|->|15|->
========
*****

***** Iteración #2 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 4
|0|->|15|->|18|->|33|->
========
*****

***** Iteración #3 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 8
|0|->|15|->|18|->|23|->|33|->|38|->|41|->|56|->
========
*****

***** Iteración #4 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 15
|0|->|15|->|18|->|23|->|27|->|33|->|38|->|41|->|45|->|50|->|56|->|60|->|65|->|68|->|83|->
========
*****

***** Iteración #5 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 22
|0|->|15|->|18|->|23|->|27|->|31|->|33|->|38|->|41|->|45|->|49|->|54|->|58|->|64|->|68|->|72|->|76
|->|81|->|87|->|91|->|96|->|114|->
========
*****
```

Última (2 de 2) captura de la ejecución.

```
***** Iteración #6 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 27
|0|->|3|->|15|->|18|->|21|->|23|->|26|->|30|->|33|->|36|->|38|->|41|->|44|->|48|->|52|->|57|->|61|
->|64|->|67|->|71|->|75|->|79|->|84|->|90|->|94|->|99|->|114|->
========
*****

***** Iteración #7 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 32
|0|->|3|->|15|->|17|->|20|->|23|->|26|->|30|->|32|->|35|->|38|->|40|->|43|->|47|->|50|->|53|->|57|
->|61|->|64|->|67|->|71|->|74|->|78|->|81|->|88|->|92|->|96|->|101|->|107|->|111|->|116|->|131|->
========
*****

***** Iteración #8 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 37
|0|->|3|->|15|->|17|->|20|->|23|->|26|->|30|->|32|->|35|->|38|->|40|->|43|->|47|->|50|->|53|->|57|
->|61|->|64|->|67|->|71|->|74|->|77|->|81|->|86|->|91|->|96|->|101|->|107|->|111|->|115|->|122|->|
129|->|139|->|147|->|152|->|158|->
========
*****

***** Iteración #9 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 40
|0|->|3|->|9|->|12|->|15|->|17|->|20|->|23|->|26|->|29|->|32|->|35|->|38|->|40|->|43|->|47|->|50|-
>|53|->|56|->|59|->|62|->|66|->|70|->|73|->|76|->|80|->|83|->|90|->|95|->|100|->|105|->|110|->|115
|->|120|->|124|->|129|->|138|->|147|->|152|->|158|->
========
*****

***** Iteración #10 de Approx-SubsetSum:
======== Imprimiendo Lista
List length: 43
|0|->|3|->|9|->|12|->|15|->|17|->|19|->|22|->|26|->|28|->|31|->|34|->|36|->|38|->|40|->|42|->|45|-
>|48|->|51|->|54|->|57|->|62|->|66|->|69|->|72|->|75|->|78|->|81|->|85|->|89|->|95|->|99|->|105|->
|109|->|114|->|119|->|124|->|129|->|134|->|139|->|147|->|152|->|157|->
========
*****

++++++++ Resultado::
Conjunto: {15,18,23,27,31,3,17,51,9,19}
Entero Objetivo: 165
Factor de error: 0.500000
Solución aproximada: 157
++++++++
```