The **schedule** package*

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Abstract

A new environment, **schedule**, is defined. Primarily intended for con-
structing charts of recurring weekly appointments, the environment may
also be used to create a schedule of events and sign-up sheets (for example,
scheduling mandatory office visits with students for discussing paper topics,
etc.)

This package requires the packages **calc** and **color**.

1 Introduction

**schedule** provides a simple interface for creating graphical charts displaying
weekly appointments. Many respects of the overall layout can be customized to
suit the user’s desires. Unless these default settings are changed, the created sched-
ule will run from Monday to Friday, 8:00am to 5:00pm, and the only predefined
command to insert appointments will be **\class**, which draws the appointment
using black text on a medium-gray background.

The main feature of the **schedule** package is its accuracy in diagramming the
length of appointments. Unlike some professionally available schedule creation
programs, the representation of the length of appointments in the **schedule** pack-
age is accurate to the minute. In other words, if you have two appointments, one
running from 2:00pm to 3:30pm on Tuesday and another running from 2:00pm to
3:31pm on Wednesday, there is a visible difference between the two representa-
tions. Unfortunately, unless you have a high-resolution printer (by which I mean
more than 600 dpi) these differences will likely only be noticeable by a on-screen
previewing program like **ghostview**.

2 Examples

The following schedule is typeset using the commands:

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\begin{schedule}[Fall Quarter, 1997]
  \class{Moral Philosophy}{HOB2 233}{M}{14:00-16:50}
  \class{Math Logic}{EIC 128}{T,\text{Th}}{11:00-12:20}
  \class{Critical Reasoning}{SSL 290}{M,\text{W, F}}{13:00-13:50}
  \meeting{Departmental Meeting}{HOB2 233}{W}{12:00-12:50}
  \workshop{Crit. Reas. Workshop}{HOB2 233}{T}{13:00-13:50}
  \class{Office Hours}{HOB2 210}{W, \text{F}}{14:00-14:50}
\end{schedule}

The result is:

<table>
<thead>
<tr>
<th>Time</th>
<th>Monday</th>
<th>Tuesday</th>
<th>Wednesday</th>
<th>Thursday</th>
<th>Friday</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00 am</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:30 am</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:00 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:30 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:00 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:30 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:00 pm</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This example demonstrates all of the user-customizable options. Note several “features” of the package:

1. Appointments falling outside of the specified time range for the schedule are automatically truncated to fit. If the appointment falls entirely outside of the time range, it is not printed at all.

2. The command \texttt{\class} is predefined to chart appointments pertaining to class attendance. New appointment types may be defined by the user via the \texttt{\NewAppointment} command. The new appointments may use any predefined color for the text or background. Note that the \texttt{color} package allows one to define new colors.

3. The boxes created to represent appointments are sized to be accurate to the minute. In other words, if you have two appointments, one 52 minutes long and the other 53 minutes long, the box representing the second appointment will be slightly longer.

4. The schedule is typeset in a centered displayed environment.
3 User Commands

\CellHeight Including \CellHeight{length} before the schedule environment tells \LaTeX how much vertical space a single hour ought to take up.

\CellWidth Including \CellWidth{width} before the schedule environment tells \LaTeX how wide to make every cell in the schedule. The overall width of the schedule is determined by multiplying this value by the number of days (set by the \FiveDay or \SevenDay command), plus the width of the time labels on the left-hand side.

\TimeRange This command must appear before the schedule environment, otherwise \LaTeX will not know how deep to make the grid. It is important to note that the time range is specified using a 24-hour format, with a single hyphen between the two times. Deviating from this format will generate an error.

\SubUnits The \SubUnits{number} tells the package how to subdivide the hour. If one does not want any subdivisions, simply use \SubUnits{60}. The value of \langle number \rangle can be any number than evenly divides 60. It is assumed that, in specifying this value, you know what you are doing: i.e., if you tell \LaTeX to use a \CellHeight of 1in, but then set \SubUnits{3}, you will get 20 subdivisions (with times) in a cell only 1in high. In other words, the text on the left-hand side of the schedule will be typeset as a horrible mess. The solution is simple: if you want a large number of subdivisions, simply set \CellHeight to a greater value.

