Pensieve header: This is the main notebook for the nb2tex project, containing both the documentation and the implementation.

Experimentation

```
In[•]:= SetDirectory["C:\\drorbn\\AcademicPensieve\\Projects\\nb2tex"]
```

```
Out[•]= C:\drorbn\AcademicPensieve\Projects\nb2tex
```

```
In[•]:= nb = NotebookGet[NotebookOpen@FileNameJoin[{Directory[], "nb2tex.nb"}]];
        nb[[1, 1]]
```

```
Out[•]= Cell[
         Pensieve header: This is the main notebook for the nb2tex project, containing both the
           documentation and the implementation., Text, CellChangeTimes →
          {{3.79032 × 10^9, 3.79032 × 10^9}, {3.79035 × 10^9, 3.79035 × 10^9}, {3.79035 × 10^9, 3.79035 × 10^9}}]
```

```
In[•]:= Cases[nb, c_Cell /; FreeQ[c, _Cell, {1, ∞}], ∞][[11]]
```

```
Out[•]= Cell[
         BoxData[FormBox[StyleBox[RowBox[{L, StyleBox[AdjustmentBox[A, BoxBaselineShift → -0.4,
                 BoxMargins → {{-0.5, -0.3}, {0, 0}}], FontSize → Smaller], T,
               AdjustmentBox[E, BoxBaselineShift → 0.5, BoxMargins → {{-0.3, 0}, {0, 0}}], X}],
            SingleLetterItalics → False], TraditionalForm]]]
```

```
In[•]:= Table[
         type = cell[[2]];
         tag = CellTags /. Cases[cell, _Rule] /. CellTags → "";
         {type, tag},
         {cell, Cases[nb, c_Cell /; Length[c] ≥ 2 ∧ FreeQ[c, _Cell, {1, ∞}], ∞]}
        ]
```

```
Out[•]= {{Text, }, {Subsection, }, {Input, }, {Output, }, {Input, }, {Output, }, {Input, },
         {Output, }, {Input, }, {Output, }, {Text, tex}, {Text, tex}, {Text, tex},
         {Subsection, pdf}, {Text, tex}, {Text, tex}, {Text, tex}, {Text, }, {Text, tex},
         {Input, pdf}, {Echo, pdf}, {Output, pdf}, {Input, pdf}, {Output, pdf}, {Text, tex},
         {Input, pdfgraph}, {Output, pdfgraph}, {Text, tex}, {Input, pdf}, {Text, tex},
         {Text, tex}, {Text, exec}, {Input, pdf}, {Output, pdf}, {Text, exec}, {Subsection, pdf},
         {Input, pdf}, {Subsection, pdf}, {Input, pdf}, {Message, pdf}, {Message, pdf},
         {Message, pdf}, {Message, pdf}, {Message, pdf}, {Message, pdf}, {Message, pdf},
         {Message, pdf}, {Message, pdf}, {Message, pdf}, {Output, pdf}, {Text, tex}}
```

In[•]:=
```
PDFWidth = 7.2;
PDFFolder = "Sample";
If[FileType[PDFFolder] === None, CreateDirectory[PDFFolder]];
PDFCounter = 0;
lines = Table[
   type = cell[[2]];
   tag = CellTags /. List @@ cell[[3 ;;]] /. CellTags → "";
   Which[
    type == "Text" ∧ tag == "tex", cell[[1]],
    StringMatchQ[tag, "pdf" ~~ ___], (
     pdfname = PDFFolder <> "/" <> ToString[++PDFCounter] <> ".pdf";
     Export[pdfname, Append[cell, PageWidth → 108 PDFWidth]];
     StringReplace[
      "\\noindent\\nbpdfXXXType{pdfname}",
      {"XXX" → StringDrop[tag, 3], "Type" → type, "pdfname" → pdfname}
     ]
    ),
    type == "Text" ∧ tag == "exec", ToExpression[cell[[1]]]; "",
    True, ""
   ],
   {cell, Cases[nb, c_Cell /; FreeQ[c, _Cell, {1, ∞}], ∞]}
  ];
StringJoin @@ Riffle[DeleteCases[lines, ""], "\n\n"]
```

