**Code :-**

import sys

3. import time

4.

5. def menu():

6. print(" Main Menu\n")

7. print(" 1. Rupiah Coin Change by Brute Force\n")

8. print(" 2. Rupiah Coin Change by Greedy Algorithm\n")

9. print(" 0. Exit\n")

10.

11. def getNumOfCoins(coins,sum):

12. if (sum==0):

13. return 0

14. else:

15. result = sys.maxsize #max integer

16. for coin in coins:

17. if (coin<=sum):

18. result = min(result, getNumOfCoins(coins,sum-

coin)+1)

19. return result

20.

21. def greedy(exchange):

22. jmlh7 = 0

23. jmlh5 = 0

24. jmlh3 = 0

25. jmlh1 = 0

26. while(exchange != 0):

27. if(exchange>=1000):

28. exchange = exchange-1000

29. jmlh7 = jmlh7+1

30. elif(exchange>=500):

31. exchange = exchange-500

32. jmlh5 = jmlh5+1

33. elif(exchange>=200):

34. exchange = exchange-200

35. jmlh3 = jmlh3+1

36. else:

37. exchange = exchange-100

38. jmlh1 = jmlh1+1

39. print(" Jumlah coin 1000 :",jmlh7)

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36. else:

37. exchange = exchange-100

38. jmlh1 = jmlh1+1

39. print(" Jumlah coin 1000 :",jmlh7)

print(" Jumlah coin 500 :",jmlh5)

41. print(" Jumlah coin 200 :",jmlh3)

42. print(" Jumlah coin 100 :",jmlh1)

43.

44.

45. if \_\_name\_\_ == "\_\_main\_\_":

46. coins = [100,200,500,1000]

47. stsum = input("Enter Rupiah amount to change in coin: ")

48. sum = int(stsum)

49. menu()

50. val = input(" Enter your choice: ")

51. while val!='0':

52. if val=='1':

53. print(" Coins : ",coins)

54. print(" Sum : ",sum)

55. begin = time.perf\_counter()

56. print(" Minimum coins:

",getNumOfCoins(coins,sum))

57. end = time.perf\_counter()

58. print(" Time execution : ",end-begin)

59. elif val=='2':

60. begin = time.perf\_counter()

61. greedy(sum)

62. end = time.perf\_counter()

63. print(" Time execution : ",end-begin)

64. menu()

65. val = input(" Enter your choice: ")

40. print(" Jumlah coin 500 :",jmlh5)

41. print(" Jumlah coin 200 :",jmlh3)

42. print(" Jumlah coin 100 :",jmlh1)

43.

44.

45. if \_\_name\_\_ == "\_\_main\_\_":

46. coins = [100,200,500,1000]

47. stsum = input("Enter Rupiah amount to change in coin: ")

48. sum = int(stsum)

49. menu()

50. val = input(" Enter your choice: ")

51. while val!='0':

52. if val=='1':

53. print(" Coins : ",coins)

54. print(" Sum : ",sum)

55. begin = time.perf\_counter()

56. print(" Minimum coins:

",getNumOfCoins(coins,sum))

57. end = time.perf\_counter()

58. print(" Time execution : ",end-begin)

59. elif val=='2':

60. begin = time.perf\_counter()

61. greedy(sum)

62. end = time.perf\_counter()

63. print(" Time execution : ",end-begin)

64. menu()

65. val = input(" Enter your choice: ")

Pseudo-code :

a) Brute Force

Function getNumOfCoins(coins, sum)

If (sum=0) then

Return 0

Else

result = max integer

coin=0

For (coin<coins.length) do //array start at 0

if (coins[coin]<=sum) then

result =

min(result,getNumOfCoins(coins,sum-

coin)+1)

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Function getNumOfCoins(coins, sum)

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if (coins[coin]<=sum) then

result =

min(result,getNumOfCoins(coins,sum-

coin)+1)

b) Greedy Algorithm

Function greedy(exchange)

Jmlh7 = 0

Jmlh5 = 0

Jmlh3 = 0

Jmlh1 = 0

While(exchange ≠ 0) do

If(exchange>=1000) then

Exchange = exchange-1000

Jmlh7=jmlh7+1

Else if(exchange>=500) then

Exchange = exchange-500

Jmlh5=jmlh5+1

Else if(exchange>=200) then

Exchange = exchange-200

Jmlh3=jmlh3+1

Else

Exchange= exchange-100

Jmlh1=jmlh1+1

Endwhile

Print(“Jumlah coin 1000:”, jmlh7)

Print(“Jumlah coin 500:”, jmlh5)

Print(“Jumlah coin 200:”, jmlh3)

Print(“Jumlah coin 100:”, jmlh1)

b) Greedy Algorithm

Function greedy(exchange)

Jmlh7 = 0

Jmlh5 = 0

Jmlh3 = 0

Jmlh1 = 0

While(exchange ≠ 0) do

If(exchange>=1000) then

Exchange = exchange-1000

Jmlh7=jmlh7+1

Else if(exchange>=500) then

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Exchange = exchange-200

Jmlh3=jmlh3+1

Else

Exchange= exchange-100

Jmlh1=jmlh1+1

Endwhile

Print(“Jumlah coin 1000:”, jmlh7)

Print(“Jumlah coin 500:”, jmlh5)

Print(“Jumlah coin 200:”, jmlh3)

Print(“Jumlah coin 100:”, jmlh1)