\BeginOn Including \BeginOn{day} tells \LaTeX what day of the week to start the schedule on. The possible values are ‘Sunday’, ‘Monday’, ‘Tuesday’, ‘Wednesday’, ‘Thursday’, ‘Friday’, or ‘Saturday’. My apologies for non-English speaking users of \LaTeX. If there is a demand for it, I will fix this in future releases.

\TextSize With the \TextSize{font-size} command, the user tells \LaTeX what size font to use when typesetting the text inside the boxes. This command ought to be one of the standard \LaTeX font-size commands, e.g., \tiny, \scriptsize, etc. Using two large of a font will almost always result in bad line breaks inside the boxes, though, due to the narrow width of a cell.

\FiveDay Tells \LaTeX to typeset a five-day schedule.

\SevenDay Tells \LaTeX to typeset a seven-day schedule.

\NewAppointment By using the \NewAppointment command, the user can customize the appearance of the schedule by changing the color of the text or the background color. The syntax is \NewAppointment{appointment-name}{background-color}{text-color}.

4 The Macros

1 \langle*header\rangle
2 \ProvidesFile{schedule.dtx}
3 \NeedsTeXFormat{LaTeX2e}
4 \ProvidesPackage{schedule}
5 \RequirePackage{calc}
\RequirePackage{color}
\definecolor{dark}{gray}{.75}
\% \% CONSTANTS FOR THE WEEK 
\% \% \def\@sunday{Su} \def\@Sunday{Sunday} \def\@monday{M} \def\@Monday{Monday} \def\@tuesday{T} \def\@Tuesday{Tuesday} \def\@wednesday{W} \def\@Wednesday{Wednesday} \def\@thursday{Th} \def\@Thursday{Thursday} \def\@friday{F} \def\@Friday{Friday} \def\@saturday{Sa} \def\@Saturday{Saturday} \% \% COUNTERS, LENGTHS, ETC. \% \% \newlength{\cell@height} \setlength{\cell@height}{1in} \newlength{\cell@width} \setlength{\cell@width}{1in} \newlength{\box@depth} \newcounter{sch@col@width} \setcounter{sch@col@width}{60} \newlength{\box@width} \setlength{\box@width}{1in*(\value{sch@col@width}/60)} \newlength{\col@width} \setlength{\col@width}{1in*(\value{sch@col@width}/60)} \newlength{\sch@depth} \setlength{\sch@depth}{9in} \newlength{\fill@length} \newlength{\@temp@length} \newlength{\@@temp@length} \newlength{\line@thickness} % The thickness of the lines in the drawing \setlength{\line@thickness}{.4pt} \newlength{\adjusted@cell@width} \newlength{\adjusted@cell@height} \newcounter{picture@units@wide} \newcounter{xcoords} \newcounter{ycoords} \newcounter{timea} \newcounter{timeb} \newcounter{grid@width} \newcounter{grid@height} \newcounter{number@of@cells} % The number of VERTICAL cells \newcounter{number@of@subcells} \newcounter{number@of@days} % The number of days in the grid
\begin{verbatim}
\newcounter{dp@vlines} \% The number of vertical lines actually needed is