Out[•]=
```
\documentclass[12pt,reqno]{amsart}
\usepackage{graphicx}
\usepackage[textwidth=6.5in,textheight=9in,headsep=0.15in,centering]{geometry}

\def\nbpdfInput#1{\vskip 1mm\noindent\includegraphics{#1}}
\def\nbpdfEcho#1{\vskip 1mm\noindent\includegraphics{#1}}
\def\nbpdfOutput#1{\vskip 1mm\noindent\includegraphics{#1}}
\def\nbpdfgraphInput#1{\vskip 1mm\noindent\includegraphics{#1}}
\def\nbpdfgraphOutput#1{\vskip 1mm\noindent\includegraphics{#1}}

\begin{document}

The nb2tex project aims to write a converter that
  takes Mathematica notebooks and converts them into latex files.

Text cells with tag ``tex'' becaome verbatim tex output. They may
  include anything texish --- like formulas $1+1=2$, or anything else.

Untagged cells are ignored; for example,
  the following one should not appear in the latex result:

Cells with tag ``pdf'' are converted into numbered pdf files in a pdf-subfolder
  (default name: same as the notebook's name; in this case, ``Sample''). The
  latex produced is \verb$\nbpdfType{Sample/nnn.pdf}$, where \verb$Type$ is
  the type of the current cell (\verb$Text$, \verb$Input$, \verb$Output$,
  \verb$Echo$, etc.), and \verb$nnn$ is the number of the current pdf file.
```

```
For example:

\noindent\nbpdfInput{Sample/1.pdf}

\noindent\nbpdfEcho{Sample/2.pdf}

\noindent\nbpdfOutput{Sample/3.pdf}

\noindent\nbpdfInput{Sample/4.pdf}

\noindent\nbpdfOutput{Sample/5.pdf}

If a tag is of the form ``pdfXXX'', the string XXX gets added to the
  \verb$\nbpdf$ command, so it becomes \verb$\nbpdfXXXType$. This is useful for
  graphics inclusions, for example, where a useful tag would be ``pdfgraph'':

\noindent\nbpdfgraphInput{Sample/6.pdf}

\noindent\nbpdfgraphOutput{Sample/7.pdf}

Invoking nb2tex (suffixes are automatically added and should not be included):

\noindent\nbpdfInput{Sample/8.pdf}

Valid options include:
\begin{itemize}
\item \verb$"PDFFolder" -> foldername$ (a string).
\item \verb$"PDFWidth" -> width$ (in inches).
\end{itemize}

Text cells with tag ``exec'' get executed using \verb$ToExpression$ at the time
  of their processing, with no output produced. This is useful for setting /
  re-setting options within the notebook itself. For example, a text cell with
  tag exec and content \verb"nb2tex$PDFWidth=10" will allow very wide outputs:

\noindent\nbpdfgraphInput{Sample/9.pdf}

\noindent\nbpdfgraphOutput{Sample/10.pdf}

\end{document}

\noindent\nbpdfInput{Sample/11.pdf}
```

LaTeX Prologue

tex

```
\documentclass[12pt,reqno]{amsart}
\usepackage{graphicx}
\usepackage[textwidth=6.5in,textheight=9in,headsep=0.15in,centering]{geometry}
```

tex

```
\def\nbpdfInput#1{\vskip 1mm\par\noindent\includegraphics{#1}}
\def\nbpdfEcho#1{\vskip 1mm\par\noindent\includegraphics{#1}}
```

```
\def\nbpdfOutput#1{\vskip 1mm\par\noindent\includegraphics{#1}}
\def\nbpdfSubsection#1{\vskip 1mm\par\noindent\includegraphics{#1}}
\def\nbpdfgraphInput#1{\vskip 1mm\par\noindent\includegraphics{#1}}
\def\nbpdfgraphOutput#1{\vskip 1mm\par\noindent\includegraphics[width=1.5in]{#1}}
```

tex

```
\begin{document}
```

pdf

Documentation

tex

The nb2tex project aims to write a converter that takes Mathematica notebooks and converts them into latex files.

tex

Text cells with tag ``tex'' becaome verbatim tex output. They may include anything texish --- like formulas $1+1=2$, or anything else.

tex

Untagged cells are ignored; for example, the following one should not appear in the latex result:

This cell must not appear in the latex output.

tex

Cells with tag ``pdf'' are converted into numbered pdf files in a pdf-subfolder (default name: same as the notebook's name; in this case, ``Sample''). The latex produced is \verb$\nbpdfType{Sample/nnn.pdf}$, where \verb$Type$ is the type of the current cell (\verb$Text$, \verb$Input$, \verb$Output$, \verb$Echo$, etc.), and \verb$nnn$ is the number of the current pdf file.

