Overview

- Defining our own data-types (enumerated data-types),
- Control structures `case ... of ...`,
- Basic sorting algorithms,
- Compiler directives,
- Files (text files),
- Basic sorting algorithms.

How to pass an array as a parameter?

- In Classical Pascal we have to define our own data-type (show why the naive approach does not work).
- Turbo Pascal (and also Free Pascal) support open-array parameters.

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- trivial use: `type int=integer;`
- use: `type x=array[1..10] of integer;`

Example

```
program nnn;
type arr=array[1..10] of integer;
var p:arr;
procedure output(a:arr);
var i:integer;
begin
    for i:=1 to 10 do
        writeln(a[i]);
end;
begin
...output(p);
end.
```

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- We say that the argument is an array of a particular type, but we omit limits.
- Example: `procedure output(a:array of integer);`
- The argument is an array indexed from 0 to N.
- The value N can be determined using a function `high`.

Example using open-array parameters

```
procedure output(a:array of integer);
var i:integer;
begin
      for i:=0 to high(a) do
            writeln(a[i]);
end;
```

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- the numbers get assigned by the compiler.

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- individual values are in the brackets separated by commas.
- Example: `type daysofweek=(monday,tuesday, wednesday, thursday,friday, saturday, sunday);`
- Or we may directly define a variable of enumerated type: `var cal:(monday,tuesday,wednesday,thursday, friday, saturday,sunday);`

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- What should we do in order to write out the names of the days?
- Either we use large `if`-clause or `case variable of ...`

Structure `case ... of ...`

- It helps us to create many branches (in a program) depending on the value of a variable.
- Syntax:

```
case variable_name of
    value1: statement or blok
    value2: statement or blok
    else statement or blok
end;
```

- Only the branch labeled by current value of the variable gets executed. The `else`-branch gets executed otherwise (for other values).
- The `else`-clause is not compulsory!
- If the last clause is a block, we write the keyword `end` twice (the former closes the block, the latter finishes the `case` block.

Example – calendar

can be found at
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- just the "comment" begins with the string-character ($). Then we place (usually 1-character long) name and a switch +/−.

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  - The full list can be found in the manual (some directives are compiler-dependent).

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- This variable gets assigned to a given file by the `Assign`-function,
- then we open the file using `Reset`, `Rewrite` or `Append`,
- after that we read (using `Read` and `Readln` functions). This time we give the `Text`-type variable as the first argument,
- writing into the file is done in the same way by calling `Write` or `Writeln` functions.
- Finally we close the file using the `Close`-function.

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- `Reset(f);` – open the file represented by `f` (for reading).
- `Rewrite(f);` – open `f` if it exists, destroy (erase) its contain.
- `Append(f);` – open `f` for appending (writing behind its current end).

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- `Close(f);` – Close the file (we won't use it anymore).

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- `eof(f);` – function returning `boolean` depending on whether we are (already) at the end of the file.
- `eof;` – function announcing the end of standard input (usually from keyboard).
- There are many further function `Rename`, `Erase`,...

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- It can happen that a file we try to open with `Reset` does not exist.
- This causes an input/output error.
- To avoid this we can either destroy the file (calling `Rewrite` – this always creates a file): but this is usually very counter-productive! Alternatively, we use an appropriate compiler-directive (to switch the input/output error off) and if an error occurs, we find out about it by calling the `IOResult`-function.

Example

```
Assign(f,'file.txt');
{$I-} {Switch the tests on input/output errors off}
Reset(f);
{$I+} {Switch IO-error on again}
if IOResult<>0 then
begin writeln('A problem!'); halt;
end;
while not eof(f) do begin
      readln(f,s);
      writeln(s);
end;
```

Beware that `IOResult` is a function and thus after calling it, the error-value gets replaced by 0. Thus we have to store it into a variable (for further use).