\newcounter{dp@hlines} \% The number of horizontal lines actually needed is
\newcounter{dp@hcell@lines} \% The number of horizontal lines that are
\begin{comment}
\% either (1) associated with an hour, or
\% (2) on the top or bottom of the grid.
\end{comment}
\newcounter{pu@cell@width}
\newcounter{pu@cell@height}
\setcounter{pu@cell@height}{60}
\newcounter{pu@grid@top}
\newcounter{pu@grid@width}
\newcounter{pu@subticks}
\newcounter{start@time}
\newcounter{end@time}
\newcounter{x@coord} \% Temporary x-coordinate
\newcounter{y@coord} \% Temporary y-coordinate
\newcounter{@tempc}
\newcounter{@tempd}
\newcounter{label@sep} \% distance from label to grid
\setcounter{label@sep}{5} \% initialized to 5 picture units
\newcounter{x@Sunday}
\newcounter{x@Monday}
\newcounter{x@Tuesday}
\newcounter{x@Wednesday}
\newcounter{x@Thursday}
\newcounter{x@Friday}
\newcounter{x@Saturday}
\newsavebox{\temp@box}
\newif\ifweekends
\newcount\@i
\newcount\@j
\def\TimeRange#1\{\compute@number@of@cells \#1\end@compute\}
\def\compute@number@of@cells#1:#2-#3:#4\end@compute{\%
\setcounter{number@of@cells}{#3-#1}\%
\setcounter{start@time}{#1}\%
\setcounter{end@time}{#3}}
\def\TextSize#1\{\def\appt@textsize{#1}\}
\TextSize{\scriptsize}
\def\IncludeWeekends\{\weekendstrue\}
\def\NoWeekends\{\weekendsfalse\}
\def\SevenDay\{\weekendstrue\}
\def\FiveDay\{\weekendsfalse\}
\def\CellHeight#1\{\setlength{\cell@height}{#1}\%
\setlength{\unitlength}{\cell@height*\ratio{1pt}{60pt}}\%
\def\CellWidth#1\{\setlength{\cell@width}{\ratio{1pt}{60pt}}\%
\setcounter{pu@cell@width}{1*\ratio{\cell@width}{\unitlength}}\%
\end{verbatim}
\@sfor \@i := 0 \upto \value{number@of@cells} \step 1 \do%
{\setcounter{x@coord}{0}% Set the x-coord right
\setcounter{y@coord}{\value{grid@height}-60*\@i}% adjust for the right hour cell
\ifnum\value{@tempc}>12%
\setcounter{@tempd}{\value{@tempc}-12}%
\put(\value{x@coord},\value{y@coord}){\makebox(0,0)[r]{\the@tempd:00 pm \ }}%
\else\put(\value{x@coord},\value{y@coord}){\makebox(0,0)[r]{\the@tempc:00 am \ }}%
\fi\relax%
\@sfor \@j := \value{pu@subticks} \upto 59 \step \value{pu@subticks} \do%
{\ifnum\@i=\value{number@of@cells}% Test to see if this should be the last label
\relax%
\else%
\ifnum\@j=60%
\relax%
\else%
\ifnum\@j<10%
\def\the@minutes{0\the\@j}%
\else\def\the@minutes{\the\@j}%
\fi%
\setcounter{y@coord}{\value{y@coord}-\@j}%
\ifnum\value{@tempc}>12%
\setcounter{@tempd}{\value{@tempc}-12}%
\put(\value{x@coord},\value{y@coord}){\makebox(0,0)[r]{\tiny\the@tempd:\the@minutes}}%
\else\put(\value{x@coord},\value{y@coord}){\makebox(0,0)[r]{\tiny\the@tempc:\the@minutes}}%
\fi%
\fi%
\fi%
\setcounter{y@coord}{\value{y@coord}+\@j}}%
