Memory occupation with Date, Address, Purchase, and Shopper classes

# Class Date

class Date {

public:

// Data members

int day, month, year;

};

|  |  |  |
| --- | --- | --- |
| day (int) | month (int) | year (int) |
|  |  |  |
| 4 bytes | 4 bytes | 4 bytes |

Size: 12 bytes

# Class Address

#define MAX\_CHAR\_ARRAY 99 + 1

#define MAX\_POSTAL\_CODE 6 + 1

class Address {

public:

// Data members

int number;

char street[MAX\_CHAR\_ARRAY], city[MAX\_CHAR\_ARRAY], zip[MAX\_POSTAL\_CODE];

};

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| number (int) | street (char[]) | | | city (char[]) | | | zip (char[]) | | | alignment to multiples of 4 |
|  | 0 |  | 99 | 0 |  | 99 | 0 |  | 6 |  |
|  |  | ... |  |  | ... |  |  | ... |  |  |
| 4 bytes | 100 bytes | | | 100 bytes | | | 7 bytes | | | 1 byte |

Size: 212 bytes (211 rounded to the nearest multiple of 4)

# Class Purchase

class Purchase {

public:

// Data members

Date saleDate;

double amount;

};

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| saleDate (Date) | Alignment to multiples of 8 | | | | amount (double) |
|  |  |  |  |  |  |
| 12 bytes | 4 bytes | | | | 8 bytes |

Size: 24 bytes (20 rounded to the nearest multiple of 8)

# Class Shopper

#define MAX\_PURCHASES 50

#define MAX\_NAME\_LENGTH 25

class Shopper {

public:

// Data members

int number;

char name[MAX\_NAME\_LENGTH];

Address Address;

double balance;

int nbPurchases;

Purchase purchases[MAX\_PURCHASES];

};

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| number (int) | name (char[]) | | | alignment | | | address | alignment | | | | balance (double) | nbPurchases (int) | alignment | | | | purchases (Purchase[]) | | |
|  | 0 |  | 24 | to multiples of 4 | | |  | to multiples of 8 | | | |  |  | to multiples of 8 | | | | 0 |  | 49 |
|  |  | ... |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | ... |  |
| 4 bytes | 25 bytes | | | 3 bytes | | | 212 bytes | 4 bytes | | | | 8 bytes | 4 bytes | 4 bytes | | | | 50\*24=1200 bytes | | |

Size: 1464 bytes