Exercise 3 (10 points)

- The first lines of all source files must be comment containing your name & ID
- Put all files (source, input, output) in folder Ex3_xxx where xxx = your full ID. That is, your source files must be in package Ex3_xxx and input/output files (if there is any) must be read from/write to this folder
- Zip Ex3_xxx & submits it to Google Classroom. Email submission is not accepted

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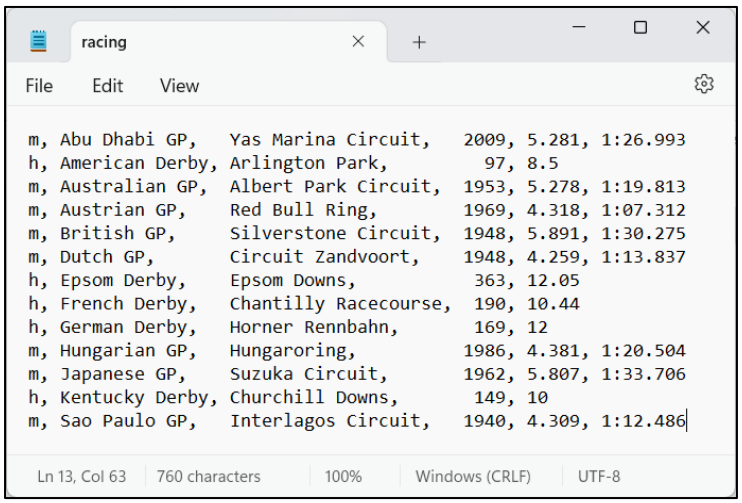
1. Copy class Racing to your source file. This class must not be changed at all.

```
class Racing
{
    public static final int CURRENT_YEAR = 2024;

    private   String event, venue;
    protected int    venueOpened, venueAge;

    public Racing(String nm, String vn)   { event = nm; venue = vn; }
    public String getEvent()              { return event; }
    public String getVenue()              { return venue; }
    public void printVenue()              { /* override this in child class */ }
    public void printDetails()            { /* override this in child class */ }
}
```

2. Write classes HorseRacing and MotorRacing that extend Racing.
   - HorseRacing : add variables distanceFurlong, distanceKM
   - MotorRacing : add variables laplength, laptimeMS, speed
   - Other variables and methods can be added to these classes

3. Write another class that acts as the main class. In main method,
   3.1 Create an array of 13 Racing objects, e.g. Racing [] allRaces
   3.2 Read each line of input file into allRaces[i]. For each line, the type of allRaces[i] may be HorseRacing or MotorRacing object depending on the input.

- Col 0 = type
  h = HorseRacing
  m = MotorRacing
- Col 1 = event
- Col 2 = venue
- For HorseRacing
  Col 3 = venue's age
  Col 4 = distance in Furlong
- For MotorRacing
  Col 3 = venue's opened year
  Col 4 = lap length in Km
  Col 5 = lap time in min:sec.ms



Note 1 - Read the whole line into a string (e.g. line) and split it at comma. Trim spaces before converting string to number; otherwise, you'll get runtime exception.

```
String line    = scan.nextLine();
String [] cols = line.split(",");
int year       = Integer.parseInt( cols[3].trim() );
```

- You can also split lap time string into min & sec.ms at colon.

```
String lapStr  = cols[5];
String [] laps = lapStr.split(":");
```

Note 2 - To compare strings

```
if (type.equals("h"))              // create HorseRacing object
if (type.equalsIgnoreCase("h"))    // create HorseRacing object

or use switch-case
```

3.3 For both types of objects -> calculate venue's opened year from age (HorseRacing) or venue's age from opened year (MotorRacing). Print all events and their venues with opened years & ages in the reverse order of the input.

3.4 For HorseRacing -> calculate race distance in km (5 furlongs = 1 km). Print event and race distance in furlongs and km – both with 2 decimal places. The output order must follow the original input order

3.5 For MotorRacing -> calculate average speed in km/hr. Print event, lap length and lap time in the original input format, and average speed in km/hr with 1 decimal place. The output order must follow the original input order.

Note 4 – Let lap length in km = X and lap time in ms = Y. Using rule-of-3

```
With Y ms              you travel X km
With Z ms (in 1 hr)    you travel ? km    --> speed in km/hr
```

Note 5 – To check type of object

```
if (allRaces[i] instanceof HorseRacing)
   HorseRacing hr = (HorseRacing) allRaces[i];
```

```
--- exec-maven-plugin:3.0.0:exec (default-cli) @ solutions ---
=== All races (reverse order) ===
Sao Paulo GP        venue = Interlagos Circuit    (opened 1940,  84 years ago)
Kentucky Derby      venue = Churchill Downs       (opened 1875, 149 years ago)
Japanese GP         venue = Suzuka Circuit        (opened 1962,  62 years ago)
Hungarian GP        venue = Hungaroring           (opened 1986,  38 years ago)
German Derby        venue = Horner Rennbahn       (opened 1855, 169 years ago)
French Derby        venue = Chantilly Racecourse  (opened 1834, 190 years ago)
Epsom Derby         venue = Epsom Downs           (opened 1661, 363 years ago)
Dutch GP            venue = Circuit Zandvoort     (opened 1948,  76 years ago)
British GP          venue = Silverstone Circuit   (opened 1948,  76 years ago)
Austrian GP         venue = Red Bull Ring         (opened 1969,  55 years ago)
Australian GP       venue = Albert Park Circuit   (opened 1953,  71 years ago)
American Derby      venue = Arlington Park        (opened 1927,  97 years ago)
Abu Dhabi GP        venue = Yas Marina Circuit    (opened 2009,  15 years ago)

=== Only Horse races (input order) ===
American Derby      distance =  8.50 furlongs   = 1.70 km
Epsom Derby         distance = 12.05 furlongs   = 2.41 km
French Derby        distance = 10.44 furlongs   = 2.09 km
German Derby        distance = 12.00 furlongs   = 2.40 km
Kentucky Derby      distance = 10.00 furlongs   = 2.00 km

=== Only Motor races (input order) ===
Abu Dhabi GP        lap = 5.281 km     lap time = 1:26.993 mins     avg speed = 218.5 km/hr
Australian GP       lap = 5.278 km     lap time = 1:19.813 mins     avg speed = 238.1 km/hr
Austrian GP         lap = 4.318 km     lap time = 1:07.312 mins     avg speed = 230.9 km/hr
British GP          lap = 5.891 km     lap time = 1:30.275 mins     avg speed = 234.9 km/hr
Dutch GP            lap = 4.259 km     lap time = 1:13.837 mins     avg speed = 207.7 km/hr
Hungarian GP        lap = 4.381 km     lap time = 1:20.504 mins     avg speed = 195.9 km/hr
Japanese GP         lap = 5.807 km     lap time = 1:33.706 mins     avg speed = 223.1 km/hr
Sao Paulo GP        lap = 4.309 km     lap time = 1:12.486 mins     avg speed = 214.0 km/hr
------------------------------------------------------------------------
```