For example:

pdf

In[•]:=
```
binom = Echo[(a + b)^32] // Expand
```

pdf

» $(a+b)^{32}$

pdf

Out[•]=
$$a^{32}+32\,a^{31}\,b+496\,a^{30}\,b^2+4960\,a^{29}\,b^3+35\,960\,a^{28}\,b^4+201\,376\,a^{27}\,b^5+906\,192\,a^{26}\,b^6+3\,365\,856\,a^{25}\,b^7+10\,518\,300\,a^{24}\,b^8+28\,048\,800\,a^{23}\,b^9+64\,512\,240\,a^{22}\,b^{10}+129\,024\,480\,a^{21}\,b^{11}+225\,792\,840\,a^{20}\,b^{12}+347\,373\,600\,a^{19}\,b^{13}+471\,435\,600\,a^{18}\,b^{14}+565\,722\,720\,a^{17}\,b^{15}+601\,080\,390\,a^{16}\,b^{16}+565\,722\,720\,a^{15}\,b^{17}+471\,435\,600\,a^{14}\,b^{18}+347\,373\,600\,a^{13}\,b^{19}+225\,792\,840\,a^{12}\,b^{20}+129\,024\,480\,a^{11}\,b^{21}+64\,512\,240\,a^{10}\,b^{22}+28\,048\,800\,a^{9}\,b^{23}+10\,518\,300\,a^{8}\,b^{24}+3\,365\,856\,a^{7}\,b^{25}+906\,192\,a^{6}\,b^{26}+201\,376\,a^{5}\,b^{27}+35\,960\,a^{4}\,b^{28}+4960\,a^{3}\,b^{29}+496\,a^{2}\,b^{30}+32\,a\,b^{31}+b^{32}$$

pdf

```
In[•]:= Series[(1 + x)^-1, {x, 0, 128}]
```

pdf

```
Out[•]= 1 - x + x^2 - x^3 + x^4 - x^5 + x^6 - x^7 + x^8 - x^9 + x^10 - x^11 + x^12 - x^13 + x^14 - x^15 + x^16 - x^17 + x^18 - x^19 + x^20 - x^21 +
  x^22 - x^23 + x^24 - x^25 + x^26 - x^27 + x^28 - x^29 + x^30 - x^31 + x^32 - x^33 + x^34 - x^35 + x^36 - x^37 + x^38 - x^39 + x^40 -
  x^41 + x^42 - x^43 + x^44 - x^45 + x^46 - x^47 + x^48 - x^49 + x^50 - x^51 + x^52 - x^53 + x^54 - x^55 + x^56 - x^57 + x^58 - x^59 +
  x^60 - x^61 + x^62 - x^63 + x^64 - x^65 + x^66 - x^67 + x^68 - x^69 + x^70 - x^71 + x^72 - x^73 + x^74 - x^75 + x^76 - x^77 + x^78 -
  x^79 + x^80 - x^81 + x^82 - x^83 + x^84 - x^85 + x^86 - x^87 + x^88 - x^89 + x^90 - x^91 + x^92 - x^93 + x^94 - x^95 + x^96 - x^97 +
  x^98 - x^99 + x^100 - x^101 + x^102 - x^103 + x^104 - x^105 + x^106 - x^107 + x^108 - x^109 + x^110 - x^111 + x^112 - x^113 +
  x^114 - x^115 + x^116 - x^117 + x^118 - x^119 + x^120 - x^121 + x^122 - x^123 + x^124 - x^125 + x^126 - x^127 + x^128 + O[x]^129
```

tex

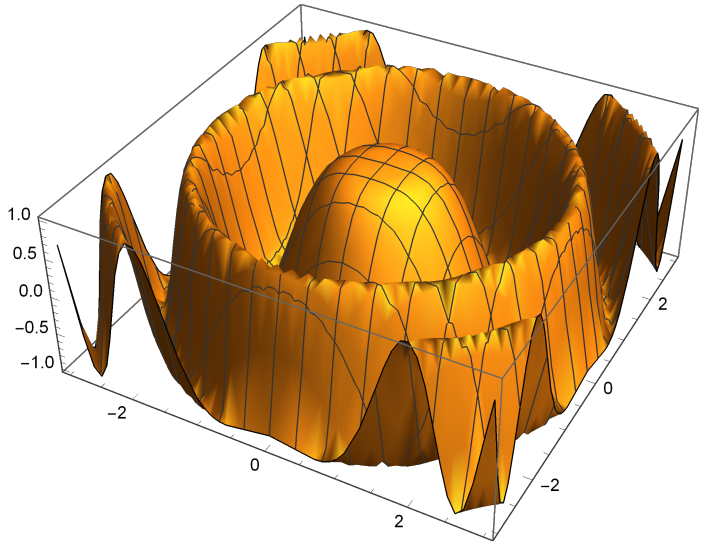
If a tag is of the form ``pdfXXX'', the string XXX gets added to the \verb$\nbpdf$ command, so it becomes \verb$\nbpdfXXXType$. This is useful for graphics inclusions, for example, where a useful tag would be ``pdfgraph'':

pdfgraph

```
In[•]:= plot = Plot3D[Cos[x^2 + y^2], {x, -3, 3}, {y, -3, 3}]
```

pdfgraph

Out[•]=



tex

Invoking nb2tex (suffixes are automatically added and should not be included):

pdf

```
nb2tex[nb_String, opts___Rule];
nb2tex[nb_String, tex_String, opts___Rule];
```