\addtocounter{@tempc}{1}}%
\def\do@days#1#2#3#4#5#6#7{%
\setcounter{x@coord}{1*\ratio{\value{pu@cell@width} pt}{2 pt}}%
\setcounter{y@coord}{\value{grid@height}+\value{label@sep}}%
\put(\value{x@coord},\value{y@coord}){\makebox(0,0)[b]{\large #1}}%
\setcounter{x@coord}{\value{x@coord}+\value{pu@cell@width}}%
\put(\value{x@coord},\value{y@coord}){\makebox(0,0)[b]{\large #2}}%
\setcounter{x@coord}{\value{x@coord}+\value{pu@cell@width}}%
\put(\value{x@coord},\value{y@coord}){\makebox(0,0)[b]{\large #3}}%
\setcounter{x@coord}{\value{x@coord}+\value{pu@cell@width}}%
\put(\value{x@coord},\value{y@coord}){\makebox(0,0)[b]{\large #4}}%
\setcounter{x@coord}{\value{x@coord}+\value{pu@cell@width}}%
\put(\value{x@coord},\value{y@coord}){\makebox(0,0)[b]{\large #5}}%
\setcounter{x@coord}{\value{x@coord}+\value{pu@cell@width}}%
\addtocounter{@tempc}{1}}%
\ifweekends
\setcounter{x@coord}{1*\ratio{\value{pu@cell@width} pt}{2 pt}}%
\setcounter{y@coord}{\value{grid@height}+\value{label@sep}}%
\put(\value{x@coord},\value{y@coord}){\makebox(0,0)[b]{\large #6}}%
\setcounter{x@coord}{\value{x@coord}+\value{pu@cell@width}}%
\put(\value{x@coord},\value{y@coord}){\makebox(0,0)[b]{\large #7}}\fi%
\def\set@x@coords@for@days{%
\ifx\start@day\@Sunday%
\@i=0\relax%
\@for \@temp := {Sunday} {Monday} {Tuesday} {Wednesday} {Thursday} {Friday} {Saturday} \do%
{\setcounter[x@0[@temp]{\@i+\value{pu@cell@width}}%
\def\skipday@i{F}
\def\skipday@ii{Sa}\fi
\ifx\start@day\@Monday
\@i=0\relax%
\@tfor \@temp := {Monday} {Tuesday} {Wednesday} {Thursday} {Friday} {Saturday} {Sunday} \do
{\setcounter{x@\@temp}{\@i*\value{pu@cell@width}}%
\advance\@i by 1}
\def\skipday@i{Sa}
\def\skipday@ii{Su}\fi
\ifx\start@day\@Tuesday
\@i=0\relax%
\@tfor \@temp := {Tuesday} {Wednesday} {Thursday} {Friday} {Saturday} {Sunday} {Monday} \do
{\setcounter{x@\@temp}{\@i*\value{pu@cell@width}}%
\advance\@i by 1}
\def\skipday@i{Su}
\def\skipday@ii{T}\fi
\ifx\start@day\@Wednesday
\@i=0\relax%
\@tfor \@temp := {Wednesday} {Thursday} {Friday} {Saturday} {Sunday} {Monday} {Tuesday} \do
{\setcounter{x@\@temp}{\@i*\value{pu@cell@width}}%
\advance\@i by 1}
\def\skipday@i{T}
\def\skipday@ii{W}\fi
\ifx\start@day\@Thursday
\@i=0\relax%
\@tfor \@temp := {Thursday} {Friday} {Saturday} {Sunday} {Monday} {Tuesday} {Wednesday} \do
{\setcounter{x@\@temp}{\@i*\value{pu@cell@width}}%
\advance\@i by 1}
\def\skipday@i{W}
\def\skipday@ii{Th}\fi
\ifx\start@day\@Friday
\@i=0\relax%
\@tfor \@temp := {Friday} {Saturday} {Sunday} {Monday} {Tuesday} {Wednesday} {Thursday} \do
{\setcounter{x@\@temp}{\@i*\value{pu@cell@width}}%
\advance\@i by 1}
\def\skipday@i{W}
\def\skipday@ii{F}\fi
\}