tex

Valid options include:
\begin{itemize}
\item \verb$"PDFFolder" -> foldername$ (a string).
\item \verb$"PDFWidth" -> width$ (in inches).
\end{itemize}

tex

Text cells with tag ``exec'' get executed using \verb$ToExpression$ at the time of their processing, with no output produced. This is useful for setting / re-setting options within the notebook itself. For

example, a text cell with tag exec and content \verb"nb2tex$PDFWidth=10" will allow very wide outputs:

exec

nb2tex$PDFWidth=10

pdf

In[ ]:=
```
binom
```

pdf

Out[ ]=
$$a^{32} + 32\, a^{31}\, b + 496\, a^{30}\, b^2 + 4960\, a^{29}\, b^3 + 35\,960\, a^{28}\, b^4 + 201\,376\, a^{27}\, b^5 + 906\,192\, a^{26}\, b^6 + 3\,365\,856\, a^{25}\, b^7 + 10\,518\,300\, a^{24}\, b^8 + 28\,048\,800\, a^{23}\, b^9 + 64\,512\,240\, a^{22}\, b^{10} + 129\,024\,480\, a^{21}\, b^{11} + 225\,792\,840\, a^{20}\, b^{12} + 347\,373\,600\, a^{19}\, b^{13} + 471\,435\,600\, a^{18}\, b^{14} + 565\,722\,720\, a^{17}\, b^{15} + 601\,080\,390\, a^{16}\, b^{16} + 565\,722\,720\, a^{15}\, b^{17} + 471\,435\,600\, a^{14}\, b^{18} + 347\,373\,600\, a^{13}\, b^{19} + 225\,792\,840\, a^{12}\, b^{20} + 129\,024\,480\, a^{11}\, b^{21} + 64\,512\,240\, a^{10}\, b^{22} + 28\,048\,800\, a^9\, b^{23} + 10\,518\,300\, a^8\, b^{24} + 3\,365\,856\, a^7\, b^{25} + 906\,192\, a^6\, b^{26} + 201\,376\, a^5\, b^{27} + 35\,960\, a^4\, b^{28} + 4960\, a^3\, b^{29} + 496\, a^2\, b^{30} + 32\, a\, b^{31} + b^{32}$$

exec

nb2tex$PDFWidth=6.5

pdf

Implementation

pdf

In[ ]:=
```
SetOptions[$FrontEndSession, PrintingStyleEnvironment → "Working"];
nb2tex[nb_String, opts___Rule] := nb2tex[nb, nb, opts];
```

pdf

In[•]:=
```
nb2tex[nb_String, tex_String, opts___Rule] := Module[
  {notebook, PDFCounter = 0, lines, type, tag, pdfname, cell, c,
   PDFFolder = PDFFolder /. {opts} /. PDFFolder → nb
  },
  nb2tex$PDFWidth = PDFWidth /. {opts} /. PDFWidth → 6.5;
  notebook = NotebookGet[NotebookOpen@FileNameJoin[{Directory[], nb <> ".nb"}]];
  If[FileType[PDFFolder] === None, CreateDirectory[PDFFolder]];
  DeleteFile /@ FileNames["*.pdf", PDFFolder];
  lines = Table[
    type = cell[[2]];
    tag = CellTags /. Cases[cell, _Rule] /. CellTags → "";
    Which[
     type == "Text" ∧ tag == "tex", StringReplace[cell[[1]], {"’" → "'", "”" → "\""}],
     StringMatchQ[tag, "pdf" ~~ ___], (
      pdfname = PDFFolder <> "/" <> ToString[++PDFCounter] <> ".pdf";
      Export[pdfname,
       Join[cell, Cell[FontSize → 11, PageWidth → 84 nb2tex$PDFWidth]]];
      StringReplace[
       "\\noindent\\nbpdfXXXType{pdfname}",
       {"XXX" → StringDrop[tag, 3], "Type" → type, "pdfname" → pdfname}
      ]
     ),
     type == "Text" ∧ tag == "exec", ToExpression[cell[[1]]]; "",
     True, ""
    ],
    {cell, Cases[notebook, c_Cell /; Length[c] ≥ 2 ∧ FreeQ[c, _Cell, {1, ∞}], ∞]}
   ];
  lines = StringJoin @@ Riffle[DeleteCases[lines, ""], "\n\n"];
  WriteString[tex <> ".tex", lines]; Close[tex <> ".tex"] ]
```

pdf

Run

pdf

In[•]:=
```
SetDirectory["C:\\drorbn\\AcademicPensieve\\Projects\\nb2tex"];
nb2tex["nb2tex", PDFFolder → "Snips"]
```

pdf

Out[•]= nb2tex.tex

LaTeX Epilogue

tex

```
\end{document}
```