% Commands to insert info about an appointment
% ------------------------------------------------------------------------
% set@start@time
% set@end@time
% set@boxdepth
% inrange
\newif\ifset@start@time
\newif\ifset@end@time
\newif\ifset@boxdepth
\newif\ininrange
\def\NewAppointment#1#2#3{% #1 = name, #2 = background color, #3 = textcolor
\expandafter\def\csname #1\endcsname{##1}{##2}{##3}{##4}{% #1 = name, #2 = background color, #3 = textcolor
\setboxdepthtrue% assume we want to calculate the box depth
\inrangetrue% assume the appt is in range
\set@start@timetrue% assume we want to calculate the start time
\set@end@timetrue% assume we want to calculate the end time
\@includetrue% assume we will include it
\edef\appt@name{#1}% save the appt name
\edef\appt@color{#2}% save the background color
\edef\appt@textcolor{#3}% save the save color
\expandafter\def\csname #1@name\endcsname{##1}% save the name
\expandafter\def\csname #1@location\endcsname{##2}% save the loc.
\expandafter\def\csname #1@days\endcsname{##3}% save the days
\expandafter\def\csname #1@time\endcsname{##4}% save the time
\place@appt@box##3,\stop}}

\NewAppointment{class}{dark}{black}

\def\place@appt@box#1{%
\ifx#1\stop \let\@next=\@gobble%\else \let\@next=\set@x@coords\fi\@next#1}

\def\set@x@coords#1,{
\def\the@day{#1}\
\ifx\the@day\@sunday\setcounter{xcoords}{\value{x@Sunday}}%\else\ifx\the@day\@monday\setcounter{xcoords}{\value{x@Monday}}%\else\ifx\the@day\@tuesday\setcounter{xcoords}{\value{x@Tuesday}}%\else\ifx\the@day\@wednesday\setcounter{xcoords}{\value{x@Wednesday}}%\else\ifx\the@day\@thursday\setcounter{xcoords}{\value{x@Thursday}}%\else\ifx\the@day\@friday\setcounter{xcoords}{\value{x@Friday}}%\else\fi\fi\fi\fi\fi\fi%
\edef\@@temp{\csname \appt@name@time\endcsname}%
\expandafter\set@y@coords\@@temp\stop}

\def\set@y@coords#1:#2-#3:#4\stop{%
\def\@starthour{#1}%
\def\@startminutes{#2}%
\def\@endhour{#3}%
\def\@endminutes{#4}%
\ifnum\@starthour<\value{start@time} \setcounter{ycoords}{\value{grid@height}}%
\edef\@starthour{\value{start@time}}%
\def\@startminutes{0}%
\set@start@timefalse%
\fi%
\ifnum\@endhour<\value{end@time} \relax%
\else \edef\@endhour{\value{end@time}}%
\def\@endminutes{0}%
\set@end@timefalse%
\fi%
\ifnum\@start@time<1\value{start@time} \setcounter{ycoords}{\value{grid@height}-(60*(\@starthour-\value{start@time})+\@startminutes)}%
\edef\@starthour{\value{start@time}}%
\def\@startminutes{0}%
\set@start@timefalse%
\fi%
\ifnum\@end@time<1\value{end@time} \relax%
\else \edef\@endhour{\value{end@time}}%
\def\@endminutes{0}%
\set@end@timefalse%
\fi%
\ifset@start@time%
\setcounter{ycoords}{\value{grid@height}-(60*(\@start@time)-\@endhours(\@start@time))%+\@endminutes)))}}%
\edef\@start@timefalse{false}%
\fi%

\ifset@end@time%
\setcounter{ycoords}{\value{grid@height}-(60*(\@end@time)-\@start@time))%+\@startminutes)))}}%
\edef\@end@timefalse{false}%
\fi%
\setcounter{ycoords@bot}{\value{grid@height}-(60*(#3-\value{start@time})+#4)}\fi
\setlength{\box@depth}{\@endhour@cell@height + (\cell@height*\ratio{\@endminutes pt}{60pt}) %
- \@starthour@cell@height - (\cell@height*\ratio{\@startminutes pt}{60pt})}\fi
\ifnum#1<\value{end@time} \relax\else \inrangefalse \fi
\draw@appt@box\place@appt@box}

\newif\if@include
\def\draw@appt@box{%
  \ifweekends \relax if we use 7-days, this won't change
  \else \ifx \the@day\skipday@i \@includefalse \fi % first condition for change
  \ifx \the@day\skipday@ii \@includefalse \fi % second condition for change
  \ifinrange \relax else \@includefalse \fi %
  \if@include %
    \put(\value{xcoords},\value{ycoords}){\colorbox{\appt@color}{\parbox[t]{\cell@width}{
      \vspace{\box@depth}}}}
    \thinlines
    \put(\value{xcoords},\value{ycoords}){\line(1,0){\value{pu@cell@width}}}
    \put(\value{xcoords},\value{ycoords@bot}){\line(1,0){\value{pu@cell@width}}}
    \put(\value{xcoords},\value{ycoords}){\parbox[t]{\cell@width-8pt}{mbox[]\@appt@textsize %
      \ifdim\box@depth>\baselineskip
        \textcolor{\appt@textcolor}{\csname \appt@name@name\endcsname} \parbox[t]{\cell@width}{\mbox[]\@appt@textsize %
          \ifdim\box@depth>2\baselineskip
            \textcolor{\appt@textcolor}{\csname \appt@name@location\endcsname} \fi\fi}}}}
  \fi
\fi
\def\convert@class@time#1:#2-#3:#4\end@time{%
  \count1=#1\relax%
  \count3=#3\relax%
  \ifnum#1>12 \advance\count1 by -12\fi\relax%
  \ifnum#3>12 \advance\count3 by -12\fi\relax%
  \ifnum#1<12 \ifnum#3<12 \mbox[the@count1:#2am--the@count3:#4am]\relax%
    \else \mbox[the@count1:#2pm--the@count3:#4pm]\fi\relax%
  \else \mbox[the@count1:#2pm--the@count3:#4pm]\fi\relax%
}\def\compute@box@depth#1:#2-#3:#4\end@bx{%
  \setlength{\box@depth}{\cell@height + (\cell@height*\ratio{\#4 pt}{60pt}) %}
  \setcounter{ycoords@bot}{\value{grid@height}-(60*(#3-\value{start@time})+#4)}\fi
}\newcounter{ycoords@bot}
\newcounter{x@tempa}
\newcounter{x@tempb}
\newcounter{y@tempa}
\newcounter{y@tempb}
\newcounter{temp@cnt@a}
\newlength{\title@height}
\newlength{\label@height}
\settoheight{\label@height}{Wednesday}
\newcounter{pu0label@width}
\newcounter{pu0label@width}
\newlength{\center@hack}
\newenvironment{schedule}{\[1][:]{\bigskip
\calculate@grid@dimensions%
\setcounter{pu@grid@width}{\value{pu@cell@width}*\value{number@of@days}}%
\settowidth{\@temp@length}{\normalsize \textbf{12:00 pm}}%
\setcounter{pu@grid@top}{\value{grid@height}+(1\ratio{\label@height}{\unitlength}) + (1\ratio{.25in}{\unitlength})}%
\if#1:\relax \else%
\settoheight{\title@height}{\large #1}%
\addtocounter{pu@grid@top}{1\ratio{\title@height}{\unitlength}}%
\fi%
\setlength{\center@hack}{(.5\linewidth-.5\unitlength*\value{pu@grid@width}+.5\unitlength*\value{pu@label@width})}%
\noindent\hspace*{\center@hack}\
\begin{picture}(\value{pu@grid@width},\value{pu@grid@top})%
\draw@grid
\add@labels
\if#1:\relax \else%
\setcounter{ycoords}{\value{grid@height}+(1\ratio{\label@height}{\unitlength}) + (1\ratio{.25in}{\unitlength})}
\setcounter{xcoords}{1\ratio{\value{pu@grid@width} pt}{2 pt}}
\put(\value{xcoords},\value{ycoords}){\makebox(0,0)[b]{\large #1}}%
\fi
\add@times
\set@x@coords@for@days}
\end{picture}\bigskip}
\setlength{\fboxsep}{0in}
%\pagestyle{empty}
\